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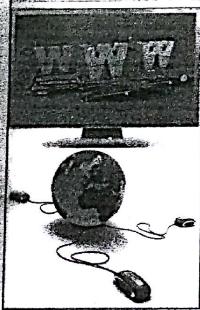
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PART-A



INTRODUCTION TO E-COMMERCE

- Introduction to E-Commerce
- Internet and E-Commerce
- Electronic Payment Methods
- Electronic Commerce Providers
- Digital Payment Systems and Digital Currencies
- Electronic Data Interchange

Introduction to E-Commerce

CHAPTER 1



INSIDE THIS CHAPTER

- 1.1. History of Electronic Commerce
- 1.2. Electronic Commerce Definition
- 1.3. The Driving Forces for E-Commerce
- 1.4. Component of E-Commerce
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- 1.6. Disadvantages of E-Commerce
- 1.7. Opportunities of E-Commerce
- 1.8. Different Types of E-Commerce
- 1.9. Electronic Commerce Framework
- 1.10. Trends In E-Commerce

1.1. HISTORY OF ELECTRONIC COMMERCE

We know that every invention has a perfect motive behind it, so as the E-Commerce. The need for electronic commerce stems from the demand within business and government to make better use of computing and to better apply computer technology to improve customer interaction, business processes and information exchange both within an enterprise and across enterprises.

Let us make some observation about the progress of E-commerce as follows :

During the 1970s, the introduction of electronic fund transfer (EFT) between banks over secure private networks changed financial markets. Electronic fund transfer optimizes electronic payment with electronically provided remittance information. Today there are many EFT variants, including the debit card whose use is becoming important at point of sales (POS) in grocery stores and retail outlets and direct deposits to employee bank accounts. Each day, every \$4 trillion change hands via EFT over the computer networks linking banks, automated clearing houses and companies. The U.S. Treasury department estimates that 55 percent of all payments by the federal government in 1995 were made via EFT.

During the late 1970s and early 1980s, electronic commerce becomes widespread with companies in the form of electronic messaging technologies: electronic data interchange (EDI) and electronic mail. Electronic messaging technologies streamline business processes by reducing paperwork and increasing automation. Business exchanging traditionally conducted with paper sa-

In the late 1980s and early 1990s electronic messaging technologies become an integral part of "groupware" or **collaborative computing systems** (also called groupware). A prominent example of such systems is lotus notes. Groupware focused primarily on talking existing nonelectronic methods and grafting them onto an electronic platform for improved business process efficiency. Although hyped as the "killer app" in the early 1990s groupware efforts resulting in small gains in productivity and efficiency.

In the mid 1980s, a completely different type of electronic commerce technology spread among consumers in the form of online services that provided a new form of social interaction (such as chat rooms and inter-relay chat [IRC]) and knowledge sharing (such as new groups and file transfer programs). Social interaction created a sense of virtual community among the cyberspace inhabitants and helped give rise to the concept of a "global village".

In the 1990s, the advent of the worldwide web on the internet represents a turning point in electronic commerce by providing an easy-to-use technology solution to the problem of information publishing. The web made electronic commerce a cheaper way of doing business (economies of scale) and enabled more diverse business activities (economies of scope).

1.2. ELECTRONIC COMMERCE DEFINITION

[MDU 2006, 2008, 2009]



IBM's Definition of E-Commerce is :

"The transformation of key business processes through the use of internet technologies"



According to R. Kalakota (1999) :

"E-Commerce is buying and selling activities over digital media"

E-Business – encompasses e-commerce and "includes the front and back-office applications that form the engine for modern business. Its not just about e-commerce transactions, it's about redefining old business models with the aid of technology to maximise customer value"

We can define electronic commerce in following three prospects :

1. From a **communication perspective**, electronic commerce is the delivery of information, products/services, or payment via telephone lines, computer networks or any other means.
2. From a **business process perspective**, electronic commerce is the application of technology toward the automation of business transactions and workflows.
3. From a **service perspective**, electronic commerce is the tool that addresses the desire of firms, consumers and management to cut service costs while improving the quality of goods and increasing the speed of service delivery.

Broadly speaking, electronic commerce emphasizes the generation and exploitation of new business opportunities and to use popular phrases, "generate business value" or "do more with less".

These improvements may result in more effective performance (better quality, greater customer satisfaction and better corporate decision making), greater economic efficiency (lower costs), and more rapid exchange (high speed, accelerated or real-time interaction). More specifically, electronic commerce enables the execution of information online transactions between two or more parties using inter-connected networks. E-commerce networks can be a combination of telephone system, cable TV, leased lines and wireless.

1.3. THE DRIVING FORCES FOR E-COMMERCE

Today's business environment is influenced greatly by market, economical, social and technological factors creating a lot of competition. Also these factors are unpredictable in that they may change unexpectedly at any time. Such changes in the business world have been defined as business pressure. In order to succeed in this dynamic world companies must take action such as lowering costs and improving quality etc. At the same time they need to be innovative in customizing their products, creating new products and providing good customer service.

The various environmental business pressures on companies today can be grouped into three categories : Market, social and technological.

These are discussed below :

1.3.1. Market and Economic Pressure

Now a days business is a pressure game. One must be ready to face utter competition in market. Now almost no company can sustain on the basis of monopoly since every product either manufactured or marketed by different companies. Let us see some parameters, which works as driving force for market :

1. **Strong Competition :** Now competition is the part of any business and companies are implementing new techniques every day to beat their competitors. E-Commerce is one of the tools of recent days, which is adopted by the companies.
2. **Global Economy :** In present scenario world becomes a global village and there are standard norms in market for business, so every country must follow these norms. There is huge gap between the growth rate of developed and developing nations, so more and more developed nations are investing in every part of world. E-Commerce is the need of such a scenario.
3. **Extremely Low Labour Cost in Some Countries :** Now this the common feature of business that companies are having manufacturing units in one part of the world and the same product is marketed in other part of the world. Definitely some medium is required to maintain it and e-commerce is providing such medium.
4. **Frequent Changes in Market Demands :** As we discussed above this the age of technology. So any change which takes place in one part of the world, rapidly reflects every where and e-commerce is the tool which is necessary to sustain in present fast changing world.
5. **Increasing Expectations of Consumers :** The expectations of consumers about quality and services are very high, so it works like driving force for e-commerce.
6. **Awareness Among Consumers :** Now consumers are well aware. Internet, print media and electronic media keep update the consumers about new products and their rates.

5. Banks

Nowadays banks are rapidly going for e-commerce to make their working efficient. ATM's or Automated Teller Machines or 24-hour Tellers are electronic terminals that let our bank almost any time to withdraw cash, make deposits, or transfer funds between accounts. We generally insert an ATM card and enter your PIN. Some financial institutions and ATM owners charge a fee, particularly to consumers who don't have accounts with them or on transactions at remote locations. Generally, ATMs must tell us they charge a fee and its amount on or at the terminal screen before we complete the transaction. Check the rules of your institution and ATMs you use to find out when or whether a fee is charged.

6. Financial Institutions

Other non-banking institutions are also adopting e-commerce, for example now we can submit LIC premium online from anywhere.

1.4.2. Process of E-Commerce

The successful implementation of the e-commerce depends on perfect processes of the e-commerce. Some very important part of the process are as follows :

- (i) Marketing
- (ii) Sales
- (iii) Payment
- (iv) Support and Service.

The complete business is the game of the marketing now a days, so **marketing process** should be compatible to e-commerce. Now more and more marketing becomes on-line and web base.

Sales are another important department of business activities so it must support e-commerce.

Now a days mode of the **payment** becomes electronic. Mostly transaction take place on line through Cyber cash. Merchants are tie-up with banks for online payment, credit and debit card payments. After sale **service and support** is the backbone of any business so more and more companies using the e-commerce to provide this service through telephone, mail and internet.

1.5. ADVANTAGES OF E-COMMERCE

There are various advantages of e-commerce that has made it a popular Business tool. These are :

- (i) **Economy** : E-commerce is highly economical. In e-commerce there is no rental of physical store space. Insurance or infrastructure investment. All we need is an idea, a unique product and a well-designed Web storefront to reach your cyber-customers, plus a partner to do fulfillment.
- (ii) **Lower Cost** : Doing e-business on the Internet is extremely cost effective; it reduces logistical problems and puts a small business on a par with giants like Amazon.com, general Motors or Bank of America. In a commercial bank.
- (iii) **Better Customer Services** : E-commerce emphasizes better and quicker customer service. Web-based customer service makes consumers happier. Instead of calling our company on the phone, holding for 10 minutes, then getting to a clerk who tapes into your account, the web merchant gives customers direct access to their personal accounts over the web. It saves time and money. It is a WIN-WIN proposition, for companies that do business with other companies, adding customer service to the web is a competitive advantage. The overnight

package delivery service, where tracking numbers allow customer to check the whereabouts of a package online, is one good example.

- (iv) **Greater Profit Margin** : E-commerce means greater profit margins. For example, the cost of processing a conventional airline ticket is Rs. 400. According to one travel agency, processing the same ticket (called e-ticket) over the web costs Rs. 50 only. Along with higher margins, business can gain more control and flexibility and are able to save time when manual transactions are done electronically.
- (v) **Knowledge Markets** : E-commerce helps create knowledge markets. Small groups inside big firms can be funded with seed money to develop new ideas. For example, Daimler Chrysler has created small teams to look for new trends and products. A Silicon valley team is doing consumer research on electric cars and advising car designs.
- (vi) **Swapping Goods and Services** : Swapping is trading something we have for something we want more. Ram's a networking consultant, offers his technical services through a company. People pay currency into Ram's account in exchange for his services instead of accepting the cash.
- (vii) **Information, Sharing, Convenience and Control** : Electronic market place improve information sharing between merchants and customers and promote quick, just-in-time deliveries. Conveniences for the customer is a major driver for changes in various industries. Customers and merchants save money; are online 24 hours a day; 7 days a week; experience no traffic jams, no crowds and do not have to carry heavy shopping bags.
- (viii) **Control** is another major driving factor. For example, instead of banks controlling the relationships with the customer, customers today can have more control of their banking needs via Internet Web sites. Banks like Bank of America and ICICI now give customer access to their accounts via the Web.
- (ix) **Quick Comparison Shopping** : E-commerce helps customers to comparison between various options. Customers can visit for various option online, without moving from the places. They can compare rate and qualities through web only.
- (x) **Teamwork** : E-commerce helps people work together. E-mail is one example of how people collaborate to exchange information and work on solutions. It has transformed the way organizations interact with suppliers, vendors, business partners and customers. More interaction means better overall results.
- (xi) **Productivity Gains** : E-commerce means productivity gains. Weaving the Web throughout an organization means improved productivity. Take the example of IBM, which incorporates the web into every corner of the firm-products, marketing and practices. The total cost savings in 1999 alone was close to \$1 billion.
- (xii) **Customization** : Digital products are highly customizable. They are easy to recognize, revise or edit. With information about consumer tastes and preferences, products can be differentiated (customized) and matched to individual needs.
- (xiii) **Ensure Secrecy** : EC devices invariably have in built security measures. For example password, encoding, cryptography, cipher etc. are some of the mechanism/measures, which provide security and prevent unauthorized access and use of data, information and transactions.

Strength of E-Commerce Over Traditional Business can be more clear by the Comparison of Both. Online purchasing and selling through e-business (wholesale and retail) Offers opportunities and advantages to the companies of all sizes engaged in different portfolios. Some of these advantages are enumerated below :

1. Sampling of products such as books, recorded lectures, and music cassettes is possible on Web for business promotion.
2. Business houses selling their goods through catalogues, can reach additional global customers at lower cost.
3. For items subjected to frequent changes e.g. shares and bonds etc., the changes in rates/ quotations can be known instantly.
4. Customer's knowledge can be enhanced on topics such as news about local event, market research, industrial report, software etc., which can be distributed easily over the Internet.
5. A closer relationship can be developed amongst business sellers whose customer base is in the Internet.
6. For wholesalers, distributors, retailers etc, it is convenient and efficient to buy from Web sites.
7. High quality, specialized products can be easily sold on Internet by the retailers.
8. Organizations can conduct interviews through Internet to select suitable candidate(s) for their requirements.
9. Group discussions can be conducted for corporate offices, industrial houses, business firms, universities, etc.

1.6. DISADVANTAGES OF E-COMMERCE

There are some problems and drawbacks of e-commerce and these are as follows :

- (i) **High Risk of Internet Start Up Organizations :** Many stories unfolded in 1999, about successful executives in established firms leaving for Internet start-ups, only to find out that "get rich" dream with a dot.com was just that a dream. However, many dot.com organizations bubble busted in 2000 and onward due to various reasons like lack of good revenue model, everything is not possible through dot.com. problem related to customer satisfaction etc.
- (ii) **Lack of a Blueprint for Handling E-Commerce :** There is a continuing shortage of e-literate people in the workplace. In a survey published in *Computer world*, nearly nine out of ten respondents said only of a few of their key managers have e-commerce skills. Internet experience, and foresight. Sixty-six percent also said that they are having a tough time attracting people wanting to take advantage of online opportunities. Finally, traditional organizational structures and cultures were found to inhibit progress in e-commerce.
- (iii) **E-commerce is Not Free :** So far, success stories in e-commerce have favored large businesses with deep pockets and good funding. According to a recent report, small retailers that go head-to-head with e-commerce giants are fighting a losing battle.
- (iv) **Security :** Security continues to be a problem for online business. In a 2000 *economist* article, 95 percent of Americans expressed reluctance to give out their credit card numbers via the Internet. For millions of potential cyber-customers, the fear of credit card theft is a

real one. Consumers have to feel confident about the integrity of the process before they commit to the purchase.

- (v) **Customers Relations Problems :** Not many businesses realizes that even an e-business cannot survive over the long term without loyal customers.
- (vi) **System and Data Integrity :** Data protection and the integrity of the system that handle the data are serious concerns. Computer viruses are rampant, with new viruses discovered every day. Viruses cause unnecessary delays, file backups, storage problems and the like. The danger of hackers accessing files and corrupting accounts adds more stress to an already complex operation.
- (vii) **Products People Won't Buy Online :** Imagine a Web site called furniture.com or living.com, where venture capitalists are investing millions in selling home furnishings online. In the case of a sofa, you'd want to sit on it, feel the texture of the fabric, etc. Beside the "sofa-road-test" factor, online furniture stores face costly returns and the kind of deliveries that cannot be expedited.
- (viii) **Corporate Vulnerability :** The availability of product details, catalogs and other information about a business through its web site makes it vulnerable to access by the competition. The idea of extracting business intelligence from the competitors Web page is called Web farming, a term coined by Richard Hackathorn.
- (ix) **Fulfillment Problems :** Tales of shipping delays, merchandise mix-ups and Web site crashing under pressure continue to be a problem in e-tailing. Customer confidence in a e-commerce's ability to deliver during heavy shopping seasons continues to be a headache. Even happy customers says the experience could be improved.
- (x) **System Scalability :** A business develops an interactive interface with customers via Web site. After a while, statistical analysis determines whether visitors to the site one-time or recurring customers. If the company expects 2 million customers and 6 million show up Web site performance is bound to experience degradation, slow down and eventually los of customers. To keep this problem for happening, a Web site must be scalable & upgradeable on a regular basis.
- (xi) **Consumer Search is not Efficient or Cost-efficient :** On the surface, the electronic marketplace appears to be a perfect market, where worldwide sellers and buyers share information and trade without intermediaries. However, a closer look indicates that new types of intermediaries are essential to e-commerce. They include electronic malls that guarantee product quality, mediators for bargaining and certificate authorities to ensure legitimacy of transactions. All these intermediaries add to transaction costs.

1.7. OPPORTUNITIES OF E-COMMERCE

We can divide the E-Commerce opportunities in three sections :

1. Commercial opportunities
2. Social Services opportunities
3. Entertainment opportunities.

1.7.1. Commercial Opportunities

- E-commerce is suitable to apply in following types of commercial transactions :
- (a) **Property Transactions** : Property Transactions can be executed by e-commerce facilities. Several estate dealers, builders, housing finance companies make use of e-commerce facilities and Internet sites to offer their products.
 - (b) **Sale, Purchase of Goods** : Consumers can buy products, industries can procure raw materials, components etc. manufacturers and sellers can sell their products by using e-commerce.
 - (c) **Delivery of Goods** : Direct E-commerce permits the delivery of products. For example, the computer software is directly downloaded by the software manufacturer on computer of the customer.
 - (d) **Electronic Payments** : Payments can be made by utilizing e-commerce devices like credit card, debit card and electronic transfer etc.
 - (e) **Banking and Money Transfer** : Banking services are also carried out by e-commerce. Online banking, ATM facility and electronic money transfer are some of the means to carry out banking transaction through e-commerce.
 - (f) **Import and Export** : Electronic payments have played significant role in import-export business. The Internet has further simplified the import-export business. Importers can now make enquiries about the products, their manufacturers, price, other terms and conditions etc. Exporters can also make enquiries about suitable consumers. Payments can be made by electronic modes including digital means like Internet payment or internet money transfer.
 - (g) **Insurance Business** : Insurance business is the latest to utilize e-commerce facilities. Consumers can enquire about insurance products and can also subscribe to a policy through e-commerce media like fax, internet etc.
 - (h) **Transportation** : Transportation is crucial for handling and delivery of raw material, components, equipments and finished products. Facilities for carriage of goods by sea or air can be arranged and monitored by Internet facility.
 - (i) **International Finance** : Financial transactions involve both the person offering financial service as well those required it. Loans, Bills Discounting, Lease Transaction can be easily carried out by e-commerce devices. Avenues of International Finance can also be investigated by internet facilities.
 - (j) **Online share trading** : It is possible to sell, buy, pledge or transfer shares through e-commerce. Several companies, brokers offer this facility. Therefore, for dealing in securities, a customer is no more required to visit a broker.
 - (k) **Tourism and Hotel Industry** : It is possible to know about different tourist spots and accommodation throughout the world by surfing on the net. Customers can book their tickets, accommodation in hotels by using different e-commerce facilities like e-mail etc.
 - (l) **Online Depository Services** : National Stock Depository Limited and Central Stock Depository Limited and several other companies offer online depository services. Therefore, one can keep his securities in d-mat form by using e-commerce.
 - (m) **Payment of Taxes** : It is possible to make payment for taxes electronically.
 - (n) **Public Issue Subscription** : Public issue of securities can also be subscribed electronically by submitting the form and making payment through credit card.

- (o) **Payment of Services** : Payment for different services like telephone, electricity, water, insurance premium, fee for children etc. can also be made by using e-commerce facilities.
- (p) **Renewal of License** : Licenses can also be renewed by using e-mail or internet facilities.

1.7.2. Social Services

E-commerce can also be utilized for following social services :

- (a) **Online Education and Distant Learning and Training** : E-commerce is equally suitable for imparting education. It is possible for the student to take lessons and imparting education. It is possible for the student to take lessons and interact with teachers through video conferencing facility. Students can also record lectures, download study material by use of different modes of e-commerce.
- (b) **Online Diagnosis and Treatment** : Video conferencing has made it possible to consult a doctor through electronic devices. Even X-rays and surgical operations can also be performed through video conferencing.
- (c) **Sharing research** : Research Scholars and Scientists sitting in different parts of the world can share each other's work and results through different modes of e-commerce.
- (d) **Filing of tax return** : It is possible to file income tax return electronically. Finance Act, 2002-03 proposes such filling of return.
- (e) **Statistics** : E-commerce helps to collect, analyse and interpret statistics relating to different matters.

1.7.3. Entertainment

E-commerce has its use in following areas of entertainment :

- (a) **Ticketing for Theatres, Cinema Halls, Concerts** : Tickets can also be reserved for theatres and concerts electronically.
- (b) **Online Games and Refreshers Courses** : E-commerce provides facilities for online games and refreshers courses.

1.8. DIFFERENT TYPES OF E-COMMERCE

[MDU 2009]

E-commerce mainly consists of distribution, purchase, sale, marketing and provision for supplementary information of products or services via the Internet. E-commerce also includes the transfer of information between enterprises. In late 70s, E-commerce started as a process of sending and receiving electronic documents such as invoices. As the process evolved, it included activities such as purchase of goods and services via Internet by using different types of purchase cards i.e. credit and debit cards. Today, E-commerce is spearheading a all new way of buying and selling online. E-commerce activities fall into identifiable categories and can be classified as business to business (B2B), business to customer (B2C) and many more as follows:

1.8.1. Business to Consumer (B2C)

B2C stands for Business to Consumer as the name suggests, it is the model taking business and consumers interaction. Online business sells to individuals. The basic concept of this model is to sell the product online to the consumers.



B2C is the indirect trade between the company and consumers. It provides direct selling through online. For example: if you want to sell goods and services to customer so that anybody can purchase any products directly from supplier's website.

Directly interact with the customers is the main difference with other business model. As B2B it manages directly relationship with consumers. B2C supply chains normally deal with business that are related to the customer.

1.8.2. Business to Business (B2B)



B2B stands for Business to Business. It consists of largest form of Ecommerce. This model defines that Buyer and seller are two different entities. It is similar to manufacturer issuing goods to the retailer or wholesaler.

Dell deals computers and other associated accessories online but it does not make up all those products. So, in govern to deal those products, first step is to purchases them from unlike businesses i.e. the producers of those products.

"It is one of the cost effective way to sell out product throughout the world".

Benefits

- Encourage your businesses online
- Products import and export
- Determine buyers and suppliers
- Position trade guides

1.8.3. Consumer to Business (C2B)

In today's Ecommerce arena, it is growing trend wherein consumers demand specific products or services from respective businesses. For example: we contact a tour and travel operator via their website for purchasing a holiday package. Consumer to business Ecommerce is growing at a rapid pace and the trend is set to continue in the future.

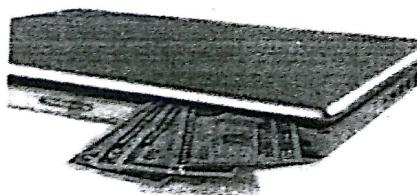


Fig. 1.1.

1.8.4. Consumer to Consumer (C2C)

Usually, this type of Ecommerce works as Consumer to Business to Consumer (C2B2C). It essentially means that a consumer would contact a business in search for a suitable customer. Most of the auction websites (like eBay) and matrimonial websites are working on this methodology.

Apart from the types of Ecommerce mentioned above, there are various other hybrid forms of ecommerce being practiced in today's globalized world. Choosing the appropriate model is crucial and vital for your business and I would leave it to your best judgment.

1.8.5. Peer to Peer (P2P)

It is a discipline that deal itself which assists people to instantly shares related computer files and computer sources without having to interact with central web server. If you are going to implement this model, both sides demand to install the expected software so that they could able to convey or start it has been tended to the release of use due to which it sometimes caught involved in cyber laws.

1.8.6. M-Commerce

It deals with conducting the transactions with the help of mobile. The mobile device consumer can interact each other and can lead the business. Mobile Commerce involves the change of ownership or rights to utilize goods and related services.

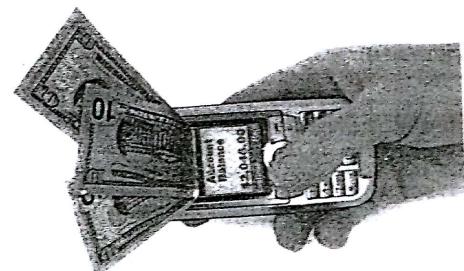


Fig. 1.2.

1.9. ELECTRONIC COMMERCE FRAMEWORK

Basically to implement e-commerce, certain infrastructure is required and that infrastructure a combination of computers, computer networks and communication softwares and finally informatic superhighway. Let us see the various activities of e-commerce and the infrastructure requirement perform these activities of e-commerce :

- (i) E-commerce provides buying and selling process so certainly e-commerce **infrastructure must support these common business services**.

We frequently sends and retrieve the information so there must be facility in **infrastructure for messaging and information distribution**.

The e-commerce related websites has the information about product and it is design so **infrastructure must have multimedia content and network publishing facilities**.

(ii) Finally information superhighway is required to performs the e-commerce transactions.

On the basis of above discussion we can say that e-commerce applications and infrastructure are two main pillars of e-commerce and they are indispensable :

(i) A clear cut government policy, public related issues, information access issues on internet, privacy of information, social and legal issues are the one pillar of e-commerce.

(ii) Uniform technical standard for information publishing user interface, electronic documentation, multimedia and network protocol are the another pillar of e-commerce.

Figure 1.3 make this concept more clear.

The successful e-commerce application will require the I-way infrastructure in the same way as it required in the traditional business. The I-way is a mesh of interconnected data communication highways of many forms: telephone wires, cable TV wires, radio-based wireless-cellular and satellite.

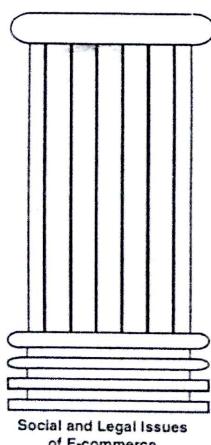


Fig. 1.3. Framework for E-commerce.

In the electronic "highway system" the multimedia content is stored in the form of electronic documents, which are digitalized, compressed and stored in computerized libraries or multimedia storage warehouse referred as "SERVER" which are linked by transport networks to each other and to the hardware/software clients that allows the customers to access them.

On the I-way, messaging software fulfills the role of distribution in the form of e-mails, EDI or point-to-point file transfers. The encryption ad decryption authentication methods have been developed to ensure security of the contents while traveling the I-way and at their destination. The public policy issues deals with the cost of accessing the information, regulation to protect customers from fraud, intrusion to privacy rights, policing of global information traffic etc. The final pillar of e-commerce is technical standards to ensure harmonious integration across the network and access of information on any type of devices like laser discs, PCs portable hand held devices or television, set top boxes (cable converter box) and on all types of operating systems.

1.9.1. The Mechanism of Electronic Commerce

1. The Business Dimension of E-commerce : These are two bases and interactive business dimensions to Electronic Commerce and these are :

- (a) *The customer dimension* : This refer to the placing of finished goods and services with the final customers.
- (b) *The enterprise dimension* : This primarily an intercorporate or interorganizational (including business to government) supply chain management (SCM) etc.

2. The Technological Dimensions of E-commerce : It can be classified according to three basic function of any market environment.

- (a) *Access environment* : It make use of private and public network technologies like Local Area Network (LAN), Wide Area Network (WAN), Internet etc.
- (b) *Transaction dimension* : These are EDI, point of sale devices, credit, debit and smart card Automated Teller Machines and Electronic Fund Transfer (EFT).
- (c) *Support dimension* : These are support services like card validation technologies, bar coding devices etc.

3. The Configuration of E-commerce : The EC to become operational require three things to happen :

- (a) *The Organizational configuration* : Integrating Business Process Electronically
- (b) *The network configuration* : Providing a backbone for e-commerce.
- (c) *The media configuration* : Getting access to the electronic market place.

1.10. TRENDS IN E-COMMERCE

There are numerous perspectives of electronic commerce which gives birth to new trends in business and society and these are discussed below :

1. From *historic perspective*, some authors see e-commerce as largely or entirely an internet phenomenon. Seddon has suggested that, "the world has just entered a third new phase in the evolution of IT capabilities; the internet era". The suggestion divides the evolution of information technology (IT) into 20 years periods:
 - 1955 – 1974 – The Electronic Data Processing (EDP) Era.
 - 1975 – 1994 – The Management Information System (MIS) Era.
 - 1995 – 2014 – The Internet Era.
2. From *an interface perspective*, e-commerce involves various information and transaction exchanges: business-to-business, business-to-consumer, consumer-to-consumer.

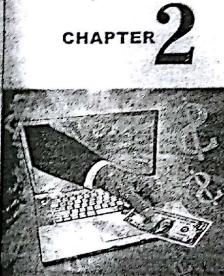
3. From a *business process perspective*, e-commerce includes activities that directly support commerce electronically, by means of networked connections. Within business processes (manufacturing, inventorying, operation) and business-to-business process (supply chain management) are managed by the same networks as business-to-consumer processes.
4. From a *communications perspective*, e-commerce is the ability to deliver products, services, information or payments via networks such as the Internet and the World Wide Web.
5. From an *Online perspective*, e-commerce is an electronic environment that makes it possible to buy and sell products, services and information on the Internet. The products may be physical such as cars or services such as news and consulting.
6. From a *structural perspective*, e-commerce involves various media: data, text, web pages, Internet Telephony and Internet desktop video.
7. As a *market*, e-commerce is the world wide network. A local store can open a Web storefront and find the world at its doorstep—customers, suppliers, competitors and payment services.

SUMMARY

In this chapter we have established the basic platform to study e-commerce. Now after reading this chapter we are thorough with e-commerce basics. Now we can easily understand the e-commerce terminologies. In this chapter we also do the critical study of e-commerce and now we are aware of strength and weakness of e-commerce.

REVIEW QUESTIONS

1. "Now a days market is driven by e-commerce." Justify this statement.
2. What do you understand by E-commerce? Discuss the driving forces for e-commerce.
3. If we want to setup the e-commerce business then what are the various required elements?
4. What are the various strength and weakness of e-commerce.
5. Discuss the commercial, social as well as Entertainment Opportunities in e-commerce.
6. "Now a days e-commerce is over powered the traditional buying and selling system." Comment on this statement.
7. "Business becomes a global phenomenon through e-commerce." Justify this statement.

**Internet and E-Commerce****INSIDE THIS CHAPTER**

- 2.1. Definition of Internet
- 2.2. E-Business and Internet
- 2.3. Uniform Resource Locator (URL)
- 2.4. Internet Address (IP Address)
- 2.5. Domain Names
- 2.6. ISP (Internet Service Providers)
- 2.7. Web Browser
- 2.8. Modes of Connecting to Internet
- 2.9. Working of Internet
- 2.10. World Wide Web
- 2.11. The Web and E-Commerce
- 2.12. E-Commerce Transaction
- 2.13. E-Business Model
- 2.14. Internet Sales Venues
- 2.15. E-commerce Solutions

2.1. DEFINITION OF INTERNET

The Internet is a network of networks, linking computers to computers sharing the TCP/IP protocols. Each runs software to provide or "serve" information and/or to access and view information.

Internet is not the only network of networks but it has three components:

1. Network of networks
2. Network with information and resources
3. Users on the network

Let us see some facts about Internet:

- The Internet is the transport vehicle for the information stored in files or documents on another computer.
- It can be compared to an international communications utility servicing computers. It sometimes compared to a giant international plumbing system.
- The Internet itself does not contain information. It is a slight misstatement to say a "document was found on the Internet." It would be more correct to say it was found *through* or *using* the Internet. What it was found in (or on) is one of the computers linked to the Internet.

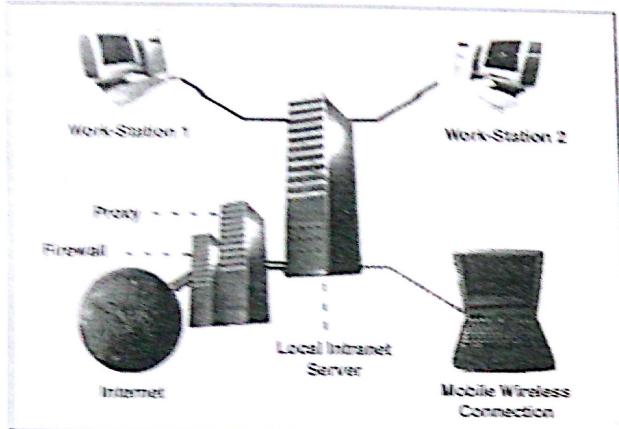


Fig. 2.1. Internet.

2.1.1. The History of Internet

Until the 1960s, very little communication was taking place between computers, and was carried out by the technology of telephone networks, i.e. circuit switching. In 1961 Paul Baran and Donald Davies independently proposed an idea of a robust, efficient store-and-forward data network based on packets, i.e. units of data carried independently from one another. The technology was called packet switching, and has been implemented as ARPANET (a network of research sites in US, a project funded by the US Department of Defense) in late 1960s. In early 1970s, ARPANET spanned the continental US, and by 1975 it had connections to Europe.

ARPANET had several protocols for communications of computers one to another or with the network. In 1974, a new, more robust suite of protocols has been developed and implemented in the ARPANET based on Transmission Control Protocol (TCP) and Internet Protocol (IP). The standard includes a large collection of protocols, some of which we mention later. These protocols have been modified several times since then, but essential ideas of the original protocols are still preserved. In 1983, the US Department of Defense has mandated that all of their computer systems use TCP/IP protocols, which boosted use of these protocols in the US and throughout the world. Another boost to TCP/IP was given by including it, also in 1983, into the communication kernel of the University of California's UNIX implementation.

In 1986, the National Science Foundation (NSF) built a backbone network (i.e. a network of fast powerful computers which can quickly forward information to each other and other computers) called NSFNET. Eventually it grew to provide connectivity between various networks, forming the foundation of what currently is known as Internet.

In 1983 the NSF started to reduce its role in governing the Internet. Currently the administration of the Internet is divided between several international organizations, such as ISOC (Internet Society) and IAB (Internet Activities Board), which supervise various technical, administrative, and other areas of the Internet.

TIPS

Modern Internet has over 32,000,000 registered domain names (according to domainstats.com/provided by ISOC). The size of Internet doubles every 10-12 months.

2.1.2. Managing the Internet

Perhaps the least understood aspect of the Internet is its management. In recent years, this subject has become the subject of intense commercial and international interest, involving multiple governments and commercial organizations, and recently congressional hearings. An issue is how the Internet will be managed in the future, and, in the process, what oversight mechanisms will ensure that the public interest is adequately served.

In the 1970s, managing the Internet was easy. Since few people knew about the Internet, decisions about almost everything of real policy concern were made in the offices of DARPA. It became clear in the late 1970s, however, that more community involvement in the decision-making processes was essential. In 1979, DARPA formed the Internet Configuration Control Board (ICCB) to insure that knowledgeable members of the technical community discussed critical issues, educated people outside of DARPA about the issues, and helped others to implement the TCP/IP protocols and gateway functions. At the time, there were no companies that offered key solutions to getting on the Internet. It would be another five years or so before companies like Cisco Systems were formed, and while there were no PCs yet, the only workstations available were specially built and their software was not generally configured for use with general networks; they were certainly considered expensive at the time.

In 1983, the small group of roughly twelve ICCB members was reconstituted (with some substitutions) as the Internet Activities Board (IAB), and about ten "Task Forces" were established under it to address issues in specific technical areas. The attendees at Internet Working Group meetings were invited to become members of as many of the task forces as they wished.

The management of the Domain Name System offers a kind of microcosm of issues now frequently associated with overall management of the Internet's operation and evolution. Someone had to take responsibility for overseeing the system's general operation. In particular, top-level domain names had to be selected, along with persons or organizations to manage each of them. Rules for the allocation of Internet addresses had to be established. DARPA had previously asked the late Jon Postel of the USC Information Sciences Institute to take on numerous functions related to administration of names, addresses and protocol related matters. With time, Postel assumed further responsibilities in this general area on his own, and DARPA, which was supporting the effort, gave its tacit approval. This activity was generally referred to as the Internet Assigned Numbers Authority (IANA). In time, Postel became the arbitrator of all controversial matters concerning names and addresses until his untimely death in October 1998.

TIPS

The rapid growth of the Internet has triggered the design of a new and larger address space (the so-called IP version 6 address space); today's Internet uses IP version 4. However, little momentum has yet developed to deploy IPv6 widely. Despite concerns to the contrary, the IPv4 address space will not be depleted for some time. Further, the use of Dynamic Host Configuration Protocol (DHCP) to dynamically assign IP addresses has also cut down on demand for dedicated IP addresses. Nevertheless, there is growing recognition in the Internet technical community that expansion of the address space is needed, as is the development of transition schemes that allow interoperation between IPv4 and IPv6 while migrating to IPv6.

It is helpful to consider separately the problem of managing the domain name space and the Internet address space. These two vital elements of the Internet architecture have rather different characteristics that color the management problems they generate. Domain names have semantics that numbers may not imply; and thus a means of determining who can use what names if needed. As a result, speculators on Internet names often claim large numbers of them without intent to use them other than to resell them later. Alternate resolution mechanisms, if widely adopted, could significantly change the landscape here.

In 1998, the Internet Corporation for Assigned Names and Numbers (ICANN) was formed as a private sector, non-profit, organization to oversee the orderly progression in use of Internet names and numbers, as well as certain protocol related matters that required oversight. The birth of this organization, which was selected by the Department of Commerce for this function, has been difficult, embodying as it does many of the inherent conflicts in resolving discrepancies in this arena. However, there is a clear need for an oversight mechanism for Internet domain names and numbers, separate from their day-to-day management.

Many questions about Internet management remain. They may also prove difficult to resolve quickly. Of specific concern is what role the U.S. government and indeed governments around the world need to play in its continuing operation and evolution. This is clearly a subject for another time.

2.1.3. Applications and Uses of Internet

The development of the internet is not an end in itself; it is a means by which the people can achieve a broad range of economic and social goals.

This internet can be used by all, not just by scientists and engineers. As entrepreneurs, factory workers, doctors, teachers, federal employees, and citizens, people can use this technology to :

- Create jobs, and lead towards growth;
- Reduce health care costs while increasing the quality of service in underserved areas;
- Deliver higher-quality, lower-cost government services;
- Prepare our children for the fast-paced workplace of the 21st century; and
- Build a more open and participatory democracy at all levels of government.

Let us see some of the applications of the Internet:

1. Economic Application

The Internet will help create high-wage jobs, stimulate economic growth, enable new products and services, and strengthen overall economy of the country. Below are some of the potential benefits to the economy:

- (i) **Economic growth** : Internet can help to increase the economic growth and productivity of any country.
- (ii) **Job creation** : Industry experts believe that the Personal Communications Services industry a new family of wireless services, could create as many as 300,000 jobs in the next 10-15 years
- (iii) **Regional, state, and local economic development** : In today's knowledge-based, global economy in which capital and technology are increasingly mobile, the quality of America's information infrastructure will help determine whether companies invest here or overseas. States and regions increasingly recognize that development of their information infrastructure is key to creating jobs and attracting new businesses.
- (iv) **Electronic commerce** : Electronic commerce (e.g., on-line parts catalogues, multi-media, mail, electronic payment, brokering services, collaborative engineering) can dramatically reduce the time required to design, manufacture, and market new products. "Time to market" is a critical success factor in today's global marketplace.

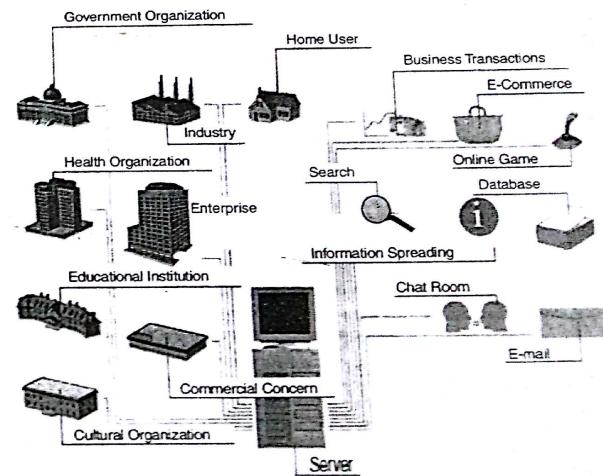


Fig. 2.2. Use of Internet.

2. Application in Health Care

The Internet can help solve global health care crisis. These problems will not be solved without comprehensive health care reform. Better use of information technology and the development of health care applications for the internet, however, can make an important contribution to reform. Experts estimate that telecommunications applications could reduce health care costs by \$36 to \$100 billion each year while improving quality and increasing access.

Below are some of the existing and potential applications:

- **Telemedicine :** By using telemedicine, doctors and other care givers can consult with specialists thousands of miles away; continually upgrade their education and skills; and share medical records and x-rays.
- **Personal Health Information Systems :** Every country can use computers and networks to promote self care and prevention by making health care information available 24 hours a day in a form that aids decision-making. Most people do not have the tools necessary to become an active and informed participant in their own health care.
- **Computer-Based Patient Records :** The Institute of Medicine has concluded that Computer-Based Patient Records are critical to improving the quality and reducing the cost of health care.

3. Application of Internet in Civic Networking

Technology in the Public Interest. The benefits of the Internet extend far beyond economic growth. As the Center for Civic Networking observed,

TIPS

"A country that works smarter; enjoys efficient, less costly government, guided by a well-informed citizenry; that produces high quality jobs and educated citizens to fill them; that paves a road away from poverty; that promotes life-long learning, public life and the cultural life of our communities. This is the promise of the Internet."

The Internet could be used to create an "electronic commons" and promote the public interest in the following ways

- (a) **Community Access Networks :** Grass-roots networks are springing up all over the country, providing citizens with a wide range of information services.
- (b) **Dissemination of Government Information :** The free flow of information between the government and the public is essential to a democratic society. Improvements in the National Information Infrastructure provide a tremendous opportunity to improve the delivery of government information to the taxpayers who paid for its collection; to provide it equitably, at a fair price, as equitably as possible.
- (c) **Universal Access :** The internet must be used to bring people together, as opposed to allowing a further polarization between information "haves" and "have nots."

4. Application in Science and Technology

One of the central objectives of the Internet is to increase the productivity of the research community and enable scientists and engineers to tackle "Grand Challenges," such as forecasting

the weather, building more energy-efficient cars, designing life-saving drugs, and understanding how galaxies are formed.

Below are just a few of the ways in which this technology is being used by world researchers:

- (a) **Solving Grand Challenges :** As a result of investments in high performance computers, software, and high-speed networks, researchers have access to more and more computational resources. As a result, scientists and engineers have been able to more accurately model the Earth's climate; design and simulate next-generation aircraft (the High Speed Civil Transport); improve detection of breast cancer by turning two-dimensional MRI images into three-dimensional views; and enhance the recovery of oil and gas from America's existing reservoirs.
- (b) **Enabling Remote Access to Scientific Instruments :** Because of advancements in networks and visualization software, scientists can control and share remote electron microscopes, radio telescopes, and other scientific instruments.
- (c) **Supporting Scientific Collaboration :** The Internet has allowed scientists around the world to access databases, share documents, and communicate with colleagues.

5. Application in Education

Increasingly, what we earn depends on what we learn. World must be well-educated and well-trained if want to compete internationally and enjoy a healthy democracy.

TIPS

"Imagine a biology student entering an impressive virtual laboratory environment that includes simulated molecules. The learner can pick up two molecules and attempt to fit them together, exploring docking sites. In addition to the three-dimensional images in the head-mounted display, the gesture gloves on his hands press back to provide feedback to his sense of touch. Alternatively, the student can expand a molecule to the size of a large building and fly around in it, examining the internal structure."

6. Application in E-Governance

Internet can help to provide a government, which is effective, efficient and responsive. Moving from red tape to results will require sweeping changes: emphasizing accountability for achieving results as opposed to following rules; putting customers first; empowering employees and reengineering how government agencies do their work.

- (a) **Develop a nationwide system to deliver government benefits electronically :** The government can cut costs through "electronic benefits transfer" for programs such as federal retirement, social security, unemployment insurance.
- (b) **Develop integrated electronic access to government information and services :** Currently, citizen access to federal government information is uncoordinated and not customer-friendly. Electronic kiosks and computer bullet-in boards can result in quick response, complete information, and an end to telephone tag.
- (c) **Establish a National Law Enforcement/Public Safety Network :** Whether responding to natural or technological disasters, or performing search and rescue or interdictio-

activities, federal, state, and local law enforcement and public safety workers must be able to communicate with each other effectively, efficiently, and securely.

2.2. E-BUSINESS AND INTERNET

Today's business environment is influenced greatly by market, economical, societal and technological factors creating a lot of competition. Also these factors are unpredictable in that they may change unexpectedly at any time. Such changes in the business world have been defined as business pressure. In order to succeed in this dynamic world companies must take action such as lowering costs and improving quality etc. At the same time they need to be innovative in customizing their products, creating new products and providing good customer service.

The various environmental business pressures on companies today can be grouped into three categories: Market, Societal and Technological. Strength of Internet Business Over traditional business can be more clear by the compression of both. Online purchasing and selling through e-business (wholesale and retail) Offers opportunities and advantages to the companies of all sizes engaged in different portfolios. Some of these advantages are enumerated below.

- Sampling of products such as books, recorded lectures, and music cassettes is possible on Web for business promotion.
- Business houses selling their goods through catalogues, can reach additional global customers at lower cost.
- For items subjected to frequent changes e.g., shares and bonds etc., the changes in rates/quotations can be known instantly.
- Customer's knowledge can be enhanced on topics such as news about local event, market research, industrial report, software etc., which can be distributed easily over the Internet.
- A closer relationship can be developed amongst business sellers whose customer base is in the Internet.
- For wholesalers, distributors, retailers etc., it is convenient and efficient to buy from Web sites.
- High quality, specialized products can be easily sold on Internet by the retailers.
- Organizations can conduct interviews through Internet to select suitable candidate(s) for their requirements.
- Group discussions can be conducted for corporate offices, industrial houses, business firms, universities, etc.

2.2.1. Disadvantage of Internet Business

- Security** : Security issues are the primary concern and the biggest disadvantage of using the Internet for business, particularly if your business involves financial transactions.
- Staying connected** : Connectivity issues can also become a disadvantage, if you are using a computer that is not reliable and is prone to locking up, or "freezing."
- Availability** : Not everyone has Internet access, and many of your potential customers who are not able to use the Internet may actually be lost to you if you do not provide an alternate means of doing business with them.

4. **Access** : If you are going to use the Internet for business, you must consistently be able to get access, whether through a wireless, DSL or cable connection. Finding access can become a disadvantage if you travel for your business.

5. **Misunderstandings** : Written text, especially in emails, can easily be misread or misinterpreted when there is no face-to-face contact.

2.3. UNIFORM RESOURCE LOCATOR (URL)

URL is an acronym for Uniform Resource Locator and is a reference (an address) to a resource on the Internet.

The following is an example of a URL which addresses the Java Web site hosted by Sun Microsystems:



As in the previous diagram, a URL has two main components :

- Protocol identifier
- Resource name

Note that the protocol identifier and the resource name are separated by a colon and two forward slashes. The protocol identifier indicates the name of the protocol to be used to fetch the resource. The example uses the Hypertext Transfer Protocol (HTTP), which is typically used to serve up hypertext documents. HTTP is just one of many different protocols used to access different types of resources on the net. Other protocols include File Transfer Protocol (FTP), Gopher, File, and News.

The resource name is the complete address to the resource. The format of the resource name depends entirely on the protocol used, but for many protocols, including HTTP, the resource name contains one or more of the components listed in the following table :

Host Name	The name of the machine on which the resource lives.
Filename	The pathname to the file on the machine.
Port Number	The port number to which to connect (typically optional).
Reference	A reference to a named anchor within a resource that usually identifies a specific location within a file (typically optional).

For many protocols, the host name and the filename are required, while the port number and reference are optional. For example, the resource name for an HTTP URL must specify a server in the network (Host Name) and the path to the document on that machine (Filename); it also can specify a port number and a reference. In the URL for the Java Web site `java.sun.com` is the host name and the trailing slash is shorthand for the file named `index.html`.

2.4. INTERNET ADDRESS (IP ADDRESS)



Every machine on the Internet has a unique identifying number, called an IP Address. The IP stands for Internet Protocol, which is the language that computers use to communicate over the Internet.

A protocol is the predefined way that someone who wants to use a service talks with that service. The "someone" could be a person, but more often it is a computer program like a Web browser.

A typical IP address looks like this:

216.27.61.137

To make it easier for us humans to remember, IP addresses are normally expressed in decimal format as a dotted decimal number like the one above. But computers communicate in binary form. Look at the same IP address in binary.

11011000.00011011.00111101.10001001

The four numbers in an IP address are called octets, because they each have eight positions when viewed in binary form. If we add all the positions together, we get 32, which is why IP addresses are considered 32-bit numbers. Since each of the eight positions can have two different states (1 or zero), the total number of possible combinations per octet is 2^8 or 256. So each octet can contain any value between zero and 255. Combine the four octets and you get 2^{32} or a possible 4,294,967,296 unique values.

TIPS

Out of the almost 4.3 billion possible combinations, certain values are restricted from use as typical IP addresses. For example, the IP address 0.0.0.0 is reserved for the default network and the address 255.255.255.255 is used for broadcasts.

The octets serve a purpose other than simply separating the numbers. They are used to create classes of IP addresses that can be assigned to a particular business, government or other entity based on size and need. The octets are split into two sections: Net and Host. The Net section always contains the first octet. It is used to identify the network that a computer belongs to. Host (sometimes referred to as Node) identifies the actual computer on the network. The Host section always contains the last octet. There are five IP classes plus certain special addresses.

2.5. DOMAIN NAMES



A name that identifies one or more IP addresses is called domain name. For example, the domain name `microsoft.com` represents about a dozen IP addresses.

Domain names are used in URLs to identify particular Web pages. For example, in the URL `http://www.kiet.edu/index.html`, the domain name is `kiet.edu`.

Every domain name has a suffix that indicates which top level domain it belongs to. There are only a limited number of such domains. For example:

- gov - Government agencies
- edu - Educational institutions
- org - Organizations (nonprofit)
- mil - Military
- com - Commercial business
- net - Network organizations
- ca - Canada
- th - Thailand
- in - India

TIPS

Because the Internet is based on IP addresses, not domain names, every Web server requires a Domain Name System (DNS) server to translate domain names into IP addresses.

2.5.1. Domain Name System



DNS stands for two things: Domain Name Service and Domain Name Servers. One acronym defines the protocol, the other defines the machines that provide the service. The job that DNS performs is very simple: it takes the IP addresses that computers connected to the Internet use to communicate with each other and it maps them to host names.

Human beings tend to have a difficult time remembering long strings of seemingly arbitrary numbers. The way that our brains work, it's difficult to make information like that stick. And that is where DNS comes in. It allows us to substitute words or phrases for those strings of numbers. Words are a lot easier for people to remember than numbers, especially when they can be tied to a specific idea that is linked to the website.

DNS translates IP addresses into hostnames and back again. The hostnames are for the benefit of human end users. The IP addresses are the only essential thing, as far as the computers are concerned.

2.6. ISP (INTERNET SERVICE PROVIDERS)

For networks connected to the global Internet, an organization obtains network number from the communication company that supplies internet connections. Such companies are called Internet Service Provider (ISPs).



ISP is an organization or business offering public access to the Internet. It is our gateway to the Net.

You have to subscribe to a provider for your Internet connection. You use your computer and modem to access the provider's system and the provider handles the rest of the details of connecting you to the Internet.

2.6.1. Types of ISP

There are many types of Internet providers. We can, for instance, choose one of the big commercial on-line service providers. The primary business of an ISP is hooking people to the Internet by giving an Internet account to subscribers, and providing them with two different kinds of access:

1. Shell access and
2. SLIP/PPP access.

Most ISP offer both kinds of access, some offer both with a single account, and others require that you choose one or the other. Once you register, your provider will give you a user name (called a user ID), a password, and a phone number to dial. To establish the Internet connection, you have your communications program dial the number. You then log in using your particular user ID and password.

At present it is VSNL (Videsh Sanchar Nigam Limited) which is dominating the Internet scene in India through its GIAS (Gateway Internet Access Service). The other service providers in India are MTNL (Maharashtra Telephone Nigam Limited), Mantra-online, Airtel, Reliance Communications and Satyam-online.

2.7. WEB BROWSER



Definition Web user access information from web servers, through a client program called browser.

Broadly speaking, a browser is responsible for the following tasks :

1. The first task is to accept a URL and retrieve the document specified by the URL.
2. The second task of browser is to interpret a HTML, document code, format it accordingly and finally render the document on the screen.
3. In this process, it may have to manage the rendering of various image formats, multimedia information, and links to other documents as well.

TIPS

The most Famous Example of Browsers are Microsoft Internet Explorer and Netscape Navigator.

Information regarding downloading the Netscape browser can be found at the site <http://www.netscape.com>. It can be download from the site or any of the listed mirror sites, and closest to your location. The internet explorer of Microsoft is popular browser, based on the Mozilla source code.

The overview of the architecture of the web browser is shown in following Fig. 2.3 :

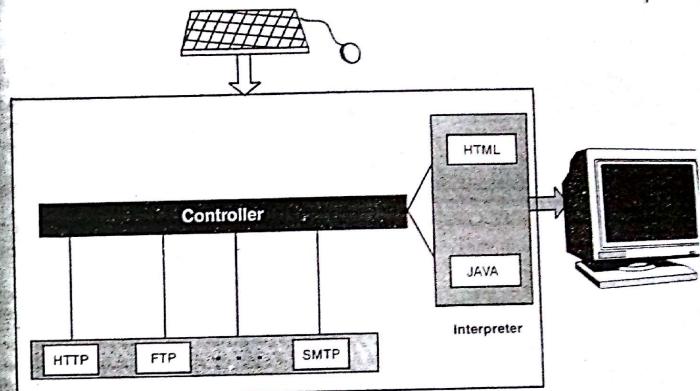


Fig. 2.3. Browser Architecture.

2.8. MODES OF CONNECTING TO INTERNET

If we are looking for a better Internet connection then we must think about high-speed Internet connections, such as cable, ISDN and DSL but need a little clarification as to what each of these different types of connections are and what they do.

2.8.1. Telephone Line Internet Connectivity (Dial-up Connection)

The most basic type of Internet connection is called a dial-up connection. This connection is made through a modem (the communication mechanism in computers) that uses a telephone line to connect to the Internet. The modem must dial the telephone every time it wants to connect to the Internet, hence the name **dial-up connection**. Most people connect to the Internet by using a modem and phone line to dial in to a PPP account on an Internet provider's computer. Most ISPs support modems at speeds 14.4Kbps, 28.2Kbps, and 56Kbps.

2.8.2. ISDN - Dial-Up Connection

The second type of dial-up connection is through an ISDN (Integrated Services Digital Network). This connection is a high-speed dial-up and requires a special type of dedicated telephone line. This type of connection improves speed because the signals received are already in a digital format, but it is costly. For a while dial-up connections were the only way to access the Internet. Now, however, broadband connections are available in many parts of the country as telephone and cable companies install new lines to accommodate fast connections.

2.8.3. Broadband Connections

Broadband is a high-speed Internet connection that makes surfing the Web more enjoyable. It also easily accommodates the video, audio, or complex graphics that are becoming commonplace on the internet. Broadband is a type of data transmission in which a single medium of wire can carry several channels or communication paths at once. So, broadband cable connections are able to transmit both television signals and Internet data at the same time. Broadband telephone connections like DSL are able to transmit both voice and data over the same line at the same time.

Broadband connections are always on. That means if your computer is on, you will be connected to the Internet with no dial-up involved. For most average users, a broadband connection will mean accessing the Internet by either a cable modem provided by their local cable company or a DSL modem and DSL telephone line provided by their local telephone service provider.

2.8.4. Internet Through Cable

Internet over cable is a technology and service that uses the existing cable TV networks (made up of coaxial cable lines that bring television signals to TV) to bring Internet data to PC or TV at a very high speed. The television and the Internet transmission take place simultaneously on the same cable but at different frequencies. This allows the user to view TV and access Internet at the same time.

There are only two drawbacks to cable:

- First, it is a shared connection, meaning you share the "pipeline" with your neighbours. That doesn't mean that your neighbours will know what you are doing on the Internet.
- The second drawback to cable is also minor. Because cable modem connections are always on, they, like DSL connections, make you more vulnerable to hacking and security breaches. For this reason, many cable companies are now providing their customers firewall software to help protect their security.

2.8.5. Internet Connectivity through Leased Line

Leased lines are dedicated circuits provided by Basic Service Providers (BSPs), which provide permanent connectivity to the Internet. Leased lines provide the last mile access from the user premises to the ISP. They provide permanent connection as compared to the temporary connectivity through dialup access. The quality of the connection is far superior to what is normally available through dialup, thanks to digital signaling, less noise, fewer exchanges etc.

Leased lines provides a scalable access method, important particularly for organizations with large user groups, including corporate, banks and financial institutions, educational and R&D organizations, government, military etc. Starting typically with 64 kbps, it is possible to deploy a scalable architecture, with multiples of E1 (2 MBPS) pipes, providing the necessary bandwidth. In fact, leased access becomes a must for large organizations in most situations.

Advantages

It provides permanent, reliable, high-speed connectivity as compared to the temporary connectivity of dial up access. The quality of the connection is far superior to what is normally available through dialup, because of the digital signaling, less noise, fewer exchanges etc.

Disadvantages

Leased bandwidth prices are quite high, compared to dialup bandwidth of comparable size. Entry level annual port prices are also high at present, so that this access method is only feasible beyond a fairly high threshold level.

Permanent connectivity to the Net exposes the organization to a variety of threats including hacking, malicious code including active vandals, viruses, Trojan Horses, macros, denial of service attacks etc.

2.9. WORKING OF INTERNET

The Internet's growth has become explosive and it seems impossible to escape the bombardment of www.com's seen constantly on television, heard on radio, and seen in magazines. Because the Internet has become such a large part of our lives, a good understanding is needed to use this new tool most effectively. It is important for the students to understand the working of internet. The working of internet can be seen in following steps :

1. Connection to internet.
2. Communication with other computers.
3. Networking infrastructure.
4. Internet infrastructure.
5. The Internet routing hierarchy.
6. Domain name and address resolution.

2.9.1. Connect to Internet

The picture below illustrates two computers connected to the Internet; your computer with IP address 1.2.3.4 and another computer with IP address 5.6.7.8. The Internet is represented as an abstract object in-between.

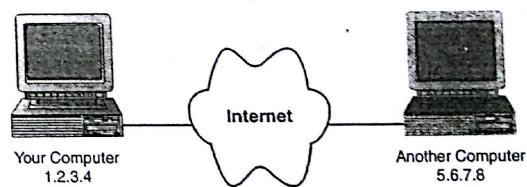


Fig. 2.4. Connection to Internet.

If you connect to the Internet through an Internet Service Provider (ISP), you are usually assigned a temporary IP address for the duration of your dial-in session. If you connect to the Internet from a Local Area Network (LAN) your computer might have a permanent IP address or it might obtain temporary one from a DHCP (Dynamic Host Configuration Protocol) server. In any case, if you are connected to the Internet, your computer has a unique IP address.

2.9.2. Communication With Other Computers

So your computer is connected to the Internet and has a unique address. How does it 'talk' to other computers connected to the Internet? An example should serve here: Let's say your IP address is 1.2.3.4 and you want to send a message to the computer 5.6.7.8. The message you want to send is "Hello computer 5.6.7.8!". Obviously, the message must be transmitted over whatever kind of wire connects your computer to the Internet. Let's say you've dialed into your ISP from home and the message must be transmitted over the phone line. Therefore the message must be translated from alphabetic text into electronic signals, transmitted over the Internet, then translated back into alphabetic text. How is this accomplished? Through the use of a protocol stack. Every computer needs one to communicate on the Internet and it is usually built into the computer's operating system (i.e. Windows, Unix, etc.). The protocol stack used on the Internet is referred to as the TCP/IP protocol stack because of the two major communication protocols used. The TCP/IP stack looks like this :

S. No.	Protocol Layer	Comments
1.	Application Protocols Layer	Protocols specific to applications such as WWW, e-mail, FTP, etc.
2.	Transmission Control Protocol Layer	TCP directs packets to a specific application on a computer using a port number.
3.	Internet Protocol Layer	IP directs packets to a specific computer using an IP address.
4.	Hardware Layer (Physical Layer)	Converts binary packet data to network signals and back. (E.g. ethernet network card, modem for phone lines, etc.)

If we were to follow the path that the message "Hello computer 5.6.7.8!" took from our computer to the computer with IP address 5.6.7.8, it would happen something like this :

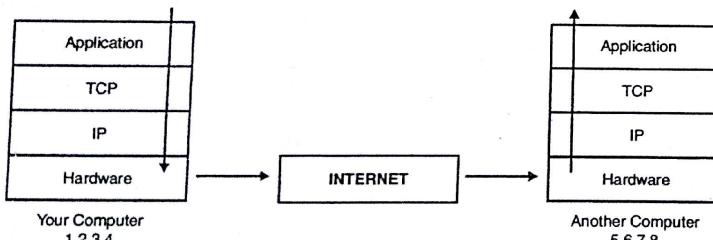


Fig. 2.5. Flow of Message on Internet.

1. The message would start at the top of the protocol stack on your computer and work its way downward.

2. If the message to be sent is long, each stack layer that the message passes through will break the message up into smaller chunks of data. This is because data sent over the Internet (and most computer networks) are sent in manageable chunks. On the Internet, these chunks of data are known as packets.
3. The packets would go through the Application Layer and continue to the TCP layer. Each packet is assigned a port number. Ports will be explained later, but suffice to say that many programs may be using the TCP/IP stack and sending messages. We need to know which program on the destination computer needs to receive the message because it will be listening on a specific port.
4. After going through the TCP layer, the packets proceed to the IP layer. This is where each packet receives its destination address, 5.6.7.8.
5. Now that our message packets have a port number and an IP address, they are ready to be sent over the Internet. The hardware layer takes care of turning our packets containing alphabetic text of our message into electronic signals and transmitting them over the phone line.
6. On the other end of the phone line your ISP has a direct connection to the Internet. The ISP's router examines the destination address in each packet and determines where to send it. Often, the packet's next stop is another router. More on routers and Internet infrastructure later.
7. Eventually, the packets reach computer 5.6.7.8. Here, the packets start at the bottom of the destination computer's TCP/IP stack and work upwards.
8. As the packets go upwards through the stack, all routing data that the sending computer stack added (such as IP address and port number) is stripped from the packets.
9. When the data reaches the top of the stack, the packets have been re-assembled into the original form, "Hello computer 5.6.7.8!"

2.9.3. Networking Infrastructure

So now you know how packets travel from one computer to another over the Internet. But what's in-between? What actually makes up the Internet? Let's look at another diagram:

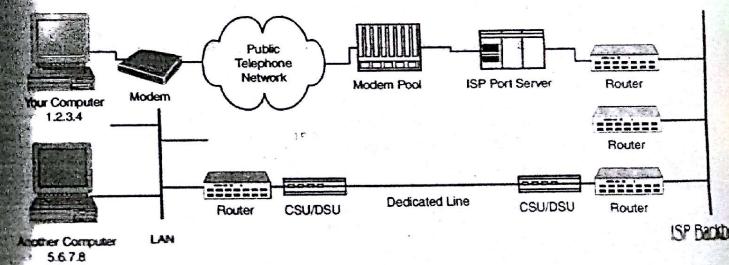


Fig. 2.6. Packet Traveling Through Internet.

Here we see Fig. 2.6 redrawn with more detail. The physical connection through the phone network to the Internet Service Provider might have been easy to guess, but beyond that might bear some explanation.

The ISP maintains a pool of modems for their dial-in customers. This is managed by some form of computer (usually a dedicated one) which controls data flow from the modem pool to a backbone or dedicated line router. This setup may be referred to as a port server, as it 'serves' access to the network. Billing and usage information is usually collected here as well.

After your packets traverse the phone network and your ISP's local equipment, they are routed onto the ISP's backbone or a backbone the ISP buys bandwidth from. From here the packets will usually journey through several routers and over several backbones, dedicated lines, and other networks until they find their destination, the computer with address 5.6.7.8.

2.9.4. Internet Infrastructure

The Internet backbone is made up of many large networks which interconnect with each other. These large networks are known as Network Service Providers or NSPs.

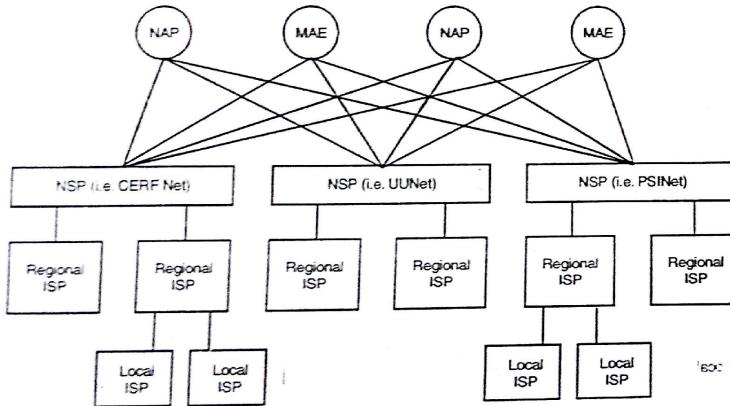
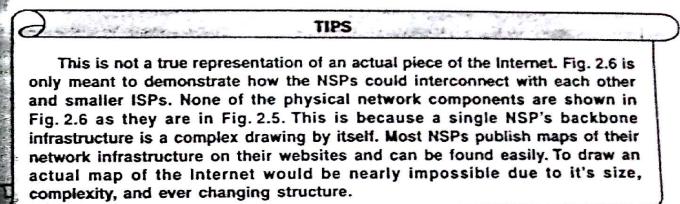


Fig. 2.7. Internet Infrastructure.

Some of the large NSPs are UUNet, CerfNet, IBM, BBN Planet, SprintNet, PSINet, as well as others. These networks peer with each other to exchange packet traffic. Each NSP is required to connect to three Network Access Points or NAPs. At the NAPs, packet traffic may jump from one NSP's backbone to another NSP's backbone. NSPs also interconnect at Metropolitan Area Exchanges or MAEs. MAEs serve the same purpose as the NAPs but are privately owned. NAPs were the original Internet interconnect points. Both NAPs and MAEs are referred to as Internet

Exchange Points or IXs. NSPs also sell bandwidth to smaller networks, such as ISPs and smaller bandwidth providers. Below is a picture showing this hierarchical infrastructure.



2.9.5. The Internet Routing Hierarchy

So how do packets find their way across the Internet? Does every computer connected to the Internet know where the other computers are? Do packets simply get 'broadcast' to every computer on the Internet? The answer to both the preceding questions is 'no'. No computer knows where any of the other computers are, and packets do not get sent to every computer. The information used to get packets to their destinations are contained in routing tables kept by each router connected to the Internet.

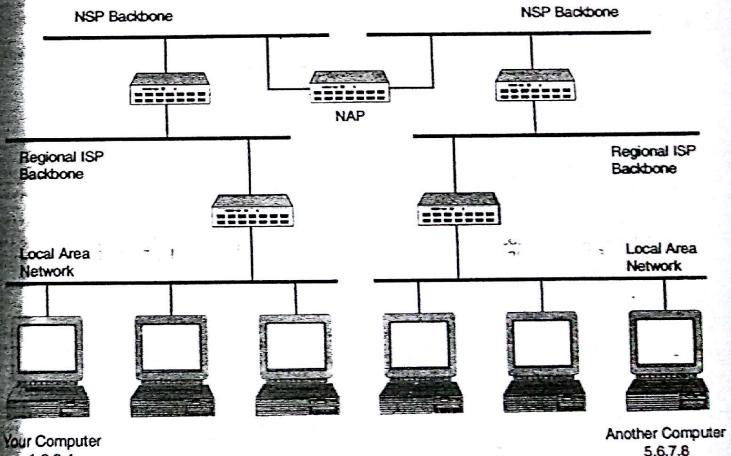


Fig. 2.8. Internet Routing Hierarchy.

Routers are packet switches. A router is usually connected between networks to route packets between them. Each router knows about its sub-networks and which IP addresses they use. The router usually doesn't know what IP addresses are 'above' it. Examine Fig. 2.7. The black boxes connecting the backbones are routers. The larger NSP backbones at the top are connected at a NAP (Network Access Points). Under them are several sub-networks, and under them, more sub-networks. At the bottom are two local area networks with computers attached.

When a packet arrives at a router, the router examines the IP address put there by the IP protocol layer on the originating computer. The router checks its routing table. If the network containing the IP address is found, the packet is sent to that network. If the network containing the IP address is not found, then the router sends the packet on a default route, usually up the backbone hierarchy to the next router. Hopefully the next router will know where to send the packet. If it does not, again the packet is routed upwards until it reaches a NSP backbone. The routers connected to the NSP backbones hold the largest routing tables and here the packet will be routed to the correct backbone, where it will begin its journey 'downward' through smaller and smaller networks until it finds its destination.

2.9.6. Domain Names and Address Resolution

But what if you don't know the IP address of the computer you want to connect to? What if the you need to access a web server referred to as www.anothercomputer.com? How does your web browser know where on the Internet this computer lives? The answer to all these questions is the Domain Name Service or DNS. The DNS is a distributed database which keeps track of computer's names and their corresponding IP addresses on the Internet.

2.10. WORLD WIDE WEB [MDU 200]

Servers store hypertext markup language (HTML) files and respond to requests. Through use of a browser, PC users can find and view server-based documents. Browsers like Netscape ensure easy access to server-based documents and display multimedia data. Future browser will include editor-like abilities, application linking, audio and video integration; data based front end ways to combine information with transactions.

Reason for the amazing success of the Web include :

1. Ease of navigation and use.
2. Ease of publishing content.
3. New distribution models.
4. Enabling a network-centric computing paradigm.
5. Enabling new intra-business applications.



World Wide Web is broad term, which is the collection of distributed documents referred to as "pages" located on computers (or servers) all over the world. For example : <http://kiit.edu>.

2.10.1. Web Architecture

To use the Web, in addition to an Internet connection, a user need a special piece of software called a Web browser (such as Netscape Navigator). The browser act as a graphical interface between the user and the Internet – it sends the necessary command to request data from other computers, then format them for the user's screen. Documents that are formatted using hypertext markup language (HTML) contain taglines that inform the browser how to format them.

The web is based on a three-part architecture :

1. HTML : Hypertext markup language, the format for web pages, provide both format and hyperlinking.

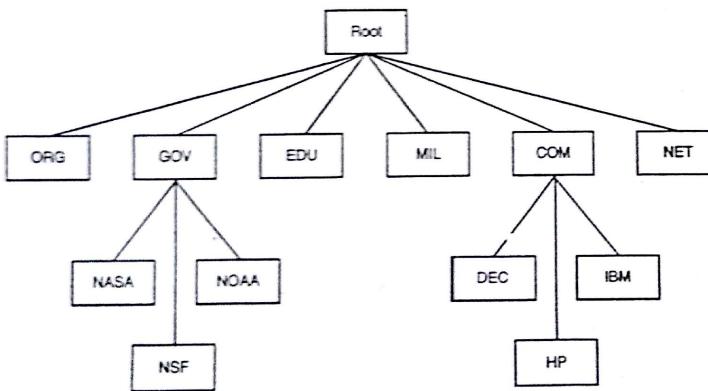


Fig. 2.9. Domain Names and Address Resolution.

Many computers connected to the Internet host part of the DNS database and the software that allows others to access it. These computers are known as DNS servers. No DNS server contains the

- i) **HTTP** Hypertext transfer protocol, the protocol for communications between Web servers and browsers.
- ii) **CGI** The common gateway interface, the interface for invoking programs from web servers.

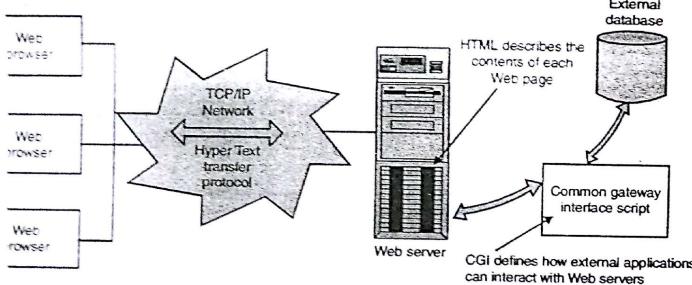


Fig. 2.10. The Web Architecture.

Figure 2.10 shows the component of web architecture, including the web clients, web servers, HTTP protocol language for Web client/server communication and applications. Within confines of this architecture, hundreds of entrepreneurs have produced tidal wave of software firms and tools.

Web architecture forms the basis for electronic commerce applications that involve software in which the functions are distributed among :

Application servers (where application reside),

Data servers (where most of the data resides), and

A Group of client computers that are usually networked PCs (where the information user work).

THE WEB AND E-COMMERCE

Figure 2.11 shows a block diagram depicting the key elements that constitute a web-based e-commerce architecture: client browser, web server and third-party services. The client browser interacts with the web server, which then intermediates the action with third party services. The web server functions can be categorized into information retrieval, data and transaction management and security. The third party services could be other web servers that provide content, information processing tools and electronic payment systems.

Importance of web for e-commerce can be understood by following :

Companies use the Web to communicate with customers and suppliers by publishing content on their web server for widespread distribution. Motivated by the potential for business-to-business as well as business-to-consumer commerce, many firms are taking steps towards selling their products on the Web.

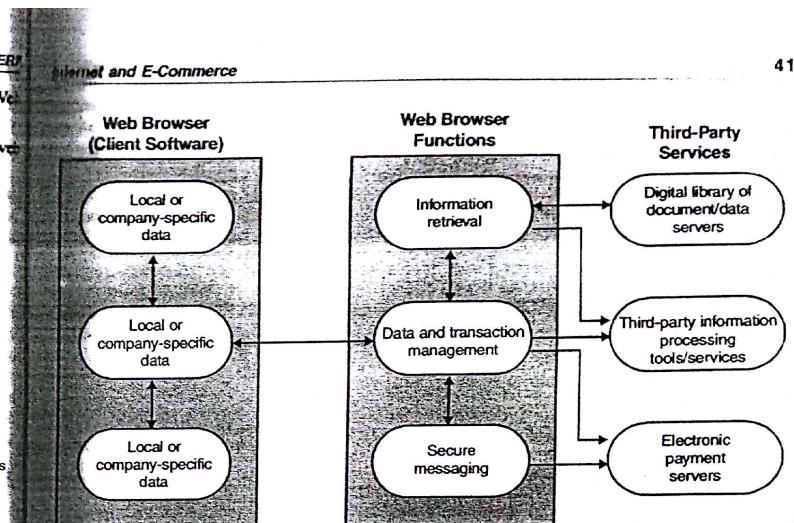


Fig. 2.11. Block diagram depicting an electronic commerce architecture.

- (ii) The Web is also changing and reshaping industries whose core business is information transfer between the firm and the consumer. Examples of such business functions include advertising, marketing, sales and customer service. Industries that are engaged in information transfer with customer include banking and financial services, retailing and electronic publishing and entertainment.

Within these industries, the Web is used for four major tasks :

1. Attracting new customers via marketing and advertising.
2. Serving existing customers via customer service and support function.
3. Developing new markets and distribution channels for existing products.
4. Developing new information based products.

2.12. E-COMMERCE TRANSACTION

Figure 2.12 represents transaction between seller and buyer.

Figure 2.13 represents the transaction between producer and consumer

(1) Electronic commerce has the potential to increase revenue by creating new markets for old products, creating new information-based products, and establishing new service delivery channels to better serve and interact with customer.

(2) The transaction management aspects of electronic commerce can also enable firms to reduce operating costs by enabling better coordination in the sales, production and distribution process (or better supply-chain management) and to consolidate operations and reduce overhead.

The goal of most electronic commerce research and its associated implementations is to reduce "friction" in online transactions. Friction is often described in economics as transaction cost. Friction can arise from inefficient market structures linking buyers, sellers and intermediaries; inefficient organizational structures (operating units, business processes and workflows); and inefficient combinations of the technological activities required to make a transaction. Ultimately, the reduction of friction is online commerce will enable smoother transactions between buyers, intermediaries and sellers.

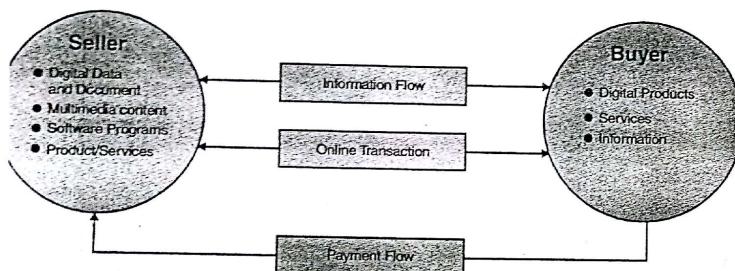


Fig. 2.12.



Fig. 2.13. Product type transactions.

3. E-BUSINESS MODEL

[MDU 2007]

E-Business Model like any business model, describes how a company functions, how it provides a product or service, how it generates revenue, and how it will create and adapt to new markets and technologies.

It has four traditional components as shown in the figure. The e-Business Model. These are the business concept, value proposition, sources of revenue, and the required activities, resources, capabilities. In a successful business, all of its business model components work together in a cooperative and supportive fashion.

(I) E-Business Concept

The *e-business concept* describes the rationale of the business, its goals and vision, and products or offerings from which it will earn revenue. A successful concept is based on a market analysis that identifies customers likely to purchase the product and how much they are willing to pay for it.

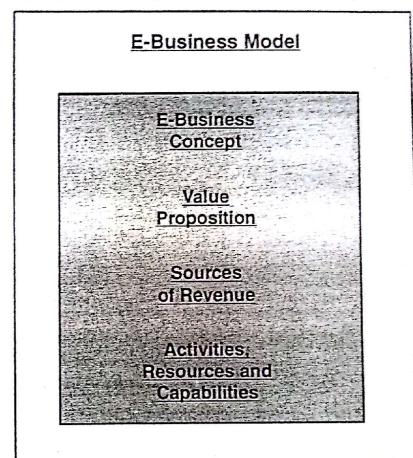


Fig. 2.14. E-Business model.

(II) Value Proposition

The *value proposition* describes the value that the company will provide to its customers and sometimes, to others as well. With a value proposition the company attempts to offer better value than competitors so that the buyer will benefit most with this product.

A value proposition may include one or more of the following points:

- Reduced price
- Improved service or convenience such as the "1 click" checkout
- Speed of delivery and assistance
- Products that lead to increased efficiency and productivity
- Access to a large and available inventory that presents options for the buyer

Providing value in an e-business uses the same approach as providing value in any business although it may require different capabilities. But common to both are the customers who seek value in a business transaction. The value proposition helps focus the business on the well-being of the customer, where it remains in successful companies.

II) Sources of Revenue

Depending on the business model, several revenue sources may be available to an e-business. Any online businesses will have a three or four of these sources. A mix of revenue sources is often referred to as a *revenue model* but may be mistakenly called a *business model*. Some of these sources of revenue are:

- Advertising
- Affiliation
- Agent commissions
- Licensing
- Sales commissions
- Sales profits
- Sponsorship
- Subscription
- Syndication
- Use Fees

For large public-private or government projects revenue sources might also include:

- Bonds, usually for large capital expenditures
- Taxes, primarily income, property and sales taxes
- Use fees and tolls

III) Activities, Resources and Capabilities

The activities, resources and capabilities of a business are sometimes known as its requirements. In order to perform the activities required to carry out the mission of the business, certain resources are needed; for example, employees with certain skills, or capabilities, are needed to perform activities correctly and efficiently. Also, inventions, processes and other intellectual property may be the individual knowledge of an employee to develop a competence in the performance of the required activities.

3.1. E-Business Model Based on the Relationship of Transaction Parties

Although there are many different ways to categorize e-business models, they can be broadly categorized as

- (1) E-business Model based on the relationship of transaction parties.
- (2) E-business Model based on the relationship of transaction parties.

E-business Model based on the relationship of transaction parties :

- B2C : Sells products or services directly to customers, e.g. amazon.com
- B2B : Sells products or services to other business, or brings multiple buyers and sellers together in a central market place, e.g. Chemdex.com
- B2G : Business selling to local, state and federal agencies, e.g. iGov.com

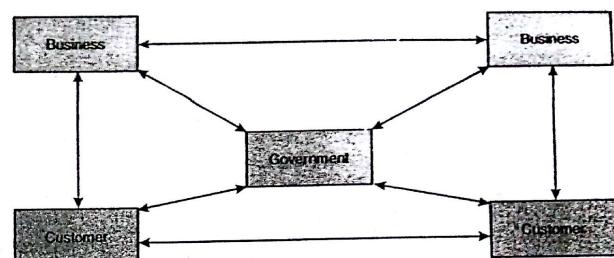


Fig. 2.8.

- C2C : Consumers sell directly to other consumers, for example, Ebay.com
- C2B : Consumers fix price on their own, which business accept or decline. For example, Priceline.com

IV) INTERNET SALES VENUES

Electronic commerce, commonly known as (electronic marketing) e-commerce or eCommerce, consists of the buying and selling of products or services over electronic systems such as the Internet and other computer networks.

The seller sells the product or service to the person and it is called virtual sales on the internet. Online sellers, online selling open up new sales channels for new products and offer buyers favorable purchasing conditions.

Online selling has effectively created a giant virtual marketplace where people can gather to buy, sell, trade and check out the goods of the day. They're enormously popular, high-traffic venues where you can begin selling product almost immediately, with...

- No overhead or upfront costs
- No sales staff or distributors

These companies offer the opportunity to sell a popular, consumable product.

- Aromazonia Candle Company
- Cierra_Ashley
- DiamondCreek Candles
- Enchanting Scents Designs
- For Every Home
- Gold Canyon Candle Company
- Hat Creek Home
- Northern Lights At Home
- PartyLite
- Scent-Sations, Inc

- Scentsy
- Thirty-One Gifts

2.15. E-COMMERCE SOLUTIONS

E-commerce is essential for the future growth of our online business. It creates increases in revenue and in portability, reduces overheads and can revolutionize our customer service. Let us discuss some of the questions as follows:

- Are you selling your goods through local shops?
- Do you have a Dealer Network?
- Do you have a National channel setup for selling your products and service through people?
- Are you changing your business model?
- And directly want to approach the customer?
- Are you looking to sell and minimize cost of transaction?
- Are you looking to capture the International Market?

Then you definitely need an E-commerce Website for your company. An E-commerce website facilitates the entire offline business to online business process comprehensively and enables a user to conduct business in a systematic way.

An e-commerce solution is a solution to conduct business using technology, through an intra-, extra- or Internet solution. There are two types of e-commerce: Business-to-consumer (B2C) e-commerce involving companies selling products or services to individuals; and business-to-business (B2B), in which companies sell to other businesses.

2.15.1. Advantages of using e-commerce Solutions

1. By making a few mouse clicks, entrepreneurs can successfully complete an online commercial transaction. Having an e-commerce solution today has become a necessity.
2. Moving a business to the Internet is a sound strategy for increasing business volume, making a business instantly international and opening up possibilities that can never exist in the "real world".
3. It doesn't matter even if businesses are small and localized. Going international will facilitate better support since e-commerce solutions will make it a 24x7 business.
4. A business with a strong Internet presence can reduce staffing and office space overhead which can result in more competitive pricing of services and products.
5. The Internet can provide a more economical form of advertising. A website with ecommerce capabilities actually draws people back; building brand loyalty and awareness which are rare in mainstream advertising.
6. Integrated payments with Banking and Accounting are possible thereby providing robust support for accounting systems.
7. In e-commerce, the interaction with the system takes place in almost real time and therefore allows the customer or bidder to respond more quickly and reduces the lag time between discussion and purchase.

SUMMARY

In this chapter, we have seen the architectural requirement for the e-commerce. Now we are aware about the role of internet and intranet in e-commerce. What is the role of web browser, web server, DNS, ISP's and other concepts in internet browsing. We have also discussed that how communication takes place over the internet.

REVIEW QUESTIONS

1. What is internet and how it helps in e-commerce ?
2. Discuss the advantages and disadvantages of internet .
3. What is ISP ? How will you select an ISP ?
4. What is Domain Name System ?
5. How addressing on the internet takes place ?
6. What is the importance of URL in internet ?
7. What is WWW ?
8. How e-commerce takes place over web ?



Electronic Payment Methods

CHAPTER 3

- INSIDE THIS CHAPTER**
- 3.1. Conventional Payment Methods
 - 3.2. E-Commerce Security Issue
 - 3.3. Online Line Commercial Environment
 - 3.4. Online Transaction and Security
 - 3.5. Offline Secure Processing
 - 3.6. Private Data Network



CONVENTIONAL PAYMENT METHODS

In the conventional process, after a buyer decides to buy goods and services from a merchant, merchant will transfer these goods and services to the buyer and the buyer will transfer cash or payment information (such as check, and credit card information) back to the merchant.

In the cash transaction : Cash moves from the buyer's account to the merchant's account via face exchanges:

- The buyer withdraws a certain *amount of money* from his account
- He transfers the cash to the seller
- The seller deposits the cash into his account

In the non-cash transaction :

- The buyer will transfer the *payment information* to the merchant
- Adjusting the appropriate accounts of the seller and buyer (via check or credit card) (If the merchant uses different bank from the buyer, a payment clearing service between 2 banks will be necessary in order to adjust appropriate accounts in different bank Fig. 3.1)

With the development of the Internet, it provides the buyer and merchant the ability to do the transaction instead of the above non-cash transaction process. In this type of system (electronic

Electronic Payment Methods

(check, online credit card), the sensitive information is transferred online along with the orders through the internet. In addition, because the transaction is done online, the probability using different banks (or banks located in different countries) between the merchant and buyer is high. Therefore, the payment clearing services is added in order to adjust appropriate merchant and buyer bank's accounts

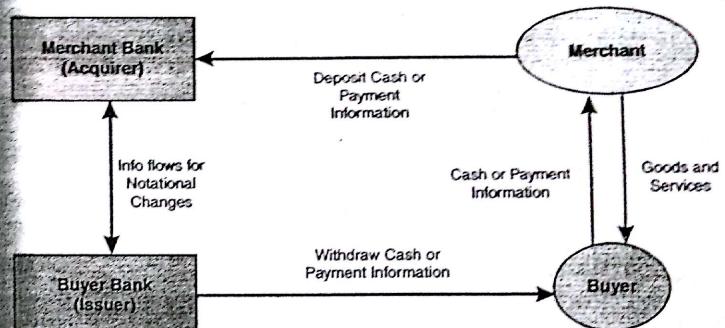


Fig. 3.1. Cash Transactions.

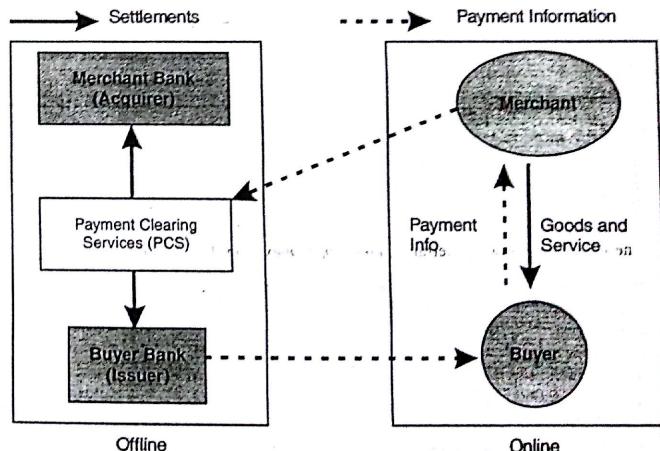


Fig. 3.2. Non-cash Transactions.

3.1.1. Problems with Traditional Payment Methods

[MDU 2006]

Traditional payment methods do not work online for the following reasons :

- (i) **Lack of Convenience** : Traditional payment methods generally require that the consumer leave the online platform and use the telephone or send a check in order to make payment.
- (ii) **Lack of Security** : In order to make a traditional payment over the internet, a consumer has to provide card/payment account details and other personal information online. Leaving the internet and providing the card/payment account details over the telephone and/or by mail also increase the security risks.
- (iii) **Lack of Coverage** : Credit cards only work with signed-up merchants and do not generally support individual-to-individual or direct business-to-business payment transactions.
- (iv) **Lack of Eligibility** : Not all potential buyers have suitable credit ratings to allow them access to credit cards and/or checking accounts.
- (v) **Lack of Support for Micro Transaction** : Many payments made over the Internet are of sufficiently low value that the cost of a phone call or letter may be too high of an overhead.

3.2. E-COMMERCE SECURITY ISSUE

[MDU 2008]

While many security issues in e-commerce are the same as general security issues, some of them are specific for the kind of software used by e-commerce businesses: databases, in particular databases which are accessed remotely, online forms and shopping carts. Below we consider these specific vulnerabilities:

3.2.1. Database Vulnerabilities

More common vulnerabilities in e-commerce are caused remotely accessed databases. Below are some examples :

- (i) Running SQL queries based on data entered by the user may allow a malicious user to append their own query to the one that is supposed to be executed. Similar things can be done, in addition to online forms, with URL rewriting and cookies. Note that the user can easily type in any URL into the browser window, including a URL which contains an extra query. The user can also easily alter a cookie which resides on the user's computer.
- To avoid these vulnerabilities, one has to check the data entered by the user, as well as URLs and cookies, to make sure that they are of the correct format. One can also restrict privileges of the process running search queries so that it is not allowed to remove data from the database. **One also has to be careful not to expose table names in the text of online forms, since this attack requires the hacker to know the table name in order to delete the information from it.**
- (ii) Another group of database security issues comes from exposing database servers to hackers. **To prevent unauthorized access, database servers should be inside a firewall.** It is also important that database passwords and user names are not exposed in web pages that user can see (not only in plain text, but also in hidden fields, and in Java script code). Such passwords and user names should be transmitted encrypted.
- (iii) Since many employees of an online business have access to the database, their account names and passwords should be kept secure. Also, all code that contains passwords for database access (such as Java code of applets and servlets) should be stored securely.

3.2.2. Shopping Cart Vulnerabilities

Numerous vulnerabilities have been discovered in shopping carts, both commercially produced and "home made" ones:

- (i) **Price manipulation** : If a price of the product is passed as a hidden parameter in an online form and the value of the parameter is used to determine the charge on the credit card, then a customer can easily replace the HTML page with the form by their own page, where all the information is the same, but the price is changed to a lower one.
- (ii) **Transaction modification** uses a similar idea. If the merchant's site redirects the user to another website for credit card verification or sends a request for the charge to the credit card company, this is often done via a POST request. The request may contain the amount of the credit card charge or the kind of a transaction (some transactions may be specified as "test", in which case no actual charge takes place). The user may modify the amount or charge or mark their transaction as "test".
- (iii) **Exposing Merchant's ID** : When the merchant sends a credit card charge request, the request may contain the merchant's ID. If the ID is exposed in the website forms, a hacker may use this ID to send their own requests to the credit card company. The request may include canceling a transaction, thus crediting money to the credit card. Hackers also may use merchant's ID to check if a credit card number is valid.
- (iv) **Other things that may be exposed by poorly written shopping cart code** are IP addresses of database servers, user name and password for database access, names of database tables and columns. All this may cause theft, damage, or modification of the data stored in the database.
- (v) **Another group of break-ins is related to so-called back door access to a shopping cart** : Shopping carts come with passwords that allow the owner to change settings or access information in the shopping cart or the database. Initially these passwords are set to default. Once the default becomes known to hackers, the software can be easily accessed and changed to serve the purposes of the hacking.

3.2.3. Customer's Passwords

Many online businesses use customer's passwords to authorize access to sensitive data (such as the order information). However, one has to be extremely careful with how the password system works. Here are potential problems :

- (i) **People Tend to Forget Their Passwords.** A forgotten password needs to be reset. However, resetting a password should be done securely. The confirmation should be sent by e-mail, and the new password should not be used until the customer replies to the e-mail. One of the recent cases of security breaches involving changing password was discovered at eBay.
- (ii) **Another possibility for stealing passwords is to "impersonate" a merchant and request the user's password.** In general, a business website may be better off without customer's passwords, and should not rely on them for protection of sensitive information.

2.4. E-Commerce Technology: Secure Payment System

Online shopping is not new in our society today. Most people have tried at least once or twice purchase something online. Purchasing online, whether services or products, requires that a customer have a valid credit card or finance account such as Pay Pal.

Due to the increasing crime on the Internet, many now are having second thoughts of giving their credit account information. To some it provides a sense of uncertainty and taking risks when purchasing online.

Over the years there is lot of e-commerce technology that has been developed. This helps the customers in many ways in terms of convenience and accessibility. But still the security of their hard earned money is left unanswered.

Now an e-commerce technology is developed known as the Secure Payment System. It is a mode of operation wherein the security of financial transactions done on the Internet is ensured to be safe and confidential.

This application of an online store is an important service that keeps the customers of an online company coming back because they view the online store as safe and reliable. In a way also it provides them a sense of safety and security of their financial transactions.

Under this type of e-commerce technology is SET or the Secure Electronic Transaction. The T uses the unique process of encrypting the information obtained between the customers and the online store.

The goal of SET is to ensure that the payment process is private, convenient and most importantly secure.

SET ensures that the order and payment information of the customers are kept confidential. T also has the capacity to authenticate the customer is the legitimate user of the credit account.

The payment process is easy and simple. When the customer made a purchase, the SET will authenticate the credit card against the details provided by the customer, and then the merchant which is the online store will send the order details to the bank. Transaction will occur between the two for the approval of the purchase. When approved the bank will digitally sign and an authorization will be given to the merchant who can then process the order.

This type of e-commerce technology is truly a breakthrough in online shopping and transactions.

The e-commerce technology developed are very important in the online e-commerce especially secure payment system. It provides the customers a piece of mind when doing Internet transactions.

Now customers will be safe against scams. A reliable e-commerce technology is truly what we need.

ONLINE COMMERCIAL ENVIRONMENT

[MDU 2008]

Electronic payment is the term used for any kind of payment processed without using cash or checks. Forms of electronic payment include use of ACH or Automated Clearing House, checks, direct debit, debit cards, and credit cards.

When we come to the e-commerce transaction, the lack of face to face interaction makes some items about the security of the sensitive information and identity. As a result, we need an intermediary party (Paypal, google checkout) to provide the security, identification as well as

payment support. In this process, the buyer don't need to transfer his sensitive information to the merchant but to the intermediary and the intermediary will confirm the identification of the buyer to the merchant (Note that the transaction between the intermediary and the banks can be performed through another type of electronic payment or conventional process)

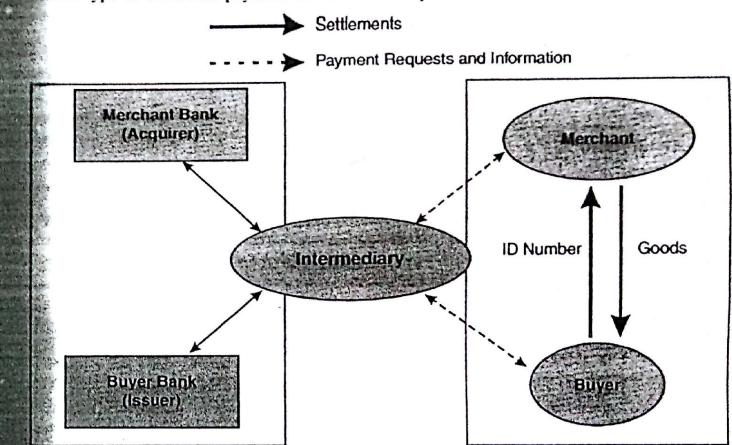


Fig. 3.3. On-line Commercial Environment.

There are several benefits of Using Electronic Payment as follows :

- (i) **Convenience :** The most apparent benefit of this mode of payment is the convenience it can offer us. With electronic payments, all you have to do is input your account and shipping information and the transaction can proceed. Payment of bills can also be done easily without the usual long lines and hassles.
- (ii) **Lower Costs :** Due to automation of functions such as credit card processing and payment, electronic payments have lowered the cost of doing business. There's less postage fees, paper consumed, and personnel as well as resources needed the costs are smaller.

3.1. Different Types of Electronic Payment Systems

[MDU 2007, 2008]

In order to have a completed overview of the electronic payment systems, a categorization of different types of electronic payment systems is necessary. There are many different researches about the types of electronic payment systems, and different authors used different criteria to categorize these systems.

In the basic classification of e-payment systems, two criteria was used to categorize the electronic payment systems: pre-paid, pay-now or pay-later and online or offline transaction

If we use the pre-paid, pay-now, or pay-later criterion, we will have following systems:

- Pre-paid**: Customer pays before the transaction (e.g. she buys electronic tokens, ticket coins, ...and uses them to pay for her transactions)
 - Pay-now**: The customer's account is checked and debited at the same time when the transaction takes place (ex: internet banking...)
 - Pay-later (credit-based)**: Customer pays after the transaction (ex: credit card...)
- If we use the second criterion, we will have
- On-line**: A third party (the bank) is involved in the transaction in real-time.
 - Off-line**: The bank (or financial organization) is not involved in real-time in the transaction.

3.3.2. Different Types of Online Payment Methods

1. Smart Cards

A smart card is similar to a magnetic stripe card but contains a microprocessor chip. The first smart cards were prepaid telephone cards, which operated on stored prepaid values. They have moved on from this to be used for things such as library cards, credit cards, student cards, and electronic purses.

2. Contact Cards

With a contact smart card, the user inserts it into a reader in order to access the information on it. The data is then transferred once physical contact is made. The reader supplies power to the chip in the card through the contacts. These cards are used in financial applications such as store-value, debit, and credit cards because of their reliability and the high power available to the microchip processor. Contact cards are slower and require more servicing than contactless cards.

3. Contactless Cards

Contactless cards communicate with the card reader using radio frequency technology. They are implanted with a radio antenna. No physical contact is required with the reader. Contactless smart cards are suitable for application in fast paced transactions. Proximity, close-coupled, and vicinity cards are sub-types of contactless cards. Vicinity cards are used in industrial tagging, car park access, and library book tagging. Contactless cards cannot support encryption techniques and are expensive to manufacture.

4. Hybrid or Combi Cards

Hybrid or combi cards combine elements of contact and contactless cards. This is done in three different ways. Firstly, there is a hybrid card that has two chips. Each chip has either a contact or contactless interface. This method offers high security but is expensive to produce. The combi card

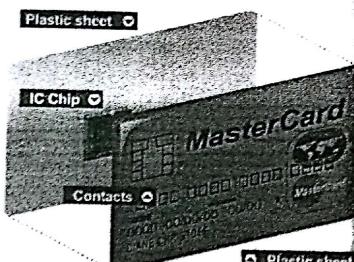


Fig. 3.4.

Electronic Payment Methods

one chip, but with a contact and contactless interface. The combi card is cheaper than the hybrid. There is a third type that uses an RF sleeve with an inbuilt antenna. This enables the card to contact the reader, thus making a contact card into a contactless one. This card type has low security.

B. Mondex

Mondex is a contact smart card that holds the equivalent of cash. It is an electronic purse. A Mondex card behaves exactly like cash and unlike other payment cards requires no signature PIN, or transaction authorization. Cash is stored on an integrated circuit (IC) on the smart card. Cash can be securely transferred from one IC to another. Value is stored in a purse in the IC. Application Carrier Device (ACD) holds the Mondex purse application. In a Mondex payment value is transferred from one purse to another. Mondex transactions take place by inserting the card into a card reader.

C. eChecks

Definition

An eCheck is an electronic representation of a paper check. An eCheck uses public key cryptographic signatures and secure messaging over the Internet to make payments and perform other financial functions. They function using the same mechanisms as paper checks, but in an electronic format.

eCheck transactions take place in the following way:

- the payer "writes" the eCheck and "gives" the eCheck to the payee electronically
- the payee "deposits" the eCheck, receives credit, and the payee's bank "clears" the eCheck to the paying bank.
- the paying bank validates the eCheck and then "charges" the check writer's account for the check

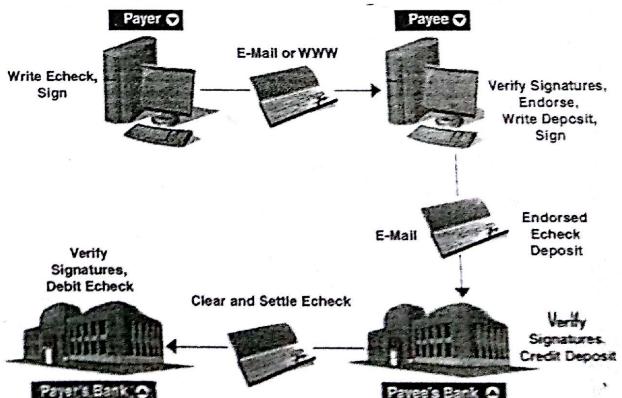


Fig. 3.5. Echecks Transaction System.

7. Mobile payments



Definition A mobile payment is where two parties exchange financial value by means of a mobile device in return for goods or services. Mobile technologies include 2G and 3G data networks, and the Bluetooth, infrared, and radio frequency identification (RFID) wireless protocols. All mobile payments should be secure, interoperable, and easy to use.

Examples of where mobile purchases could be used effectively are :

- mobile top-ups
- online shopping
- road-tolls
- fast-food drive-through
- service stations
- images or games

TIPS

Mobile payments can be either Over the Air (OTA) or across wide-area networks (WAN). OTA payments usually operate on a browser-based transfer infrastructure, such as SMS or multimedia messaging (MMS). WAN uses a wireless network and proximity payments that transfer information over short distances. Proximity payments can be made using various technologies including Bluetooth, infrared, RFID, and contactless chips.

4. ONLINE TRANSACTION AND SECURITY

[IMDU 2008]

The ease of shopping and comparing products and prices online has made it an attractive option for many shoppers. How can we make sure our transactions are safe and our credit card information is only where we intend it to? There are several ways to help ensure safe transactions on the Internet, and more are becoming possible all the time. Some of these include :

1. Stored-value cards (cards that we can buy with specified, loaded Rs. amounts)
2. Smart cards (cards that can act as credit cards, debit cards and/or stored-value cards)
3. Point-of-sale (POS) devices (like our PDA or mobile phone)
4. Digital cash
5. E-wallets
6. Online payment services like PayPal

The most important method for paying for the things we purchase online is still the credit card. The following list provides some tips on how to make sure our transaction is secure and to do so following steps can be taken :

(a) **Use the Latest Internet Browser :** The program that we use to surf the Internet is called a browser. This software has built-in encryption capabilities that scramble the information we send to a server. Using the most recent browser ensures that the data is protected using the latest encryption technology. This technology also uses a Secure Sockets Layer (SSL),

which is an Internet security protocol used by Internet browsers and Web servers to transmit sensitive information.

- (b) **Look for Digital Certificates :** That authenticate the entity we are dealing with. Independent services like VeriSign will authenticate the identity of the Web site we are visiting. Web sites that use this service (usually those that sell items or services online) will have the VeriSign logo. By clicking on the logo, you can be assured that the site is legitimate, rather than a clone of the legitimate company set up to collect your personal and financial information.
- (c) **Read the Privacy Policy :** The information we enter on the Web site should be kept confidential. Make sure we read the company's privacy policy to ensure that our personal information won't be sold to others.
- (d) **Only Use One Credit Card for all of your online purchases.**
- (e) Never give out passwords or user ID information online unless we know who we are dealing with and why they need it.
- (f) **Keep Records of All of Our Internet Transactions.** Watch our credit card statement for the charges and make sure they're accurate.
- (g) **After we have made Purchases Online, Check our E-mail.** Merchants often send confirmation e-mails or other communications about our order.

4.4.1. Secure Electronic Payments

The explosion of Internet and World Wide Web is rapidly changing the way the business transactions are carried out. It is emerging as a medium through which the goods and services are being provided to the customer. This medium is being used to serve the customers at faster rates and lower cost.

It is also being used to provide the better quality of service. Most business transactions involve the payment and settlement process. Electronic payment systems have become necessary to enable Internet commerce. The requirements of payment transactions include confidentiality, security, integrity, non-repudiation and authentication. One of the main bottlenecks in the growth of E-commerce is lack of suitable payment instrument and corresponding electronic payment system.

When you make an online purchase on the internet, your credit card information is vulnerable to interception by network sniffers. Software that easily recognizes credit card number formats. Several basic security measures are being used to solve the security problems :

- (i) Encrypt (code and scramble) the data passing between the customer and merchant
- (ii) Encrypt the data passing between customer and the company authorizing the credit card transaction or
- (iii) Take sensitive information offline.

For example many companies use the Secure Socket Layer (SSL) security method developed by Netscape Communications that automatically encrypts data passing between your Web browser and a merchant's server.

However, sensitive information is still vulnerable to misuse once it's decrypted (decoded and unscramble) and stored in a merchant's server. So a digital wallet approach such as the CyberCash payment was developed. In this method, you add security software add-on modules to your Web

browse. That enables your browser to encrypt your credit card data in such a way that only the bank that authorizes credit card transactions for the merchant gets to see it. All the merchants is told if whether your credit card transaction is approved or not.

TIPS

The Secure Electronic Transaction or SET, standard for electronic payment security extends the CyberCash digital wallet approach. In this method, EC software encrypts a digits envelop of digital certificates specifying the payments details for each transaction. SET (Secure Electronic Transaction) has been agreed to by VISA, MasterCard, IBM, Microsoft Network, Netscape and most other industry player.

Therefore, SET is expected to eventually become dominant standard for secure electronic payments in the internet. However, SET has been stalled by the reluctant of companies to incur its increased hardware, software and cost requirement.

3.4.2. Digital Certificate

Digital Certificates are the electronic counterparts to driver licenses, passports and membership cards. You can present a Digital Certificate electronically to prove your identity or your right to access information or services online.

Digital Certificates, also known as digital certificates, bind an identity to a pair of electronic keys that can be used to encrypt and sign digital information. A Digital Certificate makes it possible to verify someone's claim that they have the right to use a given key, helping to prevent people from using phony keys to impersonate other users. Used in conjunction with encryption, Digital Certificates provide a more complete security solution, assuring the identity of all parties involved in a transaction.

A Digital Certificate is issued by a Certification Authority (CA) and signed with the CA's private key.

A Digital Certificate typically contains the :

- Owner's public key
- Owner's name
- Expiration date of the public key
- Name of the issuer (the CA that issued the Digital Certificate)
- Serial number of the Digital Certificate
- Digital signature of the issuer

TIPS

The most widely accepted format for Digital Certificates is defined by the CCITT X.509 international standard; thus certificates can be read or written by any application complying with X.509. Further refinements are found in the PKCS standards and the PEM standard.

4.4.3. Digital Signature



A digital signature functions for electronic documents like a handwritten signature does for printed documents. The signature is an unforgeable piece of data that asserts that a named person wrote or otherwise agreed to the document to which the signature is attached.

A digital signature actually provides a greater degree of security than a handwritten signature since the recipient of a digitally signed message can verify both that the message originated from the person whose signature is attached and that the message has not been altered either intentionally or accidentally since it was signed. Furthermore, secure digital signatures cannot be repudiated; the signer of a document cannot later disown it by claiming the signature was forged.

In other words, Digital Signatures enable "authentication" of digital messages, assuring the recipient of a digital message of both the identity of the sender and the integrity of the message. The requirement form the digital signatures are following :

- (i) The signature must be a bit pattern that is dependent on the message being signed.
- (ii) To prevent forgery and denial, the signature must use some information unique to the sender.
- (iii) The digital signature must be easy to generate.
- (iv) The storage of a copy of the digital copy must be simple.
- (v) Forging the signature must be computationally infeasible i.e., either by constructing a fraudulent signature for a given message, or constructing a new message with an existing signature.
- (vi) The signature must be easy to verify and recognize.

1. Use of Digital Signature for Authentication

Suppose Ramesh wants to send a signed message to Naresh. He creates a message digest by using a hash function on the message. The message digest serves as a "digital fingerprint" of the message; if any part of the message is modified, the hash function returns a different result. Ramesh then encrypts the message digest with her private key. This encrypted message digest is the digital signature for the message.

Ramesh sends both the message and the digital signature to Naresh. When Naresh receives them, he decrypts the signature using Ramesh's public key, thus revealing the message digest. To verify the message, he then hashes the message with the same hash function Ramesh used and compares the result to the message digest he received from Ramesh. If they are exactly equal, Naresh can be confident that the message did indeed come from Ramesh and has not changed since she signed it. If the message digests are not equal, the message either originated elsewhere or was altered after it was signed.

TIPS

Note that using a digital signature does not encrypt the message itself. If Ramesh wants to ensure the privacy of the message, he must also encrypt it using Naresh's public key. Then only Naresh can read the message by decrypting it with his private key.

It is not feasible for anyone to either find a message that hashes to a given value or to find two different messages that hash to the same value. If either were feasible, an intruder could attach a false message onto Ramesh's signature. Specific hash functions have been designed to have the property that finding a match is not feasible, and are therefore considered suitable for use in cryptography.

One or more Digital Certificates can accompany a digital signature. If a Digital Certificate is present, the recipient (or a third party) can check the authenticity of the public key.

Validity of Digital Signatures

Normally, a key expires after some period of time, such as one year, and a document signed with an expired key should not be accepted. However, there are many cases where it is necessary to sign documents to be regarded as legally valid for much longer than two years: long-term lease contracts are examples. By registering the contract with a digital time-stamping service at the time it is signed, the signature can be validated even after the key expires.

If all parties to the contract keep a copy of the time-stamp, each can prove that the contract was signed with valid keys. In fact, the time-stamp can prove the validity of a contract even if one party's key gets compromised at some point after the contract was signed. Any digitally signed document can be time-stamped, assuring that the validity of the signature can be verified after the key expires.

Digital Time-Stamping Service

A digital time-stamping service (DTS) issues time-stamps which associate a date and time with a digital document in a cryptographically strong way. The digital time-stamp can be used at a later date to prove that an electronic document existed at the time stated on its time-stamp. For example, a physicist who has a brilliant idea can write about it with a word processor and have the document time-stamped. The time-stamp and document together can later prove that the scientist deserves the Nobel Prize, even though an arch rival may have been the first to publish.

Here's one way such a system could work. Suppose Ramesh signs a document and wants it e-stamped. He computes a message digest of the document using a secure hash function and then sends the message digest (but not the document itself) to the DTS, which sends her in return a digital time-stamp consisting of the message digest, the date and time it was received at the DTS, and the signature of the DTS. Since the message digest does not reveal any information about the content of the document, the DTS cannot eavesdrop on the documents it time-stamps. Ramesh can present the document and time-stamp together to prove when the document was written. A verifier computes the message digest of the document, makes sure it matches the digest in the time-stamp, and then verifies the signature of the DTS on the time-stamp.

The use of a DTS would appear to be extremely important, if not essential, for maintaining the integrity of documents over many years. Suppose a landlord and tenant sign a twenty-year lease. The public keys used to sign the lease are set to expire after two years. Solutions such as recertifying the keys or resigning every two years with new keys require the cooperation of both parties several years after the original signing. If one party becomes dissatisfied with the lease, he or she may cease to cooperate. The solution is to register the lease with the DTS at the time of the original signing; both parties would then receive a copy of the time-stamp, which can be used years later to verify the integrity of the original lease.

Electronic Payment Methods

In the future, it is likely that a DTS will be used for everything from long-term corporate contracts to personal diaries and letters. Today, if an historian discovers some lost letters of Gandhi Ji, their authenticity is checked by physical means. But a similar find 100 years from now may consist of an historian's computer files: digital time-stamps may be the only way to authenticate the find.

4. Legal Status of Documents Signed With Digital Signatures

If digital signatures are to replace handwritten signatures they must have the same legal status as handwritten signatures, i.e., documents signed with digital signatures must be legally binding. The Australian Government and most states and territories in Australia have already enacted legislation that gives electronic communications the same status as written communications at law (both criminal and civil). These are known as the Electronic Transactions Acts. There are some limitations on when electronic communications are effective, but the basic principle is that transactions are not valid because they took place electronically.

However, since the validity of documents with digital signatures has never been challenged in court, their legal status is not yet well-defined. Through such challenges, the courts will issue rulings that collectively define which digital signature methods, key sizes, and security precautions are acceptable for a digital signature to be legally binding.

Digital signatures have the potential to possess greater legal authority than handwritten signatures. If a ten page contract is signed by hand on the tenth page, one cannot be sure that the first nine pages have not been altered. However, if the contract was signed with digital signatures, a third party can verify that not one byte of the contract has been altered.

Currently, if two people want to digitally sign a series of contracts, they might first sign a paper contract in which they agree to be bound in the future by any contracts digitally signed by them with a given signature method and minimum key size.

4.4. Secure Socket Layer (SSL)

Definition *Secure Socket Layer (SSL) is a protocol designed and implemented by Netscape Communications. Netscape claims it is designed to work on the same principles as the socket layer, to protect any higher level protocol built on sockets, such as Telnet, FTP and HTTP.*

Secure Socket Layer (SSL) technology allows web browsers and web servers to communicate over a secure connection. In this secure connection, the data that is being sent is encrypted before being sent and then is decrypted upon receipt and before processing. Both the browser and the server encrypt all traffic before sending any data. SSL addresses the following important security considerations.

- (i) **Authentication :** During your initial attempt to communicate with a web server over a secure connection, that server will present our web browser with a set of credentials in the form of a server certificate. The purpose of the certificate is to verify that the site is who and what it claims to be. In some cases, the server may request a certificate that the client is who and what it claims to be (which is known as client authentication).
- (ii) **Confidentiality :** When data is being passed between the client and the server on a network, third parties can view and intercept this data. SSL responses are encrypted so that the data cannot be deciphered by the third party and the data remains confidential.

- (iii) **Integrity :** When data is being passed between the client and the server on a network, third parties can view and intercept this data. SSL helps guarantee that the data will not be modified in transit by that third party.

3.4.5. Secure Electronic Transaction (SET)



Definition *Secure Electronic Transaction (SET) is a system for ensuring the security of financial transactions on the Internet. It was supported initially by MasterCard, Visa, Microsoft, Netscape, others.*

With SET, a user is given an *electronic wallet* (digital certificate) and a transaction is conducted and verified using a combination of digital certificates and digital signatures among the purchaser, a merchant, and the purchaser's bank in a way that ensures privacy and confidentiality.

Assume that a customer has a SET-enabled browser such as Netscape or Microsoft's Internet Explorer and that the transaction provider (bank, store, etc.) has a SET-enabled server.

1. The customer opens a MasterCard or Visa bank account. Any issuer of a credit card is some kind of bank.
2. The customer receives a digital certificate. This electronic file functions as a credit card for online purchases or other transactions. It includes a public key with an expiration date. It has been through a digital switch to the bank to ensure its validity.
3. Third-party merchants also receive certificates from the bank. These certificates include the merchant's public key and the bank's public key.
4. The customer places an order over a Web page, by phone, or some other means.
5. The customer's browser receives and confirms from the merchant's certificate that the merchant is valid.
6. The browser sends the order information. This message is encrypted with the merchant's public key, the payment information, which is encrypted with the bank's public key (which can't be read by the merchant), and information that ensures the payment can only be used with this particular order.
7. The merchant verifies the customer by checking the digital signature on the customer's certificate. This may be done by referring the certificate to the bank or to a third-party verifier.
8. The merchant sends the order message along to the bank. This includes the bank's public key, the customer's payment information (which the merchant can't decode), and the merchant's certificate.
9. The bank verifies the merchant and the message. The bank uses the digital signature on the certificate with the message and verifies the payment part of the message.
10. The bank digitally signs and sends authorization to the merchant, who can then fill the order.

3.5. OFFLINE SECURE PROCESSING

Protecting yourself from identity theft takes proactive effort. We can't simply assume it's not going to happen to us and go on about our life — it can happen to anyone. While you can't ever

totally protect ourselves from these thieves, you can at least make yourself less attractive as a victim by doing what you can to make it more difficult for them to access our information. Here are some things we can do to protect yourself :

1. DON'T give out your ID number unless it is absolutely necessary. Many companies collect more information than they really need. Make sure that it's something they have to have and make sure they'll protect your privacy.
2. DESTROY any unwanted credit card offers. This means rip, shred, burn, whatever you can do. These pre-approved offers come almost daily.
3. DON'T put any other information besides your name and address on your check and keep a close watch on your checkbook both when you're writing checks and when it's lying around. Someone can memorize your name, address and phone number during the short time it takes you to write a check.
4. SHRED (cross-cut) any sensitive documents before you throw them into the trash. This may seem like an extreme measure, but dumpster diving happens all the time and turns up a lot more personal information than you may realize.
5. DON'T carry your passport, or birth certificate in your wallet or purse. Also, only carry many credit cards as are absolutely necessary. It has also been suggested that you photocopy everything you carry in your wallet to make canceling things easier in the event that your wallet is stolen.
6. REVIEW your credit report every year to make sure there haven't been any new credit cards or other accounts issued (to someone other than you) and to make sure there haven't been inquiries by people you haven't initiated business with.
7. NEVER give out personal information on the phone to someone you don't know about who initiated the call. Often, scam artists phone unsuspecting victims pretending to be from the financial services company and request information to be provided over the phone. Usually the story is to "update records" or sell a product. Get their name, phone number and address and then call them back at the number you have on file or that is printed on the statement you receive.
8. REVIEW your monthly credit card statement each month to make sure there aren't charges showing up that aren't yours. Also, make sure you get a monthly statement. If the statement is late, contact the credit card company. You never know when someone might have turned in a change-of-address form so they could make a few more weeks of purchases on your credit card without you noticing.
9. DON'T mail bills or documents that contain personal data (like tax forms or checks) from your personal mailbox. Take them directly to the post office or an official post service mailbox.
10. REACT QUICKLY if a creditor or merchant calls you about charges you didn't make. This too may be the first notice you get that someone has stolen your identity. Get as much information from them as you can and investigate immediately.
11. GUARD deposit slips as closely as you do checks. Not only do they have your name, address and account number printed on them, but they can also be used to withdraw money from your account. All a thief has to do is write a bad check, deposit it into your account and use the "less cash received" line to withdraw your money.

5.1. Introduction To VPN

A Virtual Private Network (VPN) connects the components of one network over another network. VPNs accomplish this by allowing the user to travel through the Internet or another public network in a manner that provides the same security and features merely available only in private networks (see Fig. 3.6).

VPNs allow users working at home or on the road to connect in a secure fashion to a remote corporate server using the routing infrastructure provided by a public internetwork (such as the Internet). From the user's perspective, the VPN is a point-to-point connection between the user's computer and a corporate server. The nature of the intermediate internetwork is irrelevant to the user because it appears as if the data is being sent over a dedicated private link.

VPN technology also allows a corporation to connect to branch offices or to other companies via a public internetwork (such as the Internet), while maintaining secure communications. The connection across the Internet logically operates as a Wide Area Network (WAN) link between sites.

In both of these cases, the secure connection across the internetwork appears to the user as private network communication—despite the fact that this communication occurs over a public internetwork—hence the name *Virtual Private Network*.

VPN technology is designed to address issues surrounding the current business trend toward increased telecommuting and widely distributed global operations, where workers must be able to connect to central resources and must be able to communicate with each other.

2. Common Uses of VPNs

Let us see VPN situations in more detail.

Remote User Access Over the Internet

VPNs provide remote access to corporate resources over the public Internet, while maintaining security of information. Figure 3.7 shows a VPN used to connect a remote user to a corporate network.

rather than making a long distance (or 1-800) call to a corporate or outsourced Network Access Server (NAS), the user calls a local ISP. Using the connection to the local ISP, the VPN software creates a virtual private network between the dial-up user and the corporate VPN server across the Internet.

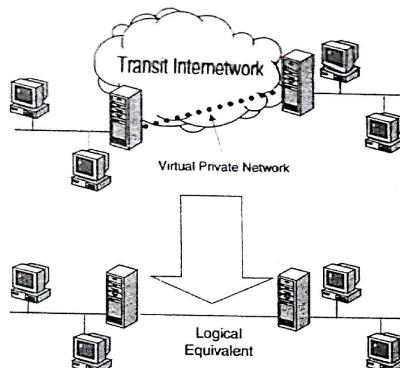


Fig. 3.6. Virtual private network.

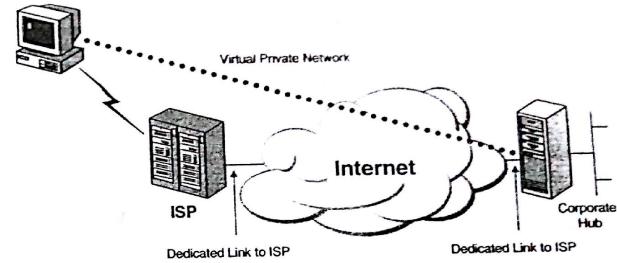


Fig. 3.7. Using a VPN to connect a remote client to a private LAN.

Connecting Networks Over the Internet

There are two methods for using VPNs to connect local area networks at remote sites:

Using dedicated lines to connect a branch office to a corporate LAN. Rather than using an expensive long-haul dedicated circuit between the branch office and the corporate hub, both the branch office and the corporate hub routers can use a local dedicated circuit and local ISP to connect to the Internet. The VPN software uses the local ISP connections and the Internet to create a virtual private network between the branch office router and corporate hub router.

Using a dial-up line to connect a branch office to a corporate LAN. Rather than having a router at the branch office make a long distance (or 1-800) call to a corporate or outsourced NAS, the router at the branch office can call the local ISP. The VPN software uses the connection to the local ISP to create a VPN between the branch office router and the corporate hub router across the Internet.

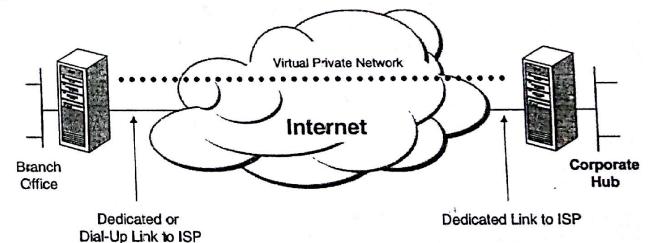


Fig. 3.8. Using a VPN to connect two remote sites.

In both cases, the facilities that connect the branch office and corporate offices to the Internet are local. The corporate hub router that acts as a VPN server must be connected to a local ISP with a dedicated line. This VPN server must be listening 24 hours a day for incoming VPN traffic.

Connecting Computers Over an Intranet

In some corporate internetworks, the departmental data is so sensitive that the department's LAN is physically disconnected from the rest of the corporate internetwork. Although this protects the department's confidential information, it creates information accessibility problems for those users not physically connected to the separate LAN.

VPNs allow the department's LAN to be physically connected to the corporate internetwork but separated by a VPN server. The VPN server is not acting as a router between the corporate internetwork and the department LAN. A router would connect the two networks, allowing everyone access to the sensitive LAN. By using a VPN, the network administrator can ensure that only those users on the corporate internetwork who have appropriate credentials (based on a need-to-know policy within the company) can establish a VPN with the VPN server and gain access to the protected resources of the department. Additionally, all communication across the VPN can be encrypted for data confidentiality. Those users who do not have the proper credentials cannot view the department LAN.

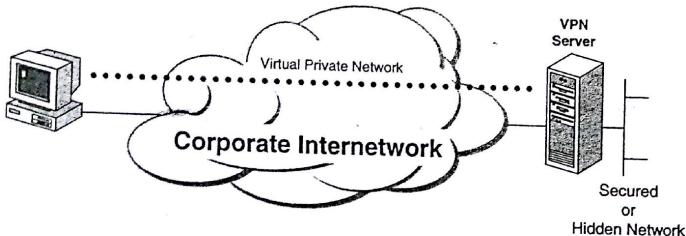


Fig. 3.9. Using a VPN to connect two computers on the same LAN.

3.6. PRIVATE DATA NETWORK

A communications network that is used by one organization or an industry group. It may be deployed as private lines leased from common carriers and entirely architected by the network owner, or it may be a virtual private network (VPN) either over the Internet or one that was provisioned within a carrier's network. Contrast with public data network.

Communications infrastructure has become as critical to the 21st century as an enabler of commerce as the railways and interstate highways were in the previous century. New private data networks are keeping businesses connected in ways previously thought unimaginable.

Internet Protocol (IP) networks are now the transport routes for local, national and global commerce delivery and a platform for growth and innovation for many companies that are either split across different sites or have mobile working practices.

Private IP networks—so called because they use protocols developed for the internet to carry data—are private networks that all internal data travels on between offices and sites in the business. They are inherently more secure than internet-based networks, and because the network provider can manage the network end to end, offer much greater performance and performance management options than the internet, which is of course an "unmanaged" environment.

SUMMARY

In this chapter, we have gone through various mode of electronic payment system like credit cards, debit cards, etc. SET standard was developed for ensuring the transaction security of information on internet. There are several different types of online payment methods, like smart cards, contact cards, mondex, echecks and mobile payment. The security is always an important issue in case of electronic payment system.

REVIEW QUESTIONS

1. How electronic payment system differs with traditional payment systems ?
2. What is SET and how SET makes our transaction secure ?
3. How electronic checks are advantageous over the traditional checks ?
4. Describe the various methods of electronic payment.
5. What are the advantages of Digital certificates ?



Electronic Commerce Providers

CHAPTER 4

- INSIDE THIS CHAPTER**
- 4.1. Developing E-Commerce Enabled Application
 - 4.2. Online E-Commerce Solutions



L. DEVELOPING E-COMMERCE ENABLED APPLICATION

Here we will study the steps involved in setting up e-commerce and requirements for our online store. The working of commerce has been shown in Figure 4.1.

The consumer first moves through the internet to the merchant's website. At the website, consumer is briefly given an introduction to the product or services the merchant offers at this point that the consumer makes the decision to visit the web store by clicking on a link or button located on the web page (e.g., Buy Now, Shop Online, or an image of a shopping cart button are common entry points into a web store). After choosing to visit the web store, consumer is typically connected to an online transaction server located somewhere else on the internet which runs software commonly referred to as a shopping cart application. This shopping cart application has been setup by the merchant to display all products and services offered, as well as calculate pricing, taxes, shipping charges, etc.

From there, the consumer decides that he wants to purchase something, so he enters all pertinent information, provides a credit card number, and is immediately notified if the order was successful.

Now, there are several basic steps we will need to accomplish before becoming Commerce enabled.

- 1. Getting an Internet
- 2. Getting a Merchant Bank Account

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- 3. Obtaining a Web Hosting Account
- 4. Web Design Considerations

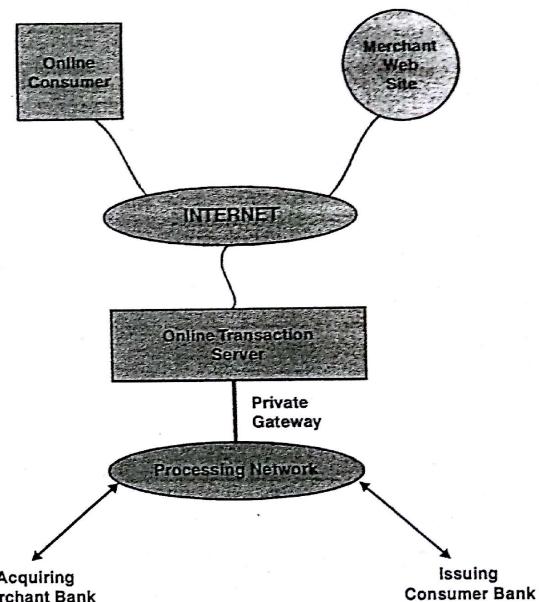


Fig. 4.1. Working of e-Commerce.

- 5. Registering a Domain Name
- 6. Obtaining a Digital Certificate
- 7. Finding a provider of online transactions
- 8. Finding shopping cart software

4.1.1. Getting an Internet Connection

Getting an Internet connection is not a big deal nowadays. We can get Internet connection from local ISP (internet service provider company).

We can get Internet connection by various ways like :

- (i) Cable line
- (ii) Lease line

- (iii) Telephone line
- (iv) Satellite link

In India many ISP like Satyam, BSNL, MTNL, Bharti Telecom, Reliance Infocom, Mantra Online and Tata etc. provides internet connection.

4.1.2. Getting a Merchant Bank Account

In order to be able to accept credit cards, we must apply for an account with a credit card merchant account provider. This can be relatively easy or somewhat difficult, depending on which country we live in, and the type of business we are running. In the past, many businesses would sign up for credit card processing through their own commercial banking institutions. However, the card processor you get signed up with must be able to support internet-based transactions in order for e-commerce to work.

Many card processors treat e-commerce as separate types of transactions and may require us to open a separate account to segregate card present and non-card present transactions.

If we plan on using ManageMore's eConnect Cart, we may want to contact Intellisoft to ensure that the Merchant Account we plan on using will work seamlessly with the shopping cart software as well as within ManageMore.

4.1.2.1. Merchant Account versus Bank Accounts

In our day to day activities of depositing money into our bank account we physically go to the local branch or visit a remote ATM (automatic teller machine) and perform the transaction.

A merchant account is different, because we can't be physically present during the 'virtual' transaction. The merchant account is merely a specialized bank account where money from credit card sales is first routed to and held before transfer to your own checking/savings account. When a payment has been accepted from a client online you will need a 'third party' to approve the transaction, hold the money for us, and finally deposit it into our account. That is the purpose of a merchant account.

This process is usually fully automated in e-commerce transactions through a payment gateway. A payment gateway is the software programming term used by merchant account providers that represents the front door to their credit card approval programs. Since our shopping cart is a software program it needs a place to 'talk to' when requesting the approval of a credit card transaction. The shopping cart uses the payment gateway for such purposes. It contacts the payment gateway of the merchant account over the Web, sends the payment amount and credit card details and then waits for an approval or denial message. Depending upon what message is received will dictate if the transaction can be completed and what the shopping cart should do next. If it was successful (the credit card was valid, the expiration date valid, and there was room on the card for this amount) then the money will transferred into our business account in real-time, or during various points in a 24 hour period.

Merchant accounts have different policies, different pricing's and different types of payment gateways that are written in many programming languages. When selecting a merchant account it is very important to understand the following :

1. How many transactions a month do you expect to process.
2. What is the average size of a typical transaction.

Electronic Commerce Providers

3. What programming language is the shopping cart written in (i.e. Java, ASP, .NET, PHP, PERL etc.)
4. What is the operating system of the web server (i.e. Windows, Linux, etc.)

TIPS

This portion of the e-commerce setup is the most complicated because it typically requires knowledge and expertise in web technologies beyond the scope of most new merchants. It is suggested that we consult a qualified e-commerce web development company or consultant who can further assist us.

4.1.3. Web Hosting

Web hosting is a very important step in this process, as this is how we gain a presence on the Internet in the first place. There are actually two scenarios that can be used for web hosting. Scenario 1 involves setting up and maintaining our own web server, while Scenario 2 involves outsourcing all web hosting administration to an ISP. (Scenario 1 will not be discussed further in this article as it pertains to organizations that typically have their own IT staff and/or a knowledgeable at running their own web server, dealing with security, etc.)

An Internet Service Provider (ISP) is a company that provides us with internet access at limited hard drive space on their web servers for hosting our website. We will need to setup an account for internet access with the ISP of our choice.

The following should be noted when searching for an Internet Service Provider :

1. Choose an ISP that is known for good technical support and has knowledgeable people familiar with e-commerce sites.
2. Choose an ISP that consistently has fast connection speeds and few interruptions.
3. As with any company we do business with, make sure the ISP is reputable.

4.1.4. Registering a Domain Name

If our business already has a corporate website implemented, then we probably already have a domain name and don't need to go through this process.

Domain names are the names for computers on the Internet that correspond to IP (Internet protocol) numbers to route information to addresses on the Internet network. Domain names serve as a convenient way of locating information and people on the Internet. In layman terms, will it be important to you, for customers to find your website by typing "123.123.456.456" or by typing something simple to remember like "www.kiet.edu"?

Registering a domain name is one of the most important decisions we can make for our online identity. Our domain name says who we are to our clients, our peers—the whole world.

The basics for registering a domain name are :

1. Contact a domain name registrar on the internet to register for a domain name. There are many to choose from, just do a web search on "domain name registrar" to get us started.
2. Select a unique domain name we would like others to use for finding our website. A place to go for checking availability of a domain name is www.whois.net

Expect a registration fee of \$5 - \$25 annually for the central registrar to keep your domain name active on the internet.

There are many other questions that arise when considering a domain name for our business that go outside the scope of this tutorial. For more FAQ's on domain names, check out www.domainbank.net or www.netsol.com.

1.5. Obtaining a Digital Certificate

A digital certificate, also known as a SSL Server Certificate, enables SSL (Secure Sockets Layer encryption) on the web server. SSL protects communications so we can take credit card orders securely and ensure that hackers cannot eavesdrop on us. Any e-commerce company that provides us with an online web store will require us to have SSL before we can use their services. Thankfully, for most people obtaining a digital certificate is not a problem. For a minimal fee, one usually use the certificate owned by the web hosting company where your page resides. If we're a larger company, however, we may want to get our own digital certificate. A certificate can cost anywhere from \$30 to \$125.00 annually.

1.5.1. Signing Digital Certificates

After we created a digital certificate, we want to have it signed by its owner. After the digital certificate has been cryptographically signed by its owner, it is difficult for anyone else to forge. In sites involved in e-commerce or any other business transaction in which authentication of identity is important, a certificate can be purchased from a well-known certificate authority such as iSign or Thawte.

1.6. Finding a Provider of Online Transactions

To process online orders, we must offer online payment options. The most widely used form of payment currently is the credit card. Marketing studies show that we'll lose 60 percent to 80 percent of our potential orders if our Website is not set up to accept credit cards; they also show that we offer credit card payment, not only will you receive more orders, but those orders will be substantially larger.

Credit cards enable impulse buying, reassure customers of our legitimacy, and simplify our billing. Other methods of collecting payment are becoming available and include charging purchases to a phone bill, using electronic funds transfers (EFT), paying by electronic check and various forms of prepayment. Each of these methods requires payment processing either in the form of a gateway added to our Website or by linking to a payment processing service.

Step 1 : Evaluate Alternative Online Payment Methods : Credit cards still reign as the method of payment for online purchases, but other payment options are available. Our product and our customers' buying preferences will influence which payment methods you accept. In other countries, credit cards are not as pervasive, so you may want to consider offering alternatives to our international customers.

Offering multiple payment options on our Website, if we can afford it and maintain our profit margin, is a means to increase sales by increasing customer convenience and confidence. Many innovative methods are better suited to micro-payments, charges under \$1, because the processing fees are often lower and credit card merchant-account fees don't apply.

Step 2 : Determine the Fee Structure that Maximizes Your Profit Margin : Not every merchant sells the same way, and not every merchant account provider charges us the same way. Choose a provider that suits our business. Begin by considering the nature of the products we sell. Are they large and expensive? Perhaps then we ought to seek a MAP that offers a higher flat-rate transaction fee and minimizes the discount rate, since even a hefty Rs. 100 transaction fee will be far lower than a 2.5 percent deduction from the charge. On the other hand, if you rely on small, high-volume sales, even a Rs. 25 transaction fee can erase our profits.

Step 3 : Specify Your Technical Requirements : Different MAPs require different "gateways" on our site. These gateways are the pieces of code that transmit our customers' orders to and from our bank's transaction authorizing agent. If we plan to manually process our orders, a secure Web form might be good enough to capture credit card information that we can process offline.

Step 4 : Evaluate Your Business's Credit-Worthiness : MAPs, like most banks, pay close attention to the companies with which they do business. Such factors as our company's length of time in business, outstanding debt, debt payment history, goods and services offered and even our personal history (for new businesses) will affect the fees our company pays to process credit card transactions on the Net.

Step 5 : Find MAPs We can Work with : Many merchant account providers refuse accounts to start-up firms or firms and individuals with bad credit histories. Some MAPs will not accept "high-risk" accounts, a term that usually encompasses adult sites, online casinos, and sites operated by firms outside the MAP's own nation. Others refuse to process any transactions that originate on the Internet—even from their own existing brick-and-mortar clients—or may require that we create a separate merchant account to process orders that are not taken face-to-face but are received by mail, phone, or via the Internet.

Step 6 : Compare Fees and Technical Capabilities : Once we've developed a list of merchant account providers who might offer us an account, we need to compare the different MAP offerings. Be certain to ask detailed questions about each MAP's technical requirements, and make sure our system can work with our MAP's gateways—the software that actually submits our customers' credit card information for payment authorization.

Step 7 : Minimize Credit Card Chargebacks : Discussion about consumer credit card protection for Internet purchases has become intense. But the fact is that U.S. federal law limits a consumer's liability for unauthorized charges to \$50, whether the purchase was made face-to-face or on the Internet. No such protective legislation exists for merchants, however, and they bear the full cost of fraudulent charges as charge backs from their banks.

When a fraudulent credit card transaction takes place without the physical card being presented to the merchant, or funds are uncollectible for some other reason, merchants are charged the sale amount by the cardholder's bank. This is known in the industry as a charge back. Merchants may also be asked to pay penalty fees in addition to the cost of the original charge. Though it has not been as hot a topic for e-tailers, credit card charge backs pose a serious threat to profits. To reduce revenue losses due to credit card fraud, online businesses need to take steps to reduce the risk they take with every order received through their Websites. Find out how credit card charge backs occur and what we can do to protect ourselves.

Step 8 : Secure all our Transaction Data and Prevent Fraud : Credit card information is extremely sensitive, and plenty of villains are waiting to exploit any breach in our security. Additionally, online merchants are as susceptible to credit-card fraud as face-to-face retailers. Make sure our merchant account provider has addressed these issues.

Step 9 : Prepare for International Payment Processing : Many payment processing and merchant account providers do not accommodate international commerce. If you plan to market our product globally, we may need to search specifically for an international provider.

4.1.7. Finding Shopping Cart Software

The next step up is to use a service like Yahoo Stores. Here we can purchase a fully functional shopping cart for a monthly fee. A merchant account is not required if using paypal or the service providers own payment processing service. If we do have a merchant account it most likely can integrate into this shopping cart system. The shopping cart provided typically is template based which will give us some flexibility in the look and feel of our website. They offer a lot of features both to assist in selling our products and also to manage the sale. These come standard with most packages.

The biggest advantage of this service is it is practically hands free. The web hosting, the shopping cart, the merchant account and the tools are all included in the monthly fee. The biggest disadvantage is that there is no ability to customize the software, add or modify the features, to create a unique and custom website that will differentiate you from our competitor using the same or like service.

This service is a great solution for anyone that has had success with paypal or wants to try out a shopping cart without making a big up front investment.

4.1.7.1. Shopping Cart Software

The last option is the most complex. This option offers the most flexibility in creating a unique shopping experience for our buyer. In this case we will need to acquire a web host our website, establish credit, open a merchant account, and purchase a digital certificate to ensure encrypted transactions for our buyers. Lastly we will need to contract out an experienced ecommerce development firm to create a custom shopping cart for our exact needs. This shopping cart will have custom graphics, and text that will create a polished look to our product line.

The biggest disadvantage in this case is the up front cost. These costs can range from several thousands for small ecommerce sites all the way up to hundreds of thousands for professional retail stores with thousands of products. The biggest advantage however, which often outweighs the other choices is the clean, polished, unique look and feel. The creation of a unique shopping experience that rivals the large retail stores and that of our competitors.

This option is best for the serious retailer or the small shop looking to create a strong name for themselves in the market place.

4.2. ONLINE E-COMMERCE SOLUTIONS

Running an online business is a great way of saving cash compared with running a real physical store. Rather than paying a large amount of cash on rent, merchants only really have to pay for the monthly subscription costs depending on which ecommerce solutions they are using. Here are a few things that they get to economize on.

Time is money. And running an internet business using a reliable and strong ecommerce software will help you incredibly. That explains why many ecommerce shopping cart providers

Electronic Commerce Providers

offer free a wide variety of fashionable and pretty ecommerce templates for their merchants to choose from. They know that their merchants may not have time or money to have precise bespoke templates or net pages created for them. These merchants need to quickly get the online store set up fast to start to sell their services. That's the reason why ecommerce solution providers need to offer as much help and assistance as feasible to cater to the needs of new and existing merchants.

Let us discuss some of the top E-commerce solution providers as follows:

1. Volusion

Volusion is a premium, award-winning e-commerce software, featured in PC Mag and other media and used by major companies like Disney and Motorola. In short, Volusion allows you to build and manage an online store to effectively sell products and services on the Internet. A low-cost merchant account is integrated with over 35 Gateways.

2. CoreCommerce

CoreCommerce is an award-winning, feature-packed e-commerce software that apart from its standard options also provides search engine optimization, one page checkout, and integration with third parties, such as QuickBooks, Facebook, UPS Worldship, and more. Store administration is easy to customize and design, and the control panel is integrated with over 26 payment gateway kinds of credit cards, multiple currency support, fully-integrated shipping options, order management, customer tools, etc.

3. BigCommerce

BigCommerce is one of the most trusted names in e-commerce business. They protect your store and data with the same military-grade security and encryption that the big banks use, and have a 99.99% average uptime track record. BigCommerce includes dozens of built-in marketing tools to drive traffic to your online store, including advanced search engine optimization, Google product export and the ability to sell your products on Facebook. It's very easy to customize. Business owners can choose from over 60 store designs and use the Drag & Drop Design Mode to customize the layout of their store while designers have full access to HTML and CSS via FTP, as well as QuickEdit and different tools.

4. Interspire

Interspire Shopping Cart is a non-hosted version of BigCommerce, an all-in-one e-commerce and shopping cart software platform that includes absolutely everything you need to sell online and attract more customers using the power, reach and affordability of the Internet.

Interspire offers an opportunity for web developers and designers to get full access to the source code and easily customize HTML-and-CSS-only store designs. They can create new stores for clients in record time using Interspire software.

5. eStore Advanced

eStore Advanced will provide you with a cart, a merchant account, secure payment gateway and unlimited use web hosting. They offer an affordable, easy to use, high powered shopping cart.

system that includes numerous useful features for your business administration, product management, marketing and promotion, order management, shipping and tax, reports, etc.

i. 3DCart

3D Cart is one of the most complete website e-commerce solutions, with over 100 features designed to grow your online business. Easy-to-use web-based administration enables you to customize your website and online shop, no graphic design or programming necessary. Additional plugins such as Livechat, Quickbooks integration and ROI tracking give you the competitive edge in an ever increasing market. There are many features to help you run the shop, from storefront design, promotion and marketing, product management, order processing, statistics and reporting, shipping and payment, etc.

. Avactis

Avactis Shopping Cart is another software package that allows you to open an online store on the Internet. Compared to other similar e-commerce solutions, Avactis allows for a fast and easy integration of an online store into an existing website without any programmer's knowledge or skills. Unlike other shopping cart software, Avactis is integrated into your website, instead of integrating your website into the online store.

. Shopster

Shopster is a free merchant network that lets you build a free online store, connect to other merchants, find dropship products to sell and sell your own products through new channels. What makes Shopster special is that you can find products from hundreds of different free dropshippers in one place. Get your products in front of thousands of retailers who sell online. Connect with them or connect with them all – you choose who you build business relationships with. The Shopster platform provides you with a free marketplace and resources to get your products sold. Their online store is customizable, integrated with PayPal, eBay listing and auction manager. Basic merchant account is free. For more information, watch the video.

Vendio

Vendio is another award-winning platform that has been supporting the needs of online sellers for over 10 years. Similar to Shopster in that it lets you reach buyers where they are shopping, without forcing you to learn a different interface for each online channel. Whether you are a seasoned online sales veteran, or just a beginner, Vendio provides an ecommerce solution that enables you to share inventory with eBay, Amazon and more, which means it makes it easy to build and run your online ecommerce business no matter where your buyers are.

. Summer Cart

Summer Cart is 100% SEO Shopping Cart Software, with search engine friendly URLs, SEO words on every page, automatic generation of sitemaps, etc. The store setup wizard makes it easy to setup your store quickly. The admin panel is very functional, offering useful sorting, filtering, search options, and easy product tracking and management.

SUMMARY

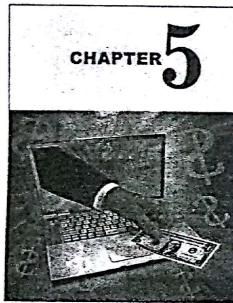
After studying e-commerce concepts on Previous chapters, we have seen implementation of e-commerce business in this chapter. The basic steps are getting on internet, a merchant bank account, obtaining a web hosting account, consideration about web design, registering a domain name, obtaining a digital certificate finding a provider of online transactions and finding a shopping cart software.

REVIEW QUESTIONS

1. Discuss the most important elements that a good website should have.
2. What are the various steps, we will need to accomplish before becoming e-commerce enabled?
3. What is merchant account and how can we get it?
4. Why should be go for domain name registration?
5. How should we select a provider of online transactions.



Digital Payment System and Digital Currencies



CHAPTER 5

INSIDE THIS CHAPTER

- 5.1. Introduction
- 5.2. Digital Payment System
- 5.3. First Virtual Environment Payment System
- 5.4. Cyber Cash Model
- 5.5. E-Commerce Servers
- 5.6. Introduction to Digital Currencies
- 5.7. Digicash
- 5.8. E-Cash
- 5.9. Smart Cards

5.1. INTRODUCTION

Electronic Payment Systems are becoming central to online business process innovation as company look for ways to serve customers faster and at lower cost. Emerging innovation in the payment for goods and services in electronic commerce promise to offer a wide range of new business opportunities.

Electronic Payment Systems and E-commerce are linked given that online consumers must pay for products and services.

Electronic payment systems are non-credit-card online payment systems. The goal of this development is to create analogs of checks and cash on the Internet, i.e. to implement all or some of the following features:

1. Protecting customers from merchant's fraud by keeping credit card numbers unknown to merchants.
2. Allowing people without credit cards to engage in online transactions.
3. Protecting confidentiality of customers.
4. In some cases providing anonymity of customers ("electronic cash").

The problems in implementing electronic payment systems, especially anonymous electronic money, are :

- (i) Preventing double spending: copying the "money" and spending it several times. This is especially hard to do with anonymous money.

- (ii) Making sure that neither the customer nor the merchant can make an unauthorized transaction.

- (iii) Preserving customer's confidentiality without allowing customer's fraud.

While electronic payment systems have not gained a very wide popularity, except for PayPal used on online auctions, such as eBay, they may become more popular in the future if more businesses start using them. Electronic payment systems may be more convenient for international business due to differences in credit card customer protection laws in different countries.

5.2. DIGITAL PAYMENT SYSTEM

The internet payment solution providers have evolved over the recent years. They facilitate the online payment system for the buyers, sellers and merchants. The credit cards from the major banking companies like Master, Visa and American Express has facilitate the payment process and make it very convenient for the online users and the merchants. Now everyone from every part of the world can buy almost everything on the internet through the credit cards.

The diversity in the payment systems enables the merchants to manage and promote their businesses by offering different currencies and the languages options to the online buyers. You need to make an account with the payment processing companies like PayPal, World Pay and 2CC to send and receive the payments worldwide. Some of the major payment processor include the following.

(i) PayPal

PayPal is the largest online payment network. PayPal provides the free and instant online payment service to the selected countries. It is the preferred payment system for the buyers and sellers throughout the world. After getting an account with the PayPal you can send and receive payment online to everyone on your email address. It is headquartered in California, USA and was founded in 1998. Through your PayPal account you can transfer your money to your bank account or your credit card. The PayPal supports different currencies.

(ii) 2CO

2CO is an excellent payment processor system that enables you to sell your products online or buy products and services online. It supports thousands of the products to be sold online. After making account with 2CO, you get robust account management, multiple shipping options, support several currencies and automate the online shopping. 2CO is also known as 2Checkout and supports more countries than the PayPal.

(iii) WorldPay

WorldPay is the leader in the online payment processing systems. It facilitates the customer to accept the payments via internet, email, phone and fax. It has variety of payment methods and supports multiple currencies and countries.

(iv) MoneyBookers

MoneyBookers is another excellent payment method and everyone from the supported countries can join it for free. After getting account with the Money Bookers, you can fund your account, send and receive payment online.

money online at the receiver's email address, shop online and receive money. With MoneyBook you can send and receive the payment in seconds. It supports local currencies in approximately countries. There is no setup cost and it accepts almost every major credit card.

(v) E-Gold

E-Gold is a digital gold currency and it allows you the trade or transfer the ownership of gold between the users. It is an account based payment system that enables the people to trade uses the gold as money. E-Gold is used for the payrolls, bill payments, e-commerce, business to business payments, person to person payments and donations.

5.3. FIRST VIRTUAL ENVIRONMENT PAYMENT SYSTEM



Virtual PIN, started in 1994 by a company called First Virtual Holding, was a system for making credit card payments over the Internet without exposing the credit card number to the merchant. It required no special software for a customer to make a purchase. Virtual PIN relied on difficulty of intercepting and forging e-mail.

To enroll, a customer gives their credit card information and their e-mail address to the First Virtual (this was done by phone). After the credit card information has been verified, the customer receives their PIN by e-mail.

The procedure for purchasing an item using Virtual PIN is as follows :

Step 1 : The customer gives the merchant their Virtual PIN.

Step 2 : The merchant sends the Virtual PIN and the amount of transaction to First Virtual.

Step 3 : First Virtual sends an e-mail to the customer asking to confirm the purchase.

Step 4 : The customer answered "Yes", "No", or "Fraud".

Step 5 : If the answer is "Yes", the merchant is informed that the charge has been accepted. If No", the charge is declined. If the answer is "Fraud", the charge is investigated.

Even though no encryption was involved, an intruder could not use a virtual PIN without being able to intercept and answer the e-mail message to confirm the purchase.

Unlike credit cards which carry the customer's name, Virtual PIN provided a customer's anonymity from the merchant. The e-mail confirmation of the transaction served as a protection against merchant's fraud.

Unfortunately, while the system has been created for all kinds of online business, the main use Virtual PIN at the time was for buying and selling pornography. Virtual PIN tried to disassociate itself from this market. Eventually the company abandoned the Virtual PIN and became specialized sending promotional e-mail.

4. CYBER CASH MODEL

CyberCash is a complete system for conducting financial transactions on the Internet. It accepts both credit card payments and cash coin transactions. The CyberCash system is a great solution for any Web site that wants to accept electronic payment for goods or services.

Cyber cash acts as a conduit for transactions among Internet, merchants, consumers and banking networks. Merchants wishing to use cyber cash to securely process credit card transactions must establish a merchant account with a bank offering cyber cash PAY button.

When the customer completes a purchase and begins a cyber cash transaction by clicking on the cyber cash PAY button of a merchant's World Wide Web site, the merchant receives information about the customer's order, as well as an encrypted message from the customer's cyber cash client. The payments are signed and encrypted then sent through merchant bank to cyber cash, which in turn passes the transaction to merchant's bank for processing. The digital wallet initially supported only credit cards, but now for small dollar amounts for products and services that are too expensive to justify using a credit card. With cyber cash the wallet is used to manage your credit cards. In a sense cyber cash process electronically presents your credit card payments to the merchant in the process just like the last time we physically pulled the card out of our wallet and presented it to a merchant. Cyber coin money is placed in to an account at cyber cash and as we make cyber coin transactions money is pulled out from your wallet and sent to the cyber coin merchant's wallet.

With cyber coin we electronically hold essentially holds digital money which can be added to your wallet using credit card used for other transactions or our checking which can be linked to our wallet. The cyber cash client software manages all of this for consumer including setting up an identity or cyber cash persona linking credit card to that persona and keeping track of cyber cash transactions through a transaction log. Cyber cash security considerations- Cyber cash uses a combination of RSA public key and DES secret key technologies to protect and guarantee data through encryption and digital signatures. It uses full 768-bit RSA as well as 56-bit DES encryption of messages. All transactions are authenticated with MD5 a message digest procedure and RSA digital signatures.

5.6. E-COMMERCE SERVERS

Web software that runs some of the main functions of an online storefront such as product display, online ordering, and inventory management. The software works in conjunction with online payment systems to process payments.



E-commerce servers tend to be at a higher echelon for risk and attacks. This is so because according to our definition, E-commerce servers are responsible for the transaction of goods and services, and the payment for those goods and services over the Internet. Therefore, the physical place where all of these transactions occur is at the server level.

Threats to E-Commerce servers fall into two general categories:

- (1) Threats from an actual attacker(s); and
- (2) Technological failure. In terms of the former, the motivation is primarily psychological.

The direct threats to E-Commerce servers can be classified as either

- (a) Malicious Code Threats; and
- (b) Transmission Threats.

With the former, malicious, or rogue programming code is introduced into the server in order to gain access to the system resources. Very often, the intent of Malicious Code Attacks is to cause large scale damage to the E-Commerce server. With the latter, the threats and risks can be classified

as either active or passive. With passive threats, the main goal is to listen (or eavesdrop) to transmissions to the server. With active threats, the intent is to alter the flow of data transmission or to create a rogue transmission aimed directly at the E-Commerce server.

5.6. INTRODUCTION TO DIGITAL CURRENCIES

A currency is a unit of exchange, facilitating the transfer of goods and services. So an e-currency is simply a unit of exchange using internet.

We can do following with digital currencies :

- Send and receive money instantly to family, friends and business associates worldwide.
- Make online payments 24 hours a day from anywhere.
- Collect real-time online payments from sale of goods and services, online games, auctions etc.
- Easily exchange dollars for gold and vice versa.

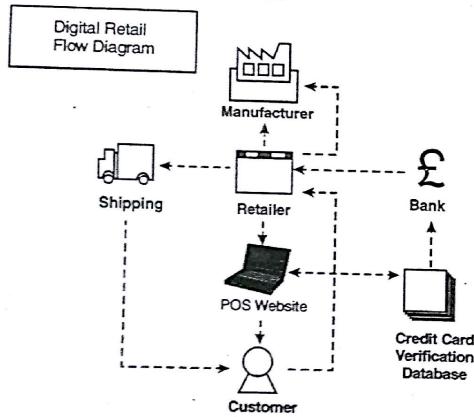


Fig. 5.1. Digital Retail Flow Diagram.

Benefits to Users

- FREE account signup.
- Real-time online payments.
- Send mass payments with one click.
- Standing Order payments.
- Email payments to any email address.
- Request payments from anyone with an email address.

Digital Payment System and Digital Currencies

- Perform one-time and recurring payments.
- Lower merchant fees than credit cards.
- Top Class security thanks to the PIN verification of spends.

5.7. DIGICASH

DigiCash (also known as E-cash) is an electronic payment system developed by Dr. David Chaum, who is widely regarded as an inventor of digital cash. The system was based on digital tokens called *digital coins*. DigiCash operated as follows :

Step 1 : A customer establishes an account with the bank or other organization that could mint and receive digital coins. The customer's account was backed by real money in some form, for instance it could be linked to the customer's checking account.

Step 2 : The customer also needs to download and install a software called *electronic wallet*.

Step 3 : To obtain DigiCash, the customer uses the electronic wallet to create digital coins. These coins are sent to the bank to sign. When the coins are signed, the equivalent amount of money is withdrawn from the customer's account.

In the proposed protocol the customer also had an option of "blinding" the coins. To blind a coin, the customer multiplies it by a random number r before sending it to the bank to sign. The bank signs the data. After the data and its digital signature are sent to the customer, the customer computes the digital signature of the original (non-multiplied) coin by dividing the bank's signature by r . This way the bank doesn't know the coin, but the customer, who knows r , can trace his/her payments. Blind signatures have not been implemented.

Step 4 : When the customer wants to make a purchase, he/she sends signed digital coins to the merchant. The merchant verifies the bank's signature and deposits the coins to the bank, where they are credited to the merchant's account.

TIPS

The DigiCash (or E-cash), produced by the company DigiCash BV based in Amsterdam, has never created a market. The company eventually declared bankruptcy. However, the algorithms used in DigiCash are considered fundamental in development of digital money.

5.7.1. Operational Process of Digicash

There are a number of electronic cash protocols. To a degree, all digital cash schemes operate in the following manner: A user installs a "cyber wallet" onto computer. Money can be put in the wallet by deciding how much is needed and then sending an encrypted message to the bank asking for this amount to be deducted from the user's account. The bank reads the message with private key decryption and verifies if it has been digitally signed in order to identify the user. The bank then generates "serial numbers", encrypts the message, signs it with its digital signature and returns it. The user is now entitled to use the message (coin or token) to spend it at merchant sites. Merchants receive e-cash during a transaction and see that it has been authorized by a bank. They then contact the bank to make sure the coins have not been spent somewhere else, and the amount is credited to the merchant's account.

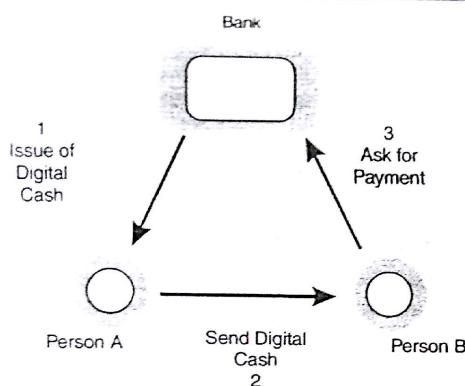


Fig. 5.2. Operational Process of DigiCash.

8. E-CASH

[MDU 2006, 2008]

E-cash is the same thing as digital money. It is different than an electronic payment because the cash is kept in a digital wallet and controlled by the user.



E-Cash is a computer generated Internet based system which allows funds to be transferred and items to be purchased by credit card, check or by money order, providing secure on-line transaction processing.

While many different companies are rushing to offer digital money products, currently e-cash is represented by two models. One is the on-line form of e-cash (introduced by DigiCash) which allows for the completion of all types of internet transactions. The other form is off-line, essentially a digitally encoded card that could be used for many of the same transactions as cash.

E-cash truly globalizes the economy, since the user can download money into his cyber-wallet in any currency desired. A merchant can accept any currency and convert it to local currency when cybergash is uploaded to the bank account.

To the extent a user wants E-cash off-line, all that is necessary is smart card technology. The money is loaded onto the smartcard, and special electronic wallets are used to offload the money to other smartcards or directly to an on-line system. Smartcards have been used successfully in countries for such transactions as phone calls for a number of years. The money could also be moved from a smartcard and returned to a bank account. Visa is developing a related product, the stored value card. This card comes in a variety of denominations, but functions more like a debit card than E-cash.

In essence, E-cash combines the benefits of other transaction mediums. Thus, it is similar to credit cards, but E-cash allows individuals to conduct transactions with each other. It is similar to personal checks, but it is feasible for very small transactions. While it appears superior to other

systems, E-cash will not completely replace paper currency. Use of E-cash will require special hardware, and while most people will have access, not all will. However, E-cash presents special challenges to the existing "middlemen" of the current paper currency society. More and more, banks and other financial intermediaries will serve simply as storehouses for money, lenders, and processing/validating electronic transactions. Personal interaction with a teller, or even visits to a bank ATM will become obsolete. All one will have to do is turn on his computer.

8.1. CyberCash

CyberCash is a system that allows customers to pay by a credit card without revealing the credit card number to the merchant. To achieve this, a credit card number is sent to the merchant in an encrypted form.

To enroll, a customer installs a software called *CyberCash wallet* on their computer. At the time of the instalment the wallet generated a pair of a public and a private key. The wallet was protected by a passphrase, and a backup key was stored encrypted on a floppy disk. A CyberCash account was linked to the customer's credit card. A variation of this scheme called *CyberCoin* was linked to the customer's checking account.

A purchase was conducted the following way :

- When the purchase was initiated, the CyberCash wallet displayed the amount, the merchant's name, and other information. After the customer approved the transaction, an encrypted payment order was sent to the merchant.
- The merchant could decrypt some of the information in the order, such as the product list, the address, etc., but not the other (such as the credit card information). The merchant's software would add its own payment information to the order, digitally sign it, and then send it to the CyberCash gateway.
- The CyberCash gateway would decrypt the information. The order would be checked for duplicate requests. The gateway would verify that the customer's and the merchant's order information match (i.e. no fraud was committed on either side). Then it would perform the money transfer and send the approval message to the merchant.

The main point of this scheme was to prevent merchant's fraud, and thus allow customers to do business with more merchants without fear of scam. However, CyberCash and CyberCoin were not able to find the market. The main reasons for the failure were the large size of customer's software and the fact that very few merchants would accept CyberCash payment. The company was eventually bought by VeriSign.

SMART CARDS

[MDU 2008]

Smart cards also called stored-value cards, use magnetic strip technology or integrated circuit chips to store customer-specific information, including electronic money. The cards can be used to purchase goods or services, store information, control access to accounts and perform many other functions.

Unlike magnetic strip cards, which can be read by any magnetic reader, and are therefore vulnerable to loss or theft, a smart card can be password-protected to guarantee that the owner only uses it.

Smart cards can run RSA encryption and can be programmed to generate a pair of public and private keys. The public key is made publicly readable, but the private key is stored on the card without anyone being able to copy it. Therefore, to use the private key, the user must physically possess the card.

Smart Card Offer Clear Benefit to Both Merchants and Customers. They reduce card handling expenses and losses caused by fraud, expedite customer transactions at the checkout counter and enhance customer convenience and safety. In addition many state and federal governments are considering stored value cards such as an efficient option for dispersing government entitlements. Other private sector institutions market stored value products to transit riders, university students, telephone customers, vending customers and retail customers.

SUMMARY

The goal of the development of electronic payment system is to create analogs of checks and cash on the internet. E-commerce is possible due to electronic payment system only. Paypal, world pay and 2CO are some of the secure digital payment system. E-currency is simply a unit of exchange using internet. Digicash is an electronic payment system, which is based on digital tokens called digital coins.

REVIEW QUESTIONS

1. What is electronic payment system ?
2. Explain digital payment system with example.
3. What is virtual pin ?
4. Explain the cyber cash model.
5. What is e-commerce server ?
6. What is digicash ?
7. What is E-cash ?
8. What is smart cards ?



Electronic Data Interchange

CHAPTER 6

INSIDE THIS CHAPTER

- 6.1. Electronic Data Interchange
- 6.2. EDI Layered Architecture
- 6.3. EDI Versus E-mail
- 6.4. EDI in Action
- 6.5. Financial EDI
- 6.6. EDI over the Internet (EDIINT)
- 6.7. Online Shopping
- 6.8. Online Selling

1. ELECTRONIC DATA INTERCHANGE

[MDU 2007, 2008]

EDI developed in the 1960s as a mean of accelerating the movement of documents pertaining to shipments and transportation. Not until the mid-1980s, however, was the technique used in a wide range of industries – automotive, retail, transportation and international trade. Its use is growing and it is set to become the standard by which organization will communicate formally with each other in the word of electronic commerce.

Electronic commerce is often equated with EDI, so it is important to qualify that electronic commerce adopts EDI and much more. In electronic commerce, EDI techniques are aimed at improving the interchange of information between trading partners, suppliers and customers.

Because of the different approaches in the development and implementation of EDI, there is no consensus on a definition of EDI. A review of some of the prevailing definitions follows:

Definition
“Electronic Data Interchange is the transmission, in a standard syntax, of unambiguous information of business or strategic significance of computers of independent organizations. [The Accredited Standard Committee for EDI of the American National Standards Institute].”

Definition
“Electronic Data Interchange is the interchange of standard formatted data between computer application systems of trading partners with minimal manual intervention. [UN/EDIFACT Training Guide].”

Introduction to E-Commerce and EDI



Electronic Data Interchange is the electronic transfer, from computer to computer of commercial and administrative data using an agreed standard to structure an EDI message.



“Electronic Data Interchange is the electronic transfer from one computer to another of computer processable data using an agreed standard to structure the data.”

Another aspect of EDI that often causes confusion is its usage in one context as a technological solution that focuses on the mechanical transport and assembly of business forms and in other contexts as a business methodology that focuses on the content and structure of forms. This confusion can be cleared by examining the layered architecture of EDI.

2. EDI LAYERED ARCHITECTURE

EDI has semantic Application Layer, Translation Layer, Packaging and Infrastructure Layer.

The EDI semantic layer describes the business application that is driving EDI. For a procurement application, this translates into requests for quotes, price quotes, purchase orders, acknowledgement of invoices. This layer is specific to a company and the software it uses. In other words, the user interface and content visible on the screen are tailored and customized to local environments.

The information seen at the EDI semantic layer must be translated from a company-specific form to a more generic or universal form so that it can be sent to various trading partners, who could be using a variety of software applications at their end.

To facilitate the transfer of computer files between two “trading partners” requires that the computer application of both sender and receiver use a compatible format for EDI document exchange. The sender must use a software application that creates an EDI file format similar to what the recipient’s computer application can read. It is not mandatory that both have identical processing systems. When the trading partner sends a document, the EDI translation software converts the proprietary format into a standard mutually agreed on by the processing systems. When a company receives the document, their EDI translation software automatically changes the standard format into the proprietary format on their document processing software so that the company can manipulate the information in whatever way it chooses to.

TIPS

EDI standards specify business form structure and to some extent influence content seen at the application layer. For instance, a purchase order name field in an X.12 standard might be specified to hold a maximum of 50 characters. An application using a 75-character field length will produce name truncation during the translation from the application layer to the standard layer. In short, the EDI standards and application level, although separate, are closely intertwined.

The EDI transport layer corresponds closely with the nonelectronic activity of sending business form from one company A to company B. The business form could be sent via regular postal service, registered mail, certified mail, to private carrier or simply faxed between companies.

EDI document transport is far more complex than simply sending e-mail messages or sharing files through a network, a modem or a bulletin board. These EDI documents are more structured than e-mail and typically are manipulated or processed more than e-mail messages by the sending and receiving software.

Electronic Data Interchange

than e-mail and typically are manipulated or processed more than e-mail messages by the sending and receiving software.

6.3. EDI VERSUS E-MAIL

Electronic Data Interchange (EDI)	Electronic Mail
There is typical no human involvement in the processing of the information, as the interface has software-to-software orientation.	The data are structured in a software-understandable way.
The interchange is composed by one software for interpretation by another software. If a reply is involved, it is composed by a software to be interpreted by another software.	The data are not necessarily structured to be software-understandable. A human-to-software interface is involved at a minimum of one end of the interchange.

The message is composed by a human and/or interpreted by a human and/or a reply is composed by a human and/or interpreted by a human.

6.4. EDI IN ACTION

The idea behind EDI is very simple. EDI seeks to take what has been a manually prepared form or a form from business application, translate that data into a standard electronic format and transmit it. At the receiving end, the standard format is “untranslated” into a format that can be read by the recipient’s application. Hence output of one application become input to another through the computer-to-computer exchange of information. The result is an elimination of the delays and the errors inherent in paper-based transactions.

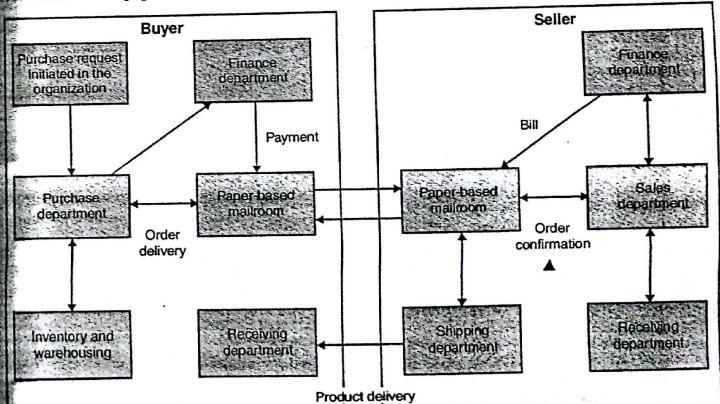


Fig. 6.1. Information flow through EDI.

Benefits of EDI can be seen by comparing the flow of information between organization before and after its implementation. For the purpose the purchasing application provides an ideal scenario. In general, EDI has been used extensively in the procurement function to streamline the interaction between the buyer and seller. Other uses for EDI to exchange transcript quickly. Auto manufacturers use EDI to transmit large, complex engineering designs created on specialized computers. Large multinational firms use EDI to send online price catalogs to customers listing products, prices and terms and make direct orders by EDI.

Figure 6.1 shows the information flow when the paper document are shuffled between organizations via the mailroom.

EDI can substantially automate the information flow and facilitate management of the business process, as illustrated in Figure 6.1. The EDI transactions for a purchase, shipment and corresponding payment are as follows:

- Step 1. Buyer's computer sends purchase order to seller's computer.*
- Step 2. Seller's computer sends purchase order confirmation to buyer's computer.*
- Step 3. Seller's computer sends booking request to transport company's computer.*
- Step 4. Transport company's computer sends booking confirmation to seller's computer.*
- Step 5. Seller's computer sends advance ship notice to buyer's computer.*
- Step 6. Transport company's computer send status to seller's computer.*
- Step 7. Buyer's computer sends Receipt advice to seller's computer.*
- Step 8. Seller's computer sends invoice to buyer's computer.*
- Step 9. Buyer's computer sends payment to seller's computer*

The purchase order confirmation is the seller's acceptance of the price and terms of sale. Note that the various internal departments are agreed and called buyer and seller to simplify the description. All the interaction occurs through EDI forms and in most cases are generated automatically by the computer.

Tangible Benefit to EDI

Savings can be achieved from the following improvement :

[MDU 2007]

- (i) **Reduced Paper-Based System :** EDI can impact the effort and expense a company devotes to maintain records, paper-related supplies, filing cabinets or other storage systems and to the other personnel required to maintain all of these systems. Electronic transactions take over most of the functions of paper forms and through automation drastically reduce the time spent to process them.
- (ii) **Improved Problem Resolution and Customer Service :** EDI can minimize the time companies spend to identify and resolve interbusiness problems. Many such problems come from data entry errors somewhere along the way and EDI can eliminate many of them.
- (iii) **Expanded Customer/Supplier Base :** Many large manufacturers and retailers with the necessary clout are ordering their suppliers to institute an EDI program. However, these are isolated island of productivity because they are unable to build bridges to other companies. With the advent of electronic commerce, the bridge is now available

II. FINANCIAL EDI

Financial EDI comprises the electronic transmission of payment and remittance information between a payer and their respective banks. Here we will examines the way business-to-business payments are made today and describes the various methods for making financial EDI payments.

Financial EDI allows businesses to replace the labour-intensive activities associated with issuing, mailing and collecting checks through the banking system with automation initiation, transmission and processing of payment instructions. Thus it eliminates the delays inherent in processing checks. Financial EDI also improves the certainty of the payment flows between corporate bank accounts because the payee's bank can credit its account on the scheduled payment date and the payer's can debit its account on the same day.

II.1. Types of Financial EDI

Traditionally, wholesale or business-to-business payment is accomplished using checks, mail and automated clearinghouse (ACH) for domestic and international fund transfer. ACH provide two basic services to industrial and financial corporate customers (including other banks) :

- (1) Fast transmission of information about their financial balances throughout the world and
- (2) Movement of money internationally by rapid speed for settlement of debit/credit balances. Banks have developed sophisticated cash management systems on the back of these services that essentially reduce the amount of money companies leave idly floating in low-earning accounts.

Let's provide a quick overview of the three principal types of noncash payment instruments currently used for business-to-business payments; checks, electronic fund transfer and automated clearinghouse (ACH) transfers.

i. Bank Checks

Checks are instruments for debit transfer where payees collect fund from payers. Funds made available by banks to depositors of checks are provisional and may be reversed if the payer does not have sufficient funds in its account to pay the check when it is received by the payee's bank.

ii. Interbank Electronic Funds Transfer (EFT)

Electronic Funds Transfer (EFT) are credit transfer between banks where fund flow directly from the payer's bank to the payee's bank. They are same day almost instantaneous payments. EFT is one of the earliest example of payment systems that use online transactions, although these transactions are carried out on private networks.

iii. Automated Clearing House (ACH) Transfers

In contrast of the EFT process, ACH transfers are used to process high volumes of relatively small-dollar payments for settlement in one or two business days. An ACH provides the following services: preauthorized credits such as the direct deposit of payrolls; preauthorized debits such as repetitive bill payments; and consumer-initiate payments (called GIRO in banking circles).

6.6. EDI OVER THE INTERNET (EDIINT)

EDI traditionally has been used by large organizations that can afford to spend huge amounts of money on converters as well as maintaining private point-to-point networks for security and reliability reasons. This was an unthinkable proposition for the small and medium sized enterprises. The advent of Internet has brightened the possibility of doing online transactions by these small and medium enterprises, but with the compromise on security. Ensuring the flow of EDI data transfer over the Internet in a secure manner is the objective of EDIINT. EDIINT solution helps to level the playing field for SMEs by providing a solution that allows these companies to do business with larger organizations and, at the same time, enjoy the cost savings, speed and other benefits of e-Commerce. EDI over the Internet (EDIINT) is a working group of the Internet Engineering Task Force (IETF) that is chartered with creating specifications for transporting EDI or XML documents over the Internet in a secure (digitally signed and encrypted), highly reliable manner.

Benefits of EDIINT

EDIINT "EDI over the Internet" offers the opportunity for large, medium and small enterprises to connect and exchange business documents over a secure public network and significantly reduce communication costs.

The following are some of the benefits

- (i) Secure : Addresses the issues of privacy, integrity, authentication and non-repudiation for B2B e-commerce over the open Internet.
- (ii) Increased Reliability due to the usage of secure protocols, guaranteed delivery, and encryption/decryption techniques
- (iii) Low-cost as compared to the VAN based transactions
- (iv) Highly accessible as connectivity to Internet is no more a luxury
- (v) Supports high bandwidth communications
- (vi) Technically mature as the specifications are being continually refined based on the feedback from industry usage

6.7. ONLINE SHOPPING



Definition A process in which images or listings of goods and services are viewed remotely via electronic means, e.g., a vendor's Web site, items are selected for purchase, and the transaction is completed electronically with a credit card or an established credit account.

Various encryption schemes may be, and usually are, used to reduce the risks of sending sensitive information, such as credit-card numbers, over the Internet or other telecommunications facility.

7.1. Online Shopping Techniques

While many e-commerce Websites are reputable and have taken the necessary safety precautions to protect you, it never hurts to always proceed cautiously. If you are making an online purchase, consider these easy steps:

1. Use only one credit card, preferably with a low credit limit, when making online purchases. Avoid using an ATM or debit card.
2. Be wary of unsolicited offers by sellers. The Internet National Fraud Information Center Watch reported that email, as a method of contact by Internet scammers was up 22% in 2007. While the offer may be legitimate, spammers like to use this tactic to side-step reputable sites that provide consumer protection for online purchases.
3. Use only reputable e-commerce websites that list a street address and telephone number in case you need to contact them directly.
4. Read the website's privacy policy. Some websites may reserve the right to sell/give your information to a third party. Check the document to see if they allow an opportunity to "opt-out" of receiving special offers from third-party vendors or for permission to share your personal information.
5. Check for a lock symbol in the status bar at the bottom of your Web browser window. Also, do not provide your personal information if the website address doesn't start with "https" (a sign that the site is using a secure server).
6. Choose only verified sellers. Check to see if the vendor is a verified member of a reputable third party such as the Better Business Bureau, VeriSign, or Guardian eCommerce. These third-party sites help to ensure online consumers will be protected when shopping or conducting e-commerce transactions.
7. Check that the delivery date posted is reasonable. If you have not dealt with the vendor on a regular basis, be wary of any Website that states the shipment will be delayed 20 or more days. Delivery dates of 7-10 days are more common.
8. Keep a paper trail of all online transactions. Print out a hard copy of the transaction and keep it in a file for future reference.
9. Be wary of website offers that just sound too good to be true. The Internet is littered with get rich quick scams and false advertising claims. Investigate all claims thoroughly before proceeding.
10. If you do not receive what you paid for, and the vendor will not return your emails or calls, contact your state's Department of Consumer Affairs for further assistance.

6.8. ONLINE SELLING



Definition All businesses that supply goods or services via the internet, phone, fax, and digital TV or by mail order including catalogues are comes under online selling.

The answers to these questions can help in online selling business planning:

- Who is your target audience?
- How will the site be navigated?
- What graphics, fonts, and colors will the site use?
- How will you design the site for different browsers/customers?

- How will you optimize the site for the search engines?
- What content will the website offer?
- How will you build trust and convey credibility?
- How will you deliver your products to customers?
- What methods of payment will you accept and how will you process payments?
- What steps will you take to keep customer information safe and secure?
- How will you drive traffic to your site?
- How will you market your website and products?

6.8.1. Benefits of Selling Online

Selling online can revolutionize your business. An online storefront has a number of very powerful advantages over a brick-and-mortar location that can yield big dividends for surprisingly little investment of time and money. Even if you have a physical shop, an online store can be a big help in marketing your business, as well as being a supplementary sales outlet that can add to your bottom line. The benefits of opening an online store are endless:

1. **Reduce your costs** - setup and operational costs are much less than selling from a physical store, directly improving your bottom line. There is no rent to pay, you hire less personnel, and so forth.
2. **Simplify your sales processes** - using simple automation, customer orders can go directly to your products database and into the shipping queue. With a well-designed online store you can improve your sales processes considerably, reducing your costs further or selling more products per transaction.
3. **Go global overnight** - increase sales opportunities by gaining instant access to a wider marketplace. Sell to the entire country and even abroad.
4. **You can sleep but your store never will** - with your online shop open 24 hours a day, 7 days a week, you increase the number of customers who can shop your selection, further increasing your opportunity for sales.
5. **Level the playing field** - with a well-designed online store you can look every bit as professional and reliable as your larger competitors.
6. **Get paid faster** - the online payments is instantaneous and will help improve your cash flow.
7. **Find new types of customers** - by creating targeted pages for the products you sell, you'll broaden your reach to a wider variety of customers from new demographics. Selling flowers? Target men, mothers and students with web pages created for Valentine's, Mother's Day and Graduation.
8. **Keep better track of what sells** - with the automated processes possible in an online store, you will know what sells best so you can optimize your offerings and manage your inventory efficiently.
9. **Put your catalog online** - your website can function as a catalog of products and services that your existing customers can refer to.

10. **Keep your customers loyal** - online selling helps you develop and maintain customer relationships in all types of markets and demographics: use new offers and products to follow-up with old customers and make additional sales.

6.8.2. Online Selling Techniques

No matter if your business is hardcore or online, Sales will remain at top priority for all the business. No business can become successful or grow without sales. Below are the major selling strategies which you should adopt to raise the products' sales

1. **Analyze top landing pages** of your website and advertise and promote your products or these pages massively. For this purpose you need any website analytical tool.
2. **Promote the strongest products** on the home page in separate section try to establish some sales "Offers" or "Special Promotion" etc. With this technique your strongest product will always remain in front of the visitor.
3. **Seasonal and occasional promotions** like summer, winter, Christmas, Easter and Halloween etc. Try to create some discounts on these occasions to catch visitors' attention which will give boost to your sales.
4. **Weekly/monthly Newsletters**: Email marketing is one of the best sources to generate traffic for your website. Always remember that first objective of your online marketing plan should be to generate more and more traffic. By newsletter marketing you will always remain in the mind of potential customers.
5. **Multiple pricing plans** for each segmentation; this goes for those websites which are dealing with multiple segmentation. Try to create some subscription plans for different target visitors.
6. **Strong affiliate marketing** will encourage other people to sell your products and you will be providing them a handsome commission to become your affiliates. To attract affiliate partners you should have special plans for all affiliates. It also goes with yourself as well by becoming affiliate of related website in related industry
7. **Blogs** are one of the best source to keep visitors regularly visit to your website. On popular blogs you can promote any type of your products which will enhance your sales.
8. **Articles** are the great asset for any website. Modern online organizations are investing heavily to build their information articles directory. One of the researches tells that 80% of the potential customers come to the product page through information articles.
9. **Survey forms** are the best source to keep the visitors interested in your website. This will also give you fair bit of idea what the potential customers exactly want from you and the you can design your products as per their needs.
10. **Testimonials and Reviews** are another source to bring potential customers on your website. It is nothing but a sense of trust. By having testimonials and reviews published on your website you will definitely create trust of the visitors on your website and with this you will have loyal customer and assured volume in the sales.

SUMMARY

In case of e-commerce, electronic transaction takes place between various parties/people. So it is important to have some standard under which data interchange takes place at various level. EDI (Electronic data interchange) is the interchange of standard formatted data between computer system of trading partners. EDI standards helps to enhance the online selling and shopping.

REVIEW QUESTIONS

1. What is EDI ?
2. What are various advantages of EDI ?
3. Explain the information flow through EDI ?
4. What is the basic difference between EDI and Email ?
5. What is EDIINT ?
6. Discuss the advantages of online selling.

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INSIDE THIS CHAPTER

- Introduction to EMS
- Components of EMS
- Concepts and Terminology
- Evolution of EMS
- Definition of ERP System
- Components of ERP System
- Enterprise Resource Planning
- Benefits of ERP
- Limitations of ERP

is full of changes and challenges. The new technologies and services are closely associated with

