**Unit 1**

 **INTRODUCTION**

Commerce (the trading of goods) has been a major impetus for human survival since the beginning of recorded history and beyond. The mass adoption of the Internet has created a paradigm shift in the way businesses are conducted today. The past decade has seen the emergence of a new kind of commerce: e-commerce, the buying and selling of goods through human-computer interaction over the Internet. Traditional physical trading of goods and currency is becoming increasingly unpopular and more businesses are jumping on the e-commerce bandwagon. Today, the line between e-commerce and traditional commerce is becoming more blurred as more businesses start and continue to integrate the Internet and e-commerce technologies into their business processes.

**DEFINITION OF E-COMMERCE**

The e-commerce can be defined as a *modern business methodology that addresses* *the needs of organizations, merchants, and consumers to cut costs while improving the quality of goods and services and increasing the speed of service delivery, by using Internet.*

It differs from the traditional electronic commerce (e-commerce) in the way that it enables the trading of goods, money and information electronically from computer to computer. Business is done electronically and there is no longer a need for physical currency or goods to conduct business.

**EVOLUTION OF E-COMMERCE**

Evolution of e-commerce can be attributed to a combination of regulatory reform and technological innovation. Though Internet (which played an important role in evolution) appeared in the late 1960s, e-commerce of today took off with the arrival of World Wide Web and browsers in early 1990s. The liberalization of the telecommunications sector and innovations such as optic fiber, DSL etc. (which has helped to expand the volume and capacity of communications) have helped in the process of that rapid growth. As a result the barriers to entry and engage in e-commerce have fallen rapidly. A brief timeline of evolution is as follows:

E-COMMERCE

* + 1969 Internet/APRAnet
	+ 1989 WWW HTML invented at CERN
	+ 1991 NSF lifts restrictions on commercial use of Internet
	+ 1993 Mosaic browser invented at University of Illinois, Urbana Champagne, is released to public
	+ 1994 Netscape releases Navigator browser
	+ 1995 Dell, Cisco, Amazon etc. began aggressively to use Internet for commercial transactions
	+ The growth of Internet has a special significance in the growth of e-commerce. It has the potential to involve general people into the process thereby increasing its reach far beyond large companies.

**CONDUCTING BUSINESS ONLINE (E-COMMERCE)**

Doing business online is electronic commerce, and there are four main areas in which companies conduct business online today:

* 1. Direct marketing, selling, and services.
	2. Online banking and billing.
	3. Secure distribution of information.
	4. Value-chain trading and corporate purchasing.

**Direct Marketing, Selling, and Services**

Today, more websites focus on direct marketing, selling, and services than on any other type of electronic commerce. Direct selling was the earliest type of electronic commerce, and has proven to be a stepping-stone to more complex commerce operations for many companies. Successes such as Amazon.com, Barnes and Noble, Dell Computer, and the introduction of e-tickets by major airlines, have catalyzed the growth of this segment, proving the reach and customer acceptance of the Internet.

**Financial and Information Services**

A broad range of financial and information services are performed over the Internet today, and sites that offer them are enjoying rapid growth. These sites are popular because they help consumers, businesses of all sizes, and financial institutions distribute some of their most important information over the Internet with greater convenience and richness that is available using other channels. For example, you have:

* + Online banking
	+ Online billing
	+ Secure information distribution

***Online Banking***

Consumers and small businesses can save time and money by doing their banking on the Internet. Paying bills, making transfers between accounts, and trading stocks, bonds, and mutual funds can all be performed electronically by using the Internet to connect consumers and small businesses with their financial institutions.

***Online Billing***

Companies whose bill can achieve significant cost savings and marketing benefits through the use of Internet-based bill-delivery and receiving systems. Today, consumers receive an average of 23 bills per month by mail from retailers, credit card companies, and utilities.

***Secure Information Distribution***

To many businesses, information is their most valuable asset. Although the Internet can enable businesses to reach huge new markets for that information, businesses must also safeguard that information to protect their assets. Digital Rights Management provides protection for intellectual and information property, and is a key technology to secure information distribution.

**Maintenance, Repair, and Operations (MRO)**

The Internet also offers tremendous time and cost savings for corporate purchasing of low-cost, high-volume goods for maintenance, repair, and operations (MRO) activities. Typical MRO goods include office supplies (such as pens and paper), office equipment and furniture, computers, and replacement parts. The Internet can transform corporate purchasing from a labor and paperwork-intensive process into a self-service application. Company employees can order equipment on websites, company officials can automatically enforce purchase approval and policies through automated business rules, and suppliers can keep their catalog information centralized and up-to-date. Purchase order applications can then use the Internet to transfer the order to suppliers. In response, suppliers can ship the requested goods and invoice the company over the Internet. In addition to reduced administrative costs, Internet-based corporate purchasing can improve order-tracking accuracy, better enforce purchasing policies, provide better customer and supplier service, reduce inventories, and give companies more power in negotiating exclusive or volume-discount contracts. In other words, the Internet and e-business have changed the way enterprises serve customers and compete with each other, and have heightened awareness for competing supply chains.

**Value-Chain Integration**

No other business model highlights the need for tight integration across suppliers, manufacturers, and distributors quite like the value chain. Delays in inventory tracking and management can ripple from the cash register all the way back to raw material production, creating inventory shortages at any stage of the value chain. The resulting out-of-stock events can mean lost business. The Internet promises to increase business efficiency by reducing reporting delays and increasing reporting accuracy. Speed is clearly the business imperative for the value chain.

**ISSUES IN IMPLEMENTING ELECTRONIC COMMERCE**

Although it is simple to describe their benefits, it is not nearly as easy to develop and deploy commerce systems. Companies can face significant implementation issues:

* Cost
* Value
	+ Security
	+ Leveraging existing systems
	+ Interoperability

**Cost**

Electronic commerce requires significant investments in new technologies that can touch many of a company’s core business processes. As with all major business systems, electronic commerce systems require significant investments in hardware, software, staffing, and training. Businesses need comprehensive solutions with greater ease-of-use to help foster cost-effective deployment.

**Value**

Businesses want to know that their investments in electronic commerce systems will produce a return. Business objectives such as lead generation, business-process automation, and cost reduction must be met. Systems used to reach these goals need to be flexible enough to change when the business changes.

**Security**

The Internet provides universal access, but companies must protect their assets against accidental or malicious misuse. System security, however, must not create prohibitive complexity or reduce flexibility. Customer information also needs to be protected from internal and external misuse. Privacy systems should safeguard the personal information critical to building sites that satisfy customer and business needs.

**Leveraging Existing Systems**

Most companies already use information technology (IT) to conduct business in non-Internet environments, such as marketing, order management, billing, inventory, distribution, and customer service. The Internet represents an alternative and complementary way to do business, but it is imperative that electronic commerce systems integrate existing systems in a manner that avoids duplicating functionality and maintains usability, performance, and reliability.

**Interoperability**

When systems from two or more businesses are able to exchange documents without manual intervention, businesses achieve cost reduction, improved performance, and more dynamic value chains. Failing to address any of these issues can spell failure for a system’s implementation effort. Therefore, your company’s commerce strategy should be designed to address all these issues to help customers achieve the benefits of electronic commerce.

Your company’s vision for electronic commerce should also be to help businesses establish stronger relationships with customers and industry partners. For example, a successful strategy for delivering this vision is described by three work-flow elements (platform, portal, and industry partners), each backed by comprehensive technology, product, and service offerings.

From self-service portals to transaction processing, a successful work-flow strategy can be the underlying engine delivering state-based, processed-focused control services for e-business applications. Human labor is expensive, and work-flow technology allows e-businesses to supplement, and in some cases eliminate, reliance on human supervision and intervention.

**HOW DO YOU WORK WITH E-COMMERCE?**

E-commerce is about setting your business on the Internet, allowing visitors to access your website, and go through a virtual catalog of your products/services online. When a visitor wants to buy something he/she likes, they merely “add” it to their virtual shopping basket. Items in the virtual shopping basket can be added or deleted, and when you’re all set to checkout, you head to the virtual checkout counter, which has your complete total, and that will ask you for your name, address etc. and method of payment (usually via credit card). Once you have entered all this information (which by the way is being transmitted securely) you can then just wait for delivery.

**COMPARISON BETWEEN TRADITIONAL COMMERCE AND E-COMMERCE**

In many cases business processes use traditional commerce activities very effectively, and these processes cannot be improved upon through technology. Products that buyers prefer to touch, smell, or examine closely are difficult to sell using electronic commerce. For example, customers might be reluctant to buy high-fashion clothing and perishable food products, such as meat or produce, if they cannot examine the products closely before agreeing to purchase them. In the case of traditional commerce retail merchants have years of experience in creating store environments that help convince a customer to buy. This combination of store design, layout and product display knowledge is called *merchandising*. Sales people in course of time develop skills that allow them to identifycustomer needs and find products and services that meet those needs. The arts of merchandising and personal selling can be difficult to practice over an electronic link. Through e-commerce branded products such as *books* or *CDs* can be easily sold. As one copy of a new book is identical to other copies and because a customer would not be concerned about freshness he would willingly order a title without examining the specific copy they would receive. The advantage of electronic commerce, namely the ability of one site to offer a wider selection of titles than even the largest physical bookstore, can outweigh the advantage of a traditional bookstore, namely the facility to browse.

Some examples of business processes are listed in the following table that suit to the e-commerce and traditional commerce respectively.

**Business processes well-suited to:**

|  |  |  |
| --- | --- | --- |
|  | *Electronic commerce* | *Traditional commerce* |
|  |  |
| • Sale/purchase of books and CDs | • Sale/purchase of high-fashion clothing |
| • | Online delivery of software | • Sale/purchase of perishable food products |
| • Advertising and promotion of | • Small-denomination transactions |
|  | travel services |  |
| • | Online tracking of shipments | • Sale of expensive jewelry and antiques |
|  |  |  |

**E-COMMERCE TECHNOLOGIES**

What technologies are necessary for e-commerce? The short answer is that most information technologies and Internet technologies that we discuss throughout the book are involved in e-commerce systems, viz.–

* + The Internet, intranets, and extranets are the network infrastructure or foundation of e-commerce.
	+ Customers must be provided with a range of secure information, marketing, transaction, processing, and payment services.
	+ Trading and business partners rely on Internet and extranets to exchange information and accomplish secure transactions; including electronic data interchange (EDI) and other supply chain and financial systems and databases.
	+ Company employees depend on a variety of Internet and intranet resources to communicate and collaborate in support of their EC work activities.
	+ Information system professionals and end users can use a variety of software tools to develop and manage the content and operations of the websites and other EC resources of a company.

**ECONOMIC POTENTIAL OF E-COMMERCE**

Consumers are pushing retailers to the wall, demanding lower process, better quality, a large selection of in-season goods. Retailers are scrambling to fill the order. They are slashing back-office costs, reducing profit margins, reducing cycle times, buying more wisely, and making huge investments in technology. They are revamping distribution channels to make sure that warehouse costs are down by reducing their average inventory levels and coordinating the consumer demand and supply patterns. In the push to reduce prices, more and more retailers are turning to overseas suppliers, in part because of cheaper labor costs. The effect of e-commerce can also be seen over the retail industry and marketing.

 **E-commerce and Retail Industry**

Retailers are in the immediate line of fire and are first to bear the brunt of cost cutting. They are putting that pressure on the manufacturing and supplier end of the pipeline. At the same time, the quest for efficiencies has led to turmoil and consolidation within the retail industry. The pressure experienced by retailers and suppliers can be seen in the disappearance of jobs, in mergers, and in the increase in business failures in the manufacturing sector.

The problems are indeed serious. Electronic markets could provide a partial solution by promising customers more convenience and merchants greater efficiency and interactivity with suppliers to revitalize the troubled retailing sector.

**E-commerce and Marketing**

Electronic commerce is forcing companies to rethink the existing ways of doing target marketing (isolating and focusing on a segment of the population), relationship marketing (building and sustaining a long-term relationship with existing and potential customers), and even event marketing (setting up a virtual booth where interested people come and visit). Consider the case of conventional direct marketers, who devote some 25 percent of their revenues to such costs as printing and postages for catalogs. Interactive marketing could help cut such expenses and may even deliver better results.

Interactive marketing is accomplished in electronic markets via interactive multimedia catalogs that give the same look and feel as a shopping channel. Users find moving images more appealing than still images and listening more appealing than reading text on screen. Those are two powerful reasons why every text-based and still-picture-based interactive experimental-based service has ever generated anywhere near the volume of retail merchandise orders that televised shopping channels have achieved. Maximum public acceptance will require that interactive catalog services have a more entertaining visual appearance than traditional text-intensive catalogs have had. Ideally, an interactive shopping program should produce full-motion demonstrations of selected products, but such a practical and economical technology has yet to be developed.

**INCENTIVES FOR ENGAGING IN E-COMMERCE**

A basic fact of Internet retailing is that all retail websites are created equal as far as the “location, location, location” imperative of success in retailing is concerned. No site is any closer to its web customers and competitors offering similar goods and services may be only a mouse click away. This makes it vital that businesses find ways to build customer satisfaction, loyalty, and relationships, so customers keep coming back to their web stores. Thus, the key to e-commerce success is to optimize several key factors such as selection and value, performance and service efficiency, the look and feel of the site, advertising and incentives to purchase, personal attention, community relationships, and security and reliability. The incentives for engaging in e-commerce are listed as follows:

1. **Selection and Value.** Attractive product selections, competitive prices, satisfactionguarantees, and customer support after the sale.
2. **Performance and Service.** Fast, easy navigation, shopping, and purchasing,and prompt shipping and delivery.
3. **Look and Feel.** Attractive web storefront, website shopping areas, multimediaproduct catalog pages, and shopping features.
4. **Advertising and Incentives.** Targeted web-page advertising and e-mail promotions,discounts and special offers, including advertising at affiliate sites.
5. **Personal Attention.** Personal web pages, personalized product recommendations,web advertising, and e-mail notices, and interactive support for all customers.
6. **Community Relationships.** Virtual communities of customers, suppliers, companyrepresentatives, and others via newsgroups, chat rooms, and links to related sites.
7. **Security and Reliability.** Security of customer information and website transactions,trustworthy product information, and reliable order fulfillment.

**DRIVING FORCES BEHIND E-COMMERCE**

The various driving forces behind e-commerce can be listed as below:

* 1. **Global Customers.** Customers are people who may travel anywhere or companieswith global operations. Global IT can help provide fast, convenient service.
	2. **Global Products.** Products are the same throughout the world or are assembledby subsidiaries throughout the world. Global IT can help manage worldwide marketing and quality control.
	3. **Global Operations.** Parts of a production or assembly process are assigned tosubsidiaries based on changing economic or other conditions. Only global IT can support such geographic flexibilities.
	4. **Global Resources.** The use and cost of common equipment, facilities, andpeople are shared by subsidiaries of a global company. Global IT can keep track of such shared resources.
	5. **Global Collaborations.** The knowledge and expertise of colleagues in a globalcompany can be quickly accessed, shared, and organized to support individual or group efforts. Only global IT can support such enterprise collaboration.

**ADVANTAGES OF E-COMMERCE**

With the astonishing growth of the Internet, many companies are finding new and exciting ways to expand upon their business opportunities. There are very few successful companies that do not use computers in their everyday business activities, which also mean there are few companies that do not use e-commerce. These are the advantages of Internet and e-commerce in general:

1. **Speed.** The Internet and World Wide Web give businesses opportunities toexchange messages or complete transactions almost instantaneously. Even with the slowest connections, doing business electronically is much faster than traditional modes. With increased speeds of communication, the delivery time is expedited and that makes the whole transaction from start to finish more efficient. Even more significant is the fact that information appearing on the Internet can be changed extremely rapidly. This gives business owners the ability to inform customers of any changes to the service that you are offering. This also allows for you to update marketing and promotional materials as often and as frequently as you would like.
2. **Cost Saving.** By using the Internet, marketing, distribution, personnel, phone,postage and printing costs, among many others, can be reduced. You can start doing business in cyberspace for as little as thousand of rupees. Most businesses will spend more than this but compared to the cost of opening a physical store, the savings are tremendous. These funds can then be diverted to marketing and advertising of your product or service.
3. **No Boundaries.** Cyberspace does not know any national boundary. That meansyou can do business all over the world as easily as you can in your own neighborhood. Since the Internet connects everyone in cyberspace, information is transmitted at the speed of sound or the speed of light, depending on your connection. Either way, distance becomes meaningless, which makes you able to link to anyone on the globe and anyone on the globe can link to you. The ability to provide links makes doing business on the Internet attractive to customers in any part of the world.
	1. **Ease of Networking.** One advantage of the Internet is that is allows peopleto easily meet, gather data/information and stay in touch with others at a very low cost. Now almost everyone can automatically expose his/her business to the international market. The web will enable firms to build on the assets that they already possess, like brand name recognition, operational infrastructure, information, and customer relationships in order to develop new markets and distribution channels. Meeting with new network locally and from other countries can be done anytime and anywhere now.

**Advantages to Customers**

* 1. **Reduced Prices—**Costs of products are reduced since stages along the valuechain are decreased. For instance, intermediaries can be eliminated by the company directly selling to the consumer instead of distributing through a retail store.
	2. **Global Marketplace—**Consumers can shop anywhere in the world. Currently,according to the World Trade Organization (WTO) there are no custom duties put on products bought and traded globally electronically. This also provides wide selection of products and services to consumers.
	3. **24-Hour Access—**Online businesses never sleep as opposed to brick and mortarbusinesses. E-commerce allows people to carry out businesses without the barriers of time or distance. One can log on to the Internet at any point of time, be it day or night and purchase or sell anything one desires at a single click of the mouse.
	4. **More Choices—**Provides consumers with more choices. For example, beforemaking any purchase, customer can study about all the major brands and features of any item. It also provides consumers with less expensive products and services by allowing them to shop in many places and conduct quick comparisons.
	5. **Quicker Delivery—**Allows quick delivery of products and services (in somecases) especially with digitized products.
	6. Consumers can receive relevant and detailed information in seconds, rather than in days or weeks.
	7. Makes it possible to participate in virtual auctions.
	8. Allows consumers to interact with other consumers and electronic communities and exchange ideas as well as compare experiences.

**Advantages to Businesses**

1. **Increased Potential Market Share—**The Internet enables businesses to haveaccess to international markets thereby increasing their market share. Companies can also achieve greater economies of scale.
	1. **Low-cost Advertising—**Advertising on the Internet costs less than advertisingon print or television depending on the intricacies and extent of the advertisement. A company can still spend a lot on advertising on the Internet if the company hires an external party to create their advertisements but advertising on the Internet itself is less costly since there is less cost associated with it in terms of printing and limited television spots.
	2. **Low Barriers to Entries—**Anyone can start up a company on the Internet.Start-up costs are a lot lower for companies since there is less need for money for capital.
	3. **Strategic Benefit—**The strategic benefit of making a business ‘e-commerceenabled’ is that it helps reduce the delivery time, labour cost and the cost incurred in the following areas:
		* Document preparation
		* Error detection and correction
		* Reconciliation
		* Mail preparation
		* Telephone calling
		* Data entry
		* Overtime
		* Supervision expenses

**Advantages to Society**

* 1. Enables people in Third world countries and rural areas to enjoy products and services which otherwise are not available to them.
	2. Facilitates delivery of public services at a reduced cost, increases effectiveness, and/or improves quality.
	3. Enables more individuals to work at home, and to do less traveling for shopping, resulting in less traffic on the roads, and lower air pollution.
	4. Allows some merchandise to be sold at lower prices since organization may not need a physical place and full inventory.

**Advantages to Women**

People in general think that women unlike men are reluctant to purchase online. On the contrary, NPD research found that women tend to shop online more than men in most product categories. The study asserts that women were more likely to shop toys, clothing, games and make up online more than men.

In short all the major advantages of e-commerce can be summarized as follows:

1. Cost reduction due to competitiveness in the procurement of products. Many suppliers of the product compete for customer patronage in open electronic markets. This competition brings down the product price.
	1. Cost reduction due to reducing the paper work. The cost effective electronic documents will be delivered almost instantly and safely. This enables both parties to take quick decisions.
	2. Information dissemination at a wider level is possible. Information about the product, cost, size, specification etc. may be made available to the customer located at widely distant geographical boundaries.
	3. Improved customer relationship may be achieved by fast dissipation of the information to the potential customers.
	4. Because all orders and inquiries are processed online, the product is directly supplied to the customer. This eliminates the need for wholesalers and retailers and brings down the product prices.
	5. Total time reduction in the order processing, as e-commerce minimizes the time taken from order to delivery.
	6. Provides better, fast and effective linkage with the clients. Since all information has to be processed in the electronic medium, that is online, it is possible to identify the customers’ requirements that lead to quick product design.
	7. Opens new vistas for the organization and generates better business avenues because of easy and cheap reach to the potential customer base.
	8. Enhances the organization’s product and market analysis as the organization gets faster feedback from the customer. These feedbacks may be processed online.

**E-COMMERCE DISADVANTAGES**

Although the list of e-commerce advantages is long, yet the e-commerce environment is far from perfection. In fact, some of the e-commerce disadvantages cause both consumers and businesses to suffer considerable misfortune. Although cost savings are usually mentioned, there are hidden costs that can quickly turn a credit into a debit. In addition, the technology is not perfect, for example, the network unreliability is a continuing concern. Moreover, some other concerns involve security, the loss of privacy, low and remote service levels, and complex legal issues. Let us discuss these disadvantages one by one.

**Hidden Costs**

Although buying on-line is convenient, the cost of this convenience is not always clear at the front end. For example, on-line purchases are often accompanied by high shipping and re-stocking fees, a lack of warranty coverage, and unacceptable delivery times. The online purchases must be shipped and the shipping charges may be considerable. In fact, too many e-commerce companies have developed a reputation of overcharging for shipping and handling.

**Network Unreliability**

With a user population of well over 100 million in North America alone, the Internet is a very busy information highway. Although the Internet is designed to overcome the single point of failure problem, there have been several well-publicized incidents of network failures during the past few years. An e-commerce website that cannot serve its customers loses sales, credibility, and even customers. In effect, a network failure can be compared to having a location at an exclusive mall that is in middle of nowhere and has no access roads that lead to it. Network reliability problems may be generated by such factors as:

* + Equipment failure in the network connection provider or ISP.
	+ Long response time due to increased network traffic or inadequate bandwidth.
	+ Accidental problems caused by nature—such as lightning, floods, earthquakes that affect communication lines—or by human error—such as a road construction worker severing a network line by accident.

**The Cost of Staying in Business**

We included operational cost savings and lower barriers of entry in the list of e-commerce advantages. That is, getting into business is relatively easier in an e-commerce environment. Unfortunately, the flip side of the coin is that staying in business may be more difficult. Remember that the easy access means increased competition, thus causing businesses to operate with very thin profit margins. To be profitable, e-businesses must maintain high sales volumes, which in turn means developing and maintaining a big and loyal customer base. Attracting customers and transforming them into repeat buyers is the key to profitability. To survive and remain competitive, businesses must invest heavily in often-costly technology. The introduction of computer technology within a business not only automates the business process but it also changes the way the company does business internally and externally. Such synergy between technology and business operations makes the company more dependent on technology, therefore making it more vulnerable to the pace and network failures.

**Lack of Security**

One of the main roadblocks to the wide acceptance of e-commerce by businesses and consumers alike is the perceived lack of adequate security for on-line transactions. For example, consumers are growing increasingly weary about providing credit card information over the Internet. During the past few years, the press has been filled with reports about hackers breaking into e-business websites and stealing credit card information. In many cases, the break-ins passed inadvertently for several months before either the seller or the buyer discovered the problem. Securing on-line transaction data during its generation and then safeguarding it after it has been stored in the database are critical issues to be faced. For example, in June of 2001, a small computer retailer exposed credit card information through its website. The problem, caused by a coding error in a web page, allowed unauthorized access to stored order and credit card information for thousand of customers, dating as far back as one year.

**Lack of Privacy**

Ensuring the security of the data is of paramount importance to customers and to the credibility of the business. Customers also worry about the privacy implications of data gathered by organizations of all types and sizes. The incredible data collection process is a mixed blessing to customers. Even at the simplest data level, sales information is stored in databases connected to web servers, thus exposing the information to cyber criminals. Because data gathering on the web is so easy, databases routinely contain information about customer purchasing habits, demographic data, credit information, and so on.

In many cases, companies sell customer database information to marketing companies. In turn, the marketing companies engage in massive e-mail campaigns to attract new customers. It doesn’t take long for the customer’s e-mail box to be filled with unwanted and unsolicited e-mail (also known as “spam”). The growing sales of personal firewalls and the large number of “hits” on websites that deal with privacy issues are testimony to the fact that customers are growing increasingly worried about their online privacy, and that they are seeking ways to protect themselves from cyber attackers.

**Low Service Levels**

Another common complaint about doing business online is the low level of customer service that online companies tend to provide. Although technology has automated business transactions to a large extent, there remains a real need for the human touch. Therefore, customer service has become a major differentiating factor. Because the web buying experience is much more impersonal than the traditional one, providing good customer service is critical to the survival of any e-business. Therefore, e-commerce websites must provide

* + a pleasant and problem-free pre-ordering and ordering experience. The website design is an important interface.
	+ readily available easily used feedback options. Major customer complaints include the lack of contact information on websites and the difficulty of contacting a customer service representative.
	+ quick and courteous complaint resolution.
	+ timely and low-cost shipping and prompt delivery of merchandise to customers.

**Legal Issues**

Legal problems encountered in the e-commerce environment include

* Software and copyright infringements. The amount of illegal content flowing freely on the Internet is illustrated by the so-called Napster case. Napster, a popular music website, was sued by the Recording Industry Association because it hosted millions of illegal digital copies of copyrighted songs that were freely downloaded by millions of users worldwide. After court action, Napster was forced to change its business model and to eliminate all illegal material from its website.
* Credit card fraud and stolen identities. The lack of security we mentioned earlier has put credit card fraud on the proverbial front burner. In addition, lack of security makes it relatively easy to assume another person’s identity in order to make fraudulent transactions. Loss of confidence in the security of on-line transactions is a brake on the e-business train.
	+ Business fraud. Online fraud also takes the form of companies that fail to deliver products and/or services to the customers who paid for them.

**REASONS FOR THE E-COMMERCE NOT BEING VERY SUCCESSFUL**

Although vast amounts of money have been invested into making e-commerce work, and although it causes vast amounts of money and large numbers of goods to change hands every day, it has so far failed to deliver the goods for a broad audience. The answer to why e-commerce has not been an overwhelming success for the masses can roughly be answered as follows:

* 1. Not everybody has access to a computer.
	2. Buying goods over the internet is not ‘natural’:
		+ One cannot feel or see the products in real life
		+ The interaction is unnatural, there is no salesperson present.
	3. People are concerned that it is unsafe to buy over the internet.

**Limited Access to Computers**

The computer is very essential to access e-commerce sites on Internet. Using a computer screen, people have visual access to a large amount of information, i.e., large number of goods to choose from. They can browse, select, get in-depth information, get overviews and so on, all at the click of a mouse button. But still in India or abroad, a large number of people do not have access on computers and therefore they are not able to take the advantage of the era of e-commerce.

**Lack of Natural Quality**

There are two issues to be addressed with respect to lack of natural quality in e-commerce.

The first pertains to the fact that people are not able to touch and feel products with their own hands before buying something. Buying something from just the picture is essentially different from buying it in a shop. People probably only tend to buy things over the internet from which they already know what they look/feel/sound like from real life, and which have little between-product variation (examples are books, CDs and videotapes) or products that they can assess from behind their computer (an example is software). This seems to be a problem for e-commerce, which can be labeled as the ‘Seeing is believing’ problem.

The second natural quality problem has to do with natural interaction during a purchase. People are used to talking to a salesperson when they purchase something. Asking questions like: “Is this product really waterproof?” or “Do I get a money back guarantee on this item?” and thousands of questions like these seem to sooth people in their purchase. It guarantees them that they get what they want. This kind of question-asking is of course not available in e-commerce, aside may be from some FAQ section (FAQ = Frequently Asked Questions).

**Unsafe Buying**

A third problem of e-commerce is that of unsafe connections to the vendor. When sending credit card information over the internet, hackers could seize this information and use it for illegal transactions.

**TYPES OF E-COMMERCE/E-COMMERCE MARKET MODELS**

E-commerce conducted between businesses differs from that carried out between a business and its consumers. There are five generally accepted types of e-commerce:

* + Business to Business (B2B)
	+ Business to Consumer (B2C)
	+ Consumer to Business (C2B)
	+ Consumer to Consumer (C2C)
	+ Business to Government (B2G)

**Business to Business (B2B)**

Business to Business or B2B refers to e-commerce activities between businesses. An e-commerce company can be dealing with suppliers or distributors or agents. These transactions are usually carried out through Electronic Data Interchange or EDI. EDI is an automated format of exchanging information between businesses over private networks. This allows more transparency among business involved; therefore business can run more efficiently, for instance, a supplier can respond faster to diminishing stock of a particular product. EDI is composed of standards that enable businesses’ computers to conduct transactions with each other without human intervention. In general, B2Bs require higher security needs than B2Cs. For example, manufacturers and wholesalers are B2B companies.

With the help of B2B e-commerce, companies are able to improve the efficiency of several common business functions, including supplier management, inventory management and payment management.

Using e-commerce enabled business applications, companies are able to better control their supplier costs by reducing PO (purchase order) processing costs and cycle times. This has the added benefit of being able to process more POs at a lesser cost in the same amount of time. E-commerce technology can also serve to shorten the order-ship-bill cycle of inventory management by linking business partners together with the company to provide faster data access. Businesses can improve their inventory auditing capabilities by tracking order shipments electronically, which results in reduced inventory levels and improves upon the ability of the company to provide “just-in-time” service.

This e-commerce technology is also being used to improve the efficiency of managing payments between a business and its partners and distributors. By processing payments electronically, companies are able to lower the number of clerical errors and increase the speed of processing invoices, which results in lowered transaction fees.

**Business to Customer (B2C)**

Business to Customer or B2C refers to e-commerce activities that are focused on consumers rather than on businesses. For instance, a book retailer would be a B2C company such as Amazon.com and other companies that follow a merchant model or brokerage business models. Other examples could also be purchasing services from an insurance company, conducting online banking and employing travel services.

**Customer to Business (C2B)**

Customer to Business or C2B refers to e-commerce activities, which use reverse pricing models where the customer determines the prices of the product or services. In this case, the focus shifts from selling to buying. There is an increased emphasis on customer empowerment.

In this type of e-commerce, consumers get a choice of a wide variety of commodities and services, along with the opportunity to specify the range of prices they can afford or are willing to pay for a particular item, service or commodity. As a result, it reduces the bargaining time, increases the flexibility and creates ease at the point of sale for both the merchant and the consumer.

**Customer to Customer (C2C)**

Customer to Customer or C2C refers to e-commerce activities, which use an auction style model. This model consists of a person-to-person transaction that completely excludes businesses from the equation. Customers are also a par of the business and C2C enables customers to directly deal with each other. An example of this is **peer auction giant,** **Ebay**.

**Business to Government (B2G)**

It is a new trend in e-commerce. This type of e-commerce is used by the government departments to directly reach to the citizens by setting-up the websites. These websites have government policies, rules and regulations related to the respective departments. Any citizen may interact with these websites to know the various details. This helps the people to know the facts without going to the respective departments. This also saves time of the employees as well as the citizens. The concept of Smart City has been evolved from B2G e-commerce.

**DIFFERENCES BETWEEN B2C AND B2B E-COMMERCE**

From all the e-commerce models described above, the two most widely used models are B2C and B2B e-commerce. The major difference between these two models is with the customer. In B2B (business-to-business) model, the customers are other companies while in B2C (business to consumer), the customers are individuals. Overall, B2B transactions are more complex and have higher security needs. Beyond that, there are two big distinctions:

* **Negotiation.** Selling goods to another business involves bargaining over prices,delivery and product specifications. Not so with most consumer sales. That makes it easier for retailers to put a catalog online, and this is why the first B2B applications were for buying finished goods or commodities that are simple to describe and price.
	+ **Integration.** Retailers don’t have to integrate with their customers’ systems.Companies selling to other businesses, however, need to make sure they can communicate without human intervention.

**ARCHITECTURAL FRAMEWORK FOR E-COMMERCE**

Architectural framework of e-commerce means the synthesizing of various existing resources like DBMS, data repository, computer languages, software agent-based transactions, monitors or communication protocols to facilitate the integration of data and software for better applications.

The architectural framework for e-commerce consists of six layers of functionality or services as follows:

1. Application services.
2. Brokerage services, data or transaction management.
3. Interface and support layers.
4. Secure messaging, security and electronic document interchange.
5. Middleware and structured document interchange, and
6. Network infrastructure and the basic communication services.
7. **Applications:** In the application layer services of e-commerce, it is decidedthat what type of e-commerce application is going to be implemented. There are three types of distinguished e-commerce applications i.e., consumer to business application, business-to-business application and intra-organizational application.
8. **Information Brokerage and Management Layer:** This layer is rapidly becomingnecessary in dealing with the voluminous amounts of information on the networks. This layer works as an intermediary who provides service integration between customers and information providers, given some constraint such as low price, fast services or profit maximization for a client. For example, a person wants to go to USA from India. The person checks the sites of various airlines for the low-price ticket with the best available service. For this he must know the URLs of all the sites. Secondly, to search the services and the best prices, he also has to feed the details of the journey again and again on different sites. If there is a site that can work as information broker and can arrange the ticket as per the need of the person, it will save the lot of time and efforts of the person. This is just one example of how information brokerages can add value. Another aspect of the brokerage function is the support for data management and traditional transaction services. Brokerages may provide tools to accomplish more sophisticated, time-delayed updates or future-compensating transactions.
9. **Interface and Support Services:** The third layer of the architectural frameworkis interface layer. This layer provides interface for e-commerce applications. Interactive catalogs and directory support services are the examples of this layer.

Interactive catalogs are the customized interface to customer applications such as home shopping. Interactive catalogs are very similar to the paper-based catalog. The only difference between the interactive catalog and paper-based catalog is that the first one has the additional features such as use of graphics and video to make the advertising more attractive.

Directory services have the functions necessary for information search and access. The directories attempt to organize the enormous amount of information and transactions generated to facilitate e-commerce.

The main difference between the interactive catalogs and directory services is that the interactive catalogs deal with people while directory support services interact directly with software applications.

1. **Secure Messaging Layer:** In any business, electronic messaging is an importantissue. The commonly used messaging systems like phone, fax and courier services have certain problems like in the case of phone if the phone line is dead or somehow the number is wrong, you are not able to deliver the urgent messages. In the case of courier service, if you want to deliver the messages instantly, it is not possible as it will take some time depending on the distance between the source and destination places. The solution for such type of problems is electronic messaging services like e-mail, enhanced fax and EDI.

The electronic messaging has changed the way the business operates. The major advantage of the electronic messaging is the ability to access the right information at the right time across diverse work groups.

The main constraints of the electronic messaging are security, privacy, and confidentiality through data encryption and authentication techniques.

1. **Middleware services:** The enormous growth of networks, client server technologyand all other forms of communicating between/among unlike platforms is the reason for the invention of middleware services. The middleware services are used to integrate the diversified software programs and make them talk to one another.
2. **Network Infrastructure:** We know that the effective and efficient linkagebetween the customer and the supplier is a precondition for e-commerce. For this a network infrastructure is required. The early models for networked computers were the local and long distance telephone companies. The telephone company lines were used for the connection among the computers. As soon as the computer connection was established, the data traveled along that single path. Telephone company switching equipment (both mechanical and computerized) selected specific telephone lines, or circuits, that were connected to create the single path between the caller and the receiver. This centrally-controlled, single-connection model is known as **circuit switching.**

However, circuit switching does not act well for sending data across a large network. In order to implement circuit switching, point-to-point connections for each pair of senders/ receivers has to be established which is both expensive and difficult to manage. There is one more technique that is used by the Internet. It is called a *packet switching* *network*. In a packet switching network, files and messages are broken down into packetsthat are labeled electronically with codes that indicate both their origin and destination. Packets travel from computer to computer along the network until they reach their destination. The destination computer collects the packets and reassembles the original data from the pieces in each packet. In packet switching, as the packet passes through various computers on its line the computers determine the best way to move the packet forward to its destination.

**TCP/IP INTERNET PROTOCOL FOR NETWORK INFRASTRUCTURE**

A protocol is a collection of rules for formatting, ordering, and error-checking data sent across a network. Protocols determine how the sending device indicates that it has finished sending a message and how the receiving device will indicate that it has received (or not received) the message.

The set of protocols that underlie the basic operation of the Internet are Transmission Control Protocols (TCP) and the Internet Protocol (IP). The TCP/IP is a two-layered program that computers use to make and break communication in a network. TCP controls assembly of the message into smaller packets before it is transmitted over the Internet. It also controls the reassembly of packets at the destination sites. The IP protocol consists of rules for routing individual data packets from their source to their destination. IP ensures that each data packet is labeled with the correct destination address.

**IMPACT OF E-COMMERCE ON BUSINESS**

E-commerce will change the way the businesses are being carried on. It will lead to the emergence of new businesses as well as business practices and also a new role for intermediaries. Indeed, all the functional areas of business will undergo change as follows:

* The new technology will transform business processes, the way products and services are created and marketed, dynamics of competitions, the organization structure of the enterprise and the nature of the enterprise itself. This will include marketing, supply management, customer and sales management, product development etc.
* Local proximity may no longer be a significant factor in retaining customer. Local markets will be replaced by global markets. Indeed it may bring to reality the goal of making the whole world as one family.
* Transparency and openness continue and will continue, to be effective business strategy. Already many businesses have started recognizing key customers, employees and suppliers more like a partner in the business. E-commerce will lead to better customer service, more personalized products, reduced costs, supply chain efficiency and faster time to market. The most significant aspect of e-commerce is new market development. The e-commerce links and the infrastructure, initially set up, can be successfully used in other sectors.
* The change in the business functions will lead to new business models and create new set of facts and circumstances that can materially change the incidence of taxation.
	+ The Internet will emerge as a new platform for marketing of products and services that will displace and rebuild existing economy. It will affect organizational structure; require different skills for negotiation, new regulatory and legal framework, electronic money, taxation and many other things. The evolution of e-commerce will have profound impact on competition, mobility of enterprises, effect on consumer behavior, changes in the way the work is defined and managed. The net will enable businesses to save time on product design, design according to the individual customer specification, order and delivery of components, tracking sales and getting feedback from customers.
	+ The businesses can have virtual project team, virtual learning space so that the employees who are dispersed over various countries can work together as if they are together in one physical room. Business can be connected to the retail points in order to ascertain market trends, demand of the products and with the suppliers upstream to order the desired requirements. Better demand forecasting and stock replenishment can lead to significant reduction in the cost.

**APPLICATIONS OF E-COMMERCE**

Following are some of the widely used e-commerce applications.

**Internet Bookshops**

It is one of the first applications of e-commerce on Internet. Books as an item of merchandize have the following significant advantages for the online retailers:

* Books can be described well on the Internet. Moreover, it is not an item, which is required to be checked physically.
* Normally, the books have nominal prices and not too much risk is involved in the online payments.
* Books are small items and can be delivered in the customer’s letterbox. The customer does not need to be at home.

Amazon.com is an example of Internet bookshops. The large online bookstores need a sophisticated website, both to attract and retain the attention of their customers. The facilities of the online bookshop may include:

* A large database of books. The details available for display include a picture of the cover, description of the book including page numbers, price of the book and reviews of other customers also if possible.
* The book can be searched with the help of search engines. The search can be made on the author’s name, title of the book or the subject etc.
* There may be software on the site, that may record the interest of the particular customer and can inform the customer on the new arrivals on that subject.

Some large online bookshop sites are:

* www.amazon.com
* www.barnsandnoble.com
* www.bol.com
* www.bookshop.blackwell.co.uk

**Grocery Supplies**

One who goes to purchase items from the supermarket must be aware of some of the similar problems as described below.

* The customer has to plan to go to the supermarket at the scheduled time of opening of the supermarket.
* The car park may be overcrowded.
* The supermarket may also have a big crowd.
* You have to pick the items and wait for your turn for billing.
* You have to unload the items on the checkout, reload into bags, load again into the car, take to the home and unload again from the car.

All these problems may be resolved with the help of online supermarket. The online supermarket is set up to meet the needs of those who cannot get to the supermarket or those who do not want to go.

The online supermarket is similar to any other online shop. The customer has to log-on on the site and select the groceries that are required. The staff pick the goods, pack and dispatch them.

Some of the noteworthy sites for grocery supplies are as follows:

* www.peapod.com
* www.homestore.com
* www.sainsbury.co.uk
* www.tesco.net

**Electronic Newspapers**

One of the hot areas on the Internet is the electronic newspaper. Electronic newspaper has advantages over both, the printed newspapers and the broadcast news on radio and televisions. In comparison to printed newspaper, the e-newspaper can give up-to-date news similar to broadcast news. Further, the browser could be set to select the news of interest of the reader and to leave out the rest. This is not possible with the broadcast news.

Despite the said advantages, the electronic newspapers are not being very popular due to the following reasons:

* Radio and television news are often consumed while people are doing other things like eating their foods or driving a car.
* Printed newspapers may be read on the train or in the park and then may be shared with someone else.
* The printed newspapers give the reader the chance to be selective (the selection depends on the moods and time of the reader).

There are a number of online newspapers and most of them are web versions of existing newspapers. For example:

* www.timesofindia.com
* www.dainikjagran.com

**Internet Banking**

Sometimes the bank, customers want to make an urgent payment but to visit the bank is not convenient. Similarly, to go to the bank to just know the balance is also not justified. Internet banking (or telephone banking) can solve these problems. To solve the problems on phone or Internet is also profitable for banks as it reduces their overheads.

With the help of online banking a customer can check his or her balance at any time of the day or night. The customer can also pay various bills like telephone, electricity etc. without going to the bank or billing centers. The typical services offered by the online banking are as follows:

* The customers can check their account balances at any time.
* The customer can obtain statements regarding any specific debit or credit that has gone through.
* Credit transfers so that bill can be paid online.
* Maintenance of standing orders and direct debits.
* The major service that is not provided is cash in and cash out. To get the money, the customer has to go to the bank or ATMs.

Some sites related to Internet banking are as follows:

* www.rbs.co.uk
* www.smile.co.uk

You cannot use the services provided by the online banks till you are not the customer.

**Electronic Auctions**

Auctions have been a well-established market mechanism for trading items at a market negotiated price, based upon demand and supply. The Internet has added a new dimension by creating an online mechanism for implementing the auction process. Traditional auctions had limited participation of people who turned up at the place of auction. Today, the same auction mechanisms can be implemented using e-commerce technologies, allowing people connected through the Internet to bid. Electronic auctions potentially encourage greater participation as Internet users can connect to a webhosting an auction and bid for an item. www.wbay.com <http://www.wbay.com> and www.auctionindia.com <http:// www.auctionindia.com> are the examples of such sites.

 **UNIT 2**

 **NETWORK INFRASTRUCTURE FOR E-COMMERCE**

Electronic commerce needs a network infrastructure to transport the content- data, audio, visual, text, animation and so on. This network infrastructure is provided by what is known as the I-way or information super highway. The information super highway may be defined as (Kalakota and Whinston)a high capacity, electronic pipeline to a consumer or business premises that is capable of simultaneously supporting a large number of E-commerce applications and providing interactive connectivity between users and services and between users and other users .The I-way has emerged as the basic network infrastructure for all types of E-commerce activities due to its capability to provide integrated voice ,data and video services . I-way has changed the way business advertise , market or sell their products and services .It has changed the relationships between business and customers, and between business and their collaborators . The information super highway has greatly affected the information sharing between various parts of the organisation and has had a considerable impact on the individual productivity and efficiency.

**THE ELEMENTS OF NETWORK INFRASTURCTURE**
1. **Network interface card**
A network interface card is more commonly referred to as NIC. It is a device that allows computers to be joined together in a local area network (LAN). Network computers communicate with each other using a given protocol or agreed- upon language for transmitting data packets between the different machines, known as nodes. The network interface card acts as a liaison for the machine to both send and receive data on the LAN.
A network card, network adapter, LAN adapter or NIC is a piece of computer hardware designed to allow computers to communicate over a computer network. It allows users to connect to each other either by using cables or wireless technology. A Network interface Controller (NIC) is a hardware interface that handles and allows a network cable device to access a computer network such as the Internet.
2.**Hubs and Switches**
Switch is a device in networks that filters and forwards packets between Local Area Network (LAN) segments. Switches operate at the data link layer and sometimes that network layer of the Open system Interconnection (OSI) reference model and therefore support any packet protocol. LANs that use switches to join segments are called switched LANs or in the case of Ethernet networks , switched Ethernet LANs. A special type of network device called the hub can be found in many small business networks. In computer networking, hub is a small, simple, inexpensive device that joins multiple computers together.
3. **Gateways**
A node in a network that serves as an entrance to another net Web pages. In homes, the gateway is the ISP that connects the user and fire wall. The gateway is also associated with both a router which use headers and forwarding tables to determine where packets are sent and a switch which provides the actual path for the packet in an out of the gateway. Gateways are also called as protocol converters and can operate at any layer. The job of gateway is any more complex than that of a router or switch.

**Network Infrastructure**

 The requirements of the network infrastructure needed to build an IP telephony system in an enterprise environment. Figure 3-1 illustrates the roles of the various devices that form the network infrastructure of a large-scale enterprise network, and Table 3-1 summarizes the features required to support each of these roles. IP telephony places strict requirements on IP packet loss, packet delay, and delay variation (or jitter). Therefore, you need to enable most of the Quality of Service (QoS) mechanisms available on Cisco switches and routers throughout the network. For the same reasons, redundant devices and network links that provide quick convergence after network failures or topology changes are also important to ensure a highly available infrastructure.

**The network has the following components:**

 • Employee desktop—Cisco 7960 IP Phones are provided for employees who work at a desk with a computer. The PC is connected via the phone’s Ethernet switch. It also is connected via a single Ethernet cable to a LAN switch that provides inline power to the phones. In Figure 3-2, the LAN switch is a separate component, but a LAN switch that optionally provides inline power can also be integrated into the router chassis for offices requiring 50 or fewer LAN connections. The ability to connect computer equipment via the phone substantially reduces the overall number of switch ports required in the office. However, this might require that an existing LAN switch be upgraded to provide inline power for the IP phones. However, inline power is not a requirement for IPT deployments.

 • Internet connectivity—This is provided via a DSL or a similar type of uplink to the local ISP, which also might host the company’s e-mail services. For larger offices, DSL may not have sufficient bandwidth. Internet connectivity may then be deployed via fractional T1/E1 leased-line services, or even a grouping of multiple DSL or Basic Rate Interface (BRI) lines

. • PSTN trunks—These PSTN lines are analog Foreign Exchange Office (FXO) connections to the central office (CO). Each line carries a single incoming or outgoing phone call. Caller ID is typically delivered on such connections, but direct inward dial (DID) operation is not. A variation of this offering from the PSTN offers DID operation; this is technically known as analog DID service. It can have a different cost than the plain FXO service. The trunks can also be on a fractional T1/E1 or a full T1/E1 type of service that runs CAS or PRI services. Small businesses often prefer familiar key system operation. In this system, individual PSTN lines are mapped to buttons on the phones

Labeled as Line1, Line2, Line3, and so on up to the number of lines coming in from the PSTN central office. (This arrangement is called key-system or square-keyswitch type of deployment.). These can also be used in the PBX-mode in which a user typically dials an access-code (like 9, commonly used in the US) for gain access to an outside PSTN line.

 • Attendant console—many small businesses with more than a handful of employees or considerable front-office customer interaction (such as a doctor’s office) prefer that an attendant or receptionist answer incoming calls. Although these businesses might use an automated attendant (AA) for after-hours coverage, the typical preferred customer interaction during normal business hours is person-to-person. Attendant consoles can be a Cisco Unified IP Phone 7960 with one or two Cisco Unified IP Phone 7914s providing a total of 34 extensions that can be monitored. Attendant consoles can also be software based consoles from Cisco-certified third-party vendors.

 • Management station—this is a web-based GUI management application for daily moves, adds, and changes to the system configuration. This can also be any one of the regular PCs used in the office. The only requirement is that it runs Internet Explorer Version 6 or later.

 • Other voice services—One or more fax machines are used by almost every type of business. A small number of analog phones may also be used around the office, such as for emergency backup PSTN connectivity if power to the building fails. Low-end IP phones, such as the Cisco Unified IP Phone 7902 or Cisco Unified IP Phone 7905, are scattered throughout the office in break rooms, health clinic exam rooms, lobbies, and perhaps conference rooms. These are often single-line phones that typically are not used to receive calls from the PSTN (they also do not have PC Ethernet ports). Instead, they are used for calls internal to the office or outgoing calls. Being IP phones, though, they participate in the intercom, paging, and display-based features often useful in a small office environment. Access to features, telephony interfaces, and calling plans can be controlled so that these phones are preventing from having access to outside lines. The Cisco Unified IP Phone 7920 wireless phone can also be a great productivity enhancer for employees whose responsibilities demand both reach ability and mobility, such as a retail floor supervisor, a warehouse supervisor, a bank branch manager, or a restaurant shift manager.

**Network Access Equipments**

Network equipment is used to combine, split, switch, boost, or direct packets of information along a computer or telecommunications network. This product area includes hubs, switches, routers, bridges, gateways, multiplexers, transceivers and firewalls. In addition to device type, network equipment is defined by protocol (e.g., Ethernet) and port or interface type. These concepts are described below.

**How Network Equipment Works**

Networking equipment interconnects devices so that data can be shared between them. The layout or topology of these connected devices describes the network's design or structure. Common topologies for computer networks include bus, ring, star, tree, and mesh. Hybrid topologies are also used.

In wireless networks, devices communicate via radio waves and do not require physical connections. In wired networks, cables are used. These cables are equipped with connectors for a specific port or interface type. For example, attachment unit interface (AUI) cables are equipped with 15-pin connectors that mate with a 15-pin receptacle on network transceivers.

 

  Fig.(1)Network Access Equipments

Computer networks handle data according to protocols that are fundamental mechanisms for network communications. Network protocols specify the software attributes of data communications, including the structure of packets and the information contained therein.  Depending upon the type of network, packets may be called blocks, cells, frames or segments. Network protocols may also prescribe some or all of the operational characteristics of the network hardware on which they run.

**Broad band Telecommunication**

In telecommunications, broadband is a wide bandwidth data transmission with an ability to simultaneously transport multiple signals and traffic types. The medium can be coaxial cable, optical fiber, radio or twisted pair

In the context of Internet access broadband is used much more loosely to mean any high-speed Internet access that is always on and faster than traditional dial-up access**.**

# Asynchronous Transfer Mode (ATM)

The physical infrastructure supporting data communications has improved its ability to transmit data quickly with advances such as optical fibers. As this physical capacity increases, there is a need to utilize effectively the **bandwidth** to carry a variety of traffic (voice, video, data) in an efficient manner. Traditionally, circuit switching is used to support the real-time delivery needed for voice and video. **Packet switching** is used to support intermittently heavy data traffic. Asynchronous Transfer Mode (ATM) has emerged as a technology that efficiently utilizes the bandwidth while carrying one or more traffic types. ATM is a high-speed packet switching technology that is capable of supporting both real-time voice and video and the kind of data traffic that has peaks and plateaus in its transmission.

ATM uses fixed size packets (called cells) to reduce processing and switching delays. The cell size is kept small, at 53 bytes, to allow for fast preparation and transmission. ATM allows different users to request varying amounts of resources to support the desired quality of transmission. It supports several traffic classes with differing quality-of service-requirements.

A user requests a connection to another user with a desired quality of service. The ATM switches use **signaling protocols** to communicate with one another about the availability of resources needed for the requested connection. ATM allocates bandwidth dynamically, so if some users are not transmitting their cells for some time, lower priority traffic with higher tolerance for delays can be transmitted.

## ATM Cells

An ATM cell is 53 bytes long with a 5-byte header possessing information for control and signaling, and 48 bytes of data payload. Having fixed-size cells may reduce queuing delays for high priority cells. Because one knows the size of a cell beforehand, it becomes easier to implement the switching mechanism in hardware for efficient switching. The header information is generated in the ATM Layer, while the ATM Adaptation Layer (AAL) breaks the entire message into 48-byte data chunks. The cell header contains fields to help deal with congestion, maintenance, and error control problems. It is broken up into the following fields:

* Generic Flow Control (GFC), a mechanism used to alleviate short-term overload conditions in the network. It is intended to provide efficient and equal utilization of the link between all the users.
* Virtual Path Identifier (VPI), which allows for more virtual paths to be supported within the network.
* Virtual Channel Identifier (VCI), which functions as a service access point as it is used for routing to and from the end user.
* Payload Type (PT), which is used to distinguish between user information and connection-associated layer management information.
* Cell Loss Priority (CLP), which is used to provide guidance to the network to discard the cell in case of congestion.
* Header Error Control (HEC), which contains the information that can be used by the physical layer for error detection or correction. It is calculated from the first 32 bits of the header.

## VCI/VPI Connections

The entire ATM network is based on virtual connections set up by the switches upon initialization of a call. Virtual Channel Identifiers (VCI) and Virtual Path Identifiers (VPI) are used to identify these virtual connections. They are used to route information from one switch to another. VCI and VPI are not addresses; they are explicitly assigned to each segment within a network.

A Virtual Channel Connection (VCC) is set up between two end users through the network and used for full-duplex flow of cells. They are also used for user-network exchange (control signaling) and network-network exchange (network management and routing). The VCI label identifies a VCC between two ATM switches and may change at intermediate nodes within a route.

Virtual channels having the same endpoints are often grouped together to form a Virtual Path Connection (VPC). This grouping of channels makes the task of network management easier without losing flexibility. Usually many virtual channels share a physical link at the same time, allowing asynchronous interweaving of cells from multiple connections. VPI connections share a common path through the network and thus network management actions need to be applied to only a single virtual path as opposed to all of the individual virtual channels.

## Layers and Their Functions

ATM is a layered architecture allowing multiple services—voice, data, and video—to be carried over the network. It consists of three layers: the physical layer, the ATM layer, and the ATM adaptation layer. Layers are as shown in Figure 1 and their functionality is summarized in Figure 2.

### Physical Layer.

The physical layer of ATM is similar to layer 1 of the **Open Systems Interconnections (OSI)** model and performs bit level functions. It defines electrical characteristics and network interfaces. It is further divided into two layers: Physical Medium (PM) and Transmission Convergence (TC) sub-layer.

The PM sub layer contains physical medium (e.g. optical fiber, coaxial, or twisted pair) dependent functions and provides bit transmission capability including bit alignment.

The TC sub layer performs five primary functions as shown in Figure 2. The lowest function is the generation and recovery of the transmission frame. Transmission frame adaptation adapts the cell flow according to the used payload structure of the transmission system in the sending direction, and extracts the cell flow from the transmission frame in the receiving direction.

The cell delineation function enables the receiver to recover the cell boundaries. The Header Error Control (HEC) sequence generation is done in the transmit direction and its value is recalculated and compared with the received value. Cell rate decoupling inserts the idle cells in the transmitting direction in order to adapt the rate of the ATM cells to the payload capacity of the transmission system. It suppresses all idle cells in the receiving direction. Only assigned and unassigned cells are passed to the ATM layer.





The ATM layer is next above the physical layer. The ATM layer takes the data to be sent and adds the 5-byte header information. It performs the following four actions:

* Cell header generation/extraction, which adds the appropriate ATM cell header to the received cell information field from the upper layer in the transmit direction. It does the opposite in the receive direction.
* Cell multiplex and demultiplex function, which **multiplexes** cells from individual virtual channels and virtual paths into one resulting cell stream in the transmit direction. It divides the arriving cell stream into individual cell flows to VCs or VPs in the receive direction.
* VPI and VCI translation, which is performed at the ATM switching and/or cross-connect nodes.
* Generic Flow Control (GFC), which supports control of the ATM traffic flow in a customer network.

### ATM Adaptation Layer.

The AAL performs the adaptation of OSI higher layer protocols, as most applications cannot deal directly with cells. The Adaptation Layer assures the appropriate service characteristics, and divides all types of data into the 48-byte payload that will make up the ATM cell. AAL is further divided into two sublayers: Segmentation and Reassembly (SAR) and Convergence Sublayer (CS).

The SAR sublayer performs segmentation of the higher layer information into a size suitable for the payload of the ATM cells of a virtual connection and, at the receiving side, it reassembles the contents of the cells of a virtual connection into data units to be delivered to the higher layers. The CS sublayer performs functions like message identification and time/clock recovery.

## Key Benefits of ATM

ATM offers significant benefits to users and those who design and maintain communications networks. Because network transport functions can be separated into those related to an individual logical connection (virtual connection) and those related to a group of logical connections (virtual path), ATM simplifies network management. ATM also allows for the integration of networks, improving efficiency and manageability and providing a single network for carrying voice, data, and video.

ATM increases network performance and reliability because the network is required to deal with fewer aggregated entities. There is also less processing needed and it takes less time to add new virtual channels because capacity is reserved beforehand on a virtual path connection. Finally, ATM offers a high degree of infrastructure compatibility. Because ATM is not based on a specific type of physical transport, it can be transported over twisted pair, coaxial, and fiber optic cables.

**ISDN**

Integrated Services Digital Network is a telephone system network. It is a wide area network becoming widely available. Prior to the ISDN, the phone system was viewed as a way to transport voice, with some special services available for data. The key feature of the ISDN is that it integrates speech and data on the same lines, adding features that were not available in the classic telephone system**.**

ISDN is a circuit -switched telephone network system, that also provides access to packet switched networks, designed to allow digital transmission of voice and data over ordinary telephone copper wires, resulting in better voice quality than· an analog phone. It offers circuit-switched connections (for either voice or data), and packet-switched connections (for data), in increments of 64 Kbit/s.

Another major market application is Internet access, where ISDN typically provides a maximum of 128 Kbit/s in both upstream and downstream directions (which can be considered to be broadband speed, since it exceeds the narrowband speeds of standard analog 56k telephone lines). ISDN B-channels can be bonded to achieve a greater data rate; typically 3 or 4 BRIs (6 to 8 64 Kbit/s channels) are bonded.

ISDN should not be mistaken for its use with a specific [protocol](http://ecomputernotes.com/computernetworkingnotes/computer-network/protocol), such as Q.931 whereby ISDN is employed as the network, data-link and physical layers in the context of the OSI model. In a broad sense ISDN can be considered a suite of digital services existing on layers 1, 2 and 3 of the OSI model. ISDN is designed to provide access to voice and data services simultaneously.

However, common use has reduced ISDN to be limited to Q.931 and related protocols, which are a set of protocols for establishing and breaking circuit switched connections, and for advanced call features for the user. They were introduced in 1986. In a videoconference, ISDN provides simultaneous voice, video, and text transmission between individual desktop videoconferencing systems and group (room) videoconferencing systems.

The first generation of ISDN is called as a narrowband ISDN and it is based on the use of 64 kbps channel as the basic unit of switching and has a circuit switching orientation. The main device in the narrowband ISDN is the frame relay. The second generation of ISDN is referred to as the broadband ISDN (B-ISDN).

It supports very high data rates (typically hundreds of Mbps). It has a packet switching orientation. The main important technical contribution of B-ISDN is the asynchronous transfer mode (ATM), which is also called as cell relay.

## ****ISDN Interfaces****

There are several kinds of access interfaces to the ISDN dermed :

### ****Basic Rate Interface (BRl)****

### ****Primary Rate Interface (PRl)****

### ****Broadband-ISDN (B-ISDN)****

### ****Basic Rate Interface (BRI)****

Basic Rate Interface service consists of two data-bearing channels ('B' channels) and one signaling channel ('D' channel) to initiate connections. The B channels operate at 64 Kbps maximum; however, (in the U.S. it can be limited to 56 Kbps.

The D channel operates at a maximum of 16 Kbps. The two channels can operate independently. For example, one channel can be used to send a fax to a remote location, while the other channel is used as a TCP/IP connection to a different location.

The basic rate interface (BRl) specifies a digital pipe consisting of two B channels and 16 Kbps D channel. Two B channels of 64 Kbps each, plus one D channel of 16 Kbps, equal 144 Kbps. In addition, the BRl service itself requires 48 Kbps of operating overhead. BRl therefore requires a digital pipe of 192 Kbps. Conceptually, the BRl service is like a large pipe that contains three smaller pipes, two for the B channels and one for the D channel.

The remainder of the space inside the large pipe carries the overhead bits required for its operation. In the following figure shaded portion of the circle surrounds the Band D channels shows the overhead.

### ****Primary Rate Interface (PRI)****

Primary Rate Interface service consists of a D channel and either 23 (depending on the country you are in). PRI is not supported on the iSeries. Or 30 B channels

The usual Primary Rate Interface (PRI) specifies a digital pipe with 23 *B*channels and one 64 Kbps D channel. Twenty-three B channels of 64 Kbps each, plus one D channel of 64 Kbps equals 1.536 Mbps. In addition, the PRI service itself uses 8 Kbps of overhead.

PRI therefore requires a digital pipe of 1.544 Mbps. Conceptually; the PRI service is like a*large*pipe containing 24 smaller pipes, 23 for the B channels and 1 for the D channel. The rest of the pipe carries the overhead bits required for its operation. In figure, the shaded portion of the circle surrounding the B and D channels shows the overhead.

### ****Broadband-ISDN (B-ISDN)****

Narrowband ISDN has been designed to operate over the current communications infrastructure, which is heavily dependent on the copper cable. B-ISDN however, relies mainly on the evolution of fiber optics. According to CCITT B-ISDN is best described as 'a service requiring transmission channels capable of supporting rates greater than the primary rate.

## ****Principle of ISDN****

The ISDN works based on the standards defined by ITU-T (formerly CCITT). (The Telecommunication Standardization Sector (ITU- T) coordinates standards for telecommunications on behalf of the International Telecommunication Union (ITU) and is based in Geneva, Switzerland. The standardization work of ITU dates back to 1865, with the birth of the International Telegraph Union.

It became a United Nations specialized agency in 1947, and the International Telegraph and Telephone Consultative Committee (CCITT), (from the French name "Comite Consultatif International Telephonique et Telegraphique") was created in 1956. It was renamed ITU-T in 1993.

**The principle of ISDN according to ITU –T is as stated below**

The ISDN is supported by a wide range of voice and non-voice applications of the same network. It provides a range of services· using a limited set of connections and multipurpose user-network interface arrangements

ISDN supports a variety of applications that include both switched and non-switched connections. The switched connections. Include both circuit and packet switched connections.

As far as possible, new services introduced into an ISDN should be arranged to be compatible with the 64 Kbps switched digital connections.

A layered protocol structure should be used for the specification of access to an ISDN.

This is the same as the OSI reference model. The standards which have already been developed for OSI applications such as X.25 can be used for ISDN.

ISDNs may be implemented in a variety of configurations.

## ****ISDN Services****

The purpose of the ISDN is to provide fully integrated digital services to users. These services fall into categories- better services, teleservices and supplementary services.

**1. Bearer Services:** Bearer services provide the means to transfer [information](http://ecomputernotes.com/fundamental/information-technology/what-do-you-mean-by-data-and-information) (voice, data and video) between users without the network manipulating the content of that information. The network does not need to process the information and therefore does not change the content.

Bearer services belong to the *first*three layers of the OSI model and are well defined in the ISDN standard. They can be provided using circuit-switched, packet-switched, frame-switched, or cell-switched networks.

**2. Teleservices:**In teleservices, the network may change or process the contents of the data. These services correspond to layers 4-7 of the OSI model. Teleservices relay on the facilities of the bearer services and are designed to accommodate complex user needs, without the user having to be aware of the details of the process. Teleservices include telephony, teletex, telefax, videotex, telex and teleconferencing. Although the ISDN defines these services by name, they have not yet become standards.

                        

**3. Supplementary Service:**Supplementary services are those services that provide additional functionality to the bearer services and teleservices. Examples of these services are reverse charging, call waiting, and message handling, all familiar from today's telephone company services.

**FRAME RELAY**

Frame relay has evolved from X.25 packet switching and objective is to reduce network delays, protocol overheads and equipment cost. Error correction is done on an end-to-end basis rather than a link -to-link basis as in X.25 switching. Frame relay can support multiple users over the same line and can establish a permanent virtual circuit or a switched virtual circuit.

Frame relay is considered to be a protocol, which must be carried over a physical link. While useful for connection of LANs, the combination of low throughput, delay variation and frame discard when the link is congested will limit its usefulness to multimedia.



•Packet switching was developed when the long distance digital communication showed a large error rate.

•To reduce the error rate, additional coding bits were introduced in each packet in order to introduce redundancy to detect and recover errors.

•But in the modem high speed telecommunication a system, this overhead is unnecessary and infect counter productive.

•Frame relay was developed for taking the advantage of the high data rates and low error rates in the modem communication system.

• The original packet switching networks were designed with a data rate at the user end of about 64 kbps.

• But the frame relay networks are designed to operate efficiently at the user's data rates upto 2 Mbps.

• This is possible practically because most of the overhead (additional bits) are striped off.

• Frame relay is a virtual circuit wide area network which was designed in early 1990s.

• Frame relay also is meant for more efficient transmission scheme than the X.25 protocol.

• Frame Relay is used mostly to route Local Area Network protocols such as IPX or TCP/IP.

• The biggest difference between Frame Relay and X.25 is that X.25 guarantees data integrity and network managed flow control at the cost of some network delays. Frame Relay switches packets end-to-end much faster, but there is no guarantee of data integrity at all.

• FRAD (Frame Relay Assembler/Disassembler) is a device used by frame relay to handle frames arriving from other protocols.

• A FRAD assembles and disassembles frames coming from other protocols.

• This is an option offered by frame relay. Its long form is Voice Over Frame Relay.

• VOFR allows voice transfer on the frame relay. Voice is transferred in the digital form with the help of PCM.

• This is an inexpensive way of sending voice over long distance. But the quality of sound is not very good.

LMI:

• Originally there was no provision for control and management of interfaces in the frame relay because it was designed to provide PVC connection.

• So recently a protocol called LMI (local management information).

• This protocol provides management features such as :

1. A mechanism to check if data is flowing.

2. A multicast mechanism.

3. A mechanism to check the status of a switch.

Congestion control and quality of service:

One of the advantages of frame relay is that it provides congestion control and quality of service.

Advantages of frame relay:

Some of the advantages of frame relay are:

1. Streamlined communication process.

2. The number of functions of a protocol at the user-network interface is reduced.

3. Lower delay.

4. Higher throughput.

5. Frame relay can be used at access speeds upto 2 Mbps.

6. Frame Relay is cost- effective, partly due to the fact that the network buffering requirements are carefully optimized.

7. Compared to X.25, with its store and forward mechanism and full error correction, network buffering is minimal.

8. Frame Relay is also much faster than X.25: the frames are switched to their destination with only a few byte times delay, as opposed to several hundred milliseconds delay on X.25.



Disadvantages of frame relay:

1. Frames are delivered unreliably.

2. Packets may not be delivered in the same sequence as that at the sending end.

3. Packets having errors are simply discarded.

4. Frame relay does not provide flow control.

5. It does not provide the acknowledgement of received packets.

6. Frame discarded in case of network congestion. If congestion occurs in the network, frame (data) is discarded within the network without retransmission of this frame. The sender must perform retransmission control at his own responsibility.

Congestion control in frame relay networks:

• The frame relay network implements a simple congestion control mechanism in which involves congestion notification.

• The two congestion notification mechanisms are as follows:

1. FECN : Forward Explicit Congestion Notification.

2. BECN: Backward Explicit Congestion Notification.

• Both these are controlled by a single bit contained in the frame header of frame relay.

• The frame header of frame relay also contains a Discard Eligibility (DE) bit. It is useful in identifying the less important traffic which can be dropped in the event of congestion.

• The FECN bit is a part of the address field of the frame header.

• If the network is congested, the FECN bit is set to 1. When such frames reach the destination, the FECN = 1 indicates the presence of congestion. The flow control can then be initiated or the indication may be ignored.

• As shown in Fig. the FECN bit travels to the destination i.e. in the direction of transmission.

• The BECN bit also is a part of the address field of the frame header.

• The value of BECN bit is set to 1 in the frames that traveling in the opposite direction (to the sender).

• The BECN = 1 indicates congestion and the flow control is exercised to control the congestion.

Discard Eligibility (DE):

• If "DE" bit of a frame is set to 1 then it shows that, the particular frame has lower importance than the other frames.

• In the event of congestion, the frames with DE = 1 are discarded first to reduce the possibility of critical data getting affected by the congestion.

Frame Relay and the OSI Reference Mode

Frame relay constitutes of the OSI second layer (data link layer). Above that layer the protocol may be determined as desired by the user. Therefore, the IP protocol (the third-layer protocol) which is commonly used for LAN can be used without any modification.

**Mobile Commerce**

Mobile e-commerce (m-commerce) is a term that describes online sales transactions that use wireless electronic devices such as hand-held computers, mobile phones or laptops. These wireless devices interact with computer networks that have the ability to conduct online merchandise purchases. Any type of cash exchange is referred to as an e-commerce transaction. Mobile e-commerce is just one of the many subsets of electronic commerce. Mobile e-commerce may also be known as mobile commerce.

**Wireless Application Protocol**

Wireless application protocol (WAP) is a communications protocol that is used for wireless data access through most mobile wireless networks. WAP enhances wireless specification interoperability and facilitates instant connectivity between interactive wireless devices (such as mobile phones) and the Internet.


WAP functions in an open application environment and may be created on any type of OS. Mobile users prefer WAP because of its ability to efficiently deliver electronic information.

**Wireless Application Protocol Technology**

WAP is a global standard developed by the WAP Forum for wireless devices to access the Internet and telephony services. WAP can also be used to access data from corporate intranets through public or private IP networks. Figure A shows the WAP services that are currently offered.

|  |
| --- |
| Figure A |
| http://tr1.cbsistatic.com/hub/i/2015/06/03/9bab3a30-0989-11e5-940f-14feb5cc3d2a/r00220000712jim02_01.gif |

**WAP specifications**

WAP is an open specification that defines a set of protocols in application, session, transaction, security, and transport layers. To leverage existing programming and development skills, it is based on existing standards and protocols such as XML, HTTP, UDP, HTML, and JavaScript.

The key elements of the WAP specification include:

* A well-known applications development framework. The WAP transport model is analogous to the Internet model, except for the gateway that is inserted between the Web server and the client. This familiar model leverages the existing development skills of WWW programming.
* WML (Wireless Markup Language) as the standard markup language.
* A browser inside WAP devices that parses WML and WMLScript.
* A framework to support advanced telephony services, like WWW to mobile messaging, call forwarding, mobile to telefax access, and address book access.

Figure B compares a protocol stack based on the Internet model to WAP. As you can see, numerous networks are included in WAP, with the ultimate goal of targeting multiple networks.

|  |
| --- |
| Figure B |
| http://tr1.cbsistatic.com/hub/i/2015/06/03/9bc1b976-0989-11e5-940f-14feb5cc3d2a/r00220000712jim02_02.gif |

**How WAP works**

A typical WAP network consists of the following components:

* User with WAP-enabled device
* Gateway
* Application server
the application server can be located in either a public or private IP network. The gateway normally is located in telecom networks, but it can be set up by a company using its own computer systems. To get an idea of how these components work together, let’s look at a typical scenario using WAP technology:
1. A user with a WAP device requests content from the application server.
2. The request reaches the gateway first, which does the protocol translation from WAP to HTTP and routes the HTTP request to the destination server.
3. The server returns WML output and adds HTTP headers to the gateway, depending upon whether dynamic or static pages are requested.
4. The gateway converts WML and HTTP to binary form to conserve bandwidth and returns a WAP response to the user.
5. The browser inside the WAP device interprets the WML and shows the contents.

**WAP limitations**

Compared to PCs, wireless devices are limited in terms of processing power, memory, battery life, and display size. Other issues of low bandwidth, latency, and connection stability motivated the forum to come up with a new set of WAP standards. They have reused many of the existing standards while creating new extensions to address the above-mentioned problems. The new WAP specifications leverage the existing investment in hardware, software, applications, and development skills.

**Mobile Information Devices**

Mobile Information Device Profile (MIDP) is a specification published for the use of Java on embedded devices such as mobile phones and PDAs. MIDP is part of the Java Platform, Micro Edition (Java ME) framework and sits on top of Connected Limited Device Configuration (CLDC), a set of lower level programming interfaces. MIDP was developed under the Java Community Process

 
There are several different ways to create MIDP applications: code can be written in a plain text editor, or one can use a more advanced IDE such as NetBeans, IntelliJ (with bundled Java ME plugin), or Eclipse (with plugins such as EclipseME) which has a user interface for graphically laying out any forms you create, as well as providing many other advanced features not available in a simple text editor.

**Limitations of MID**

MID 1.0 has no active rendering APIs

MID 1.0 has no support for direct access to image pixels (RGB data)

MID 1.0 has no support for full screen mode

MID 1.0 has no support for audio.

MID 1.0 requires only HTTP support[clarification needed].

MID 1.0 cannot query key status (although key events are supported)

The specifications are not always clear, leading to differences in implementations.

Some limitations may be avoided by using a vendor-specific API or MIDP2.0, which obviously reduces the portability of the application**.**

**UNIT -3**

**Security issues on Web**

E-commerce systems are based upon internet use, which provides open and easy communications on a global basis. However, because the internet is unregulated, unmanaged and uncontrolled, it poses a wide range of risks and threats to the systems operating on it.

The use of the internet means that your internal IT and e-commerce systems are potentially accessible by anyone, irrespective of their location.

**Threats from hackers and the risks to business**

Some of the more common threats that hackers pose to e-commerce systems include:

* carrying out denial-of-service (DoS) attacks that stop access to authorized users of a website, so that the site is forced to offer a reduced level of service or, in some cases, ceases operation completely
* gaining access to sensitive data such as price lists, catalogues and valuable intellectual property, and altering, destroying or copying it
* altering your website, thereby damaging your image or directing your customers to another site
* gaining access to financial information about your business or your customers, with a view to perpetrating fraud
* using viruses to corrupt your business data

**Impact of a security incident on the business**

If your website is hacked into, it can have a significant impact upon a business running an e-commerce service. The potential business implications of a security incident include the following:

* direct financial loss as a consequence of fraud or litigation
* subsequent loss as a result of unwelcome publicity
* criminal charges if you are found to be in breach of the Data Protection or Computer Misuse Acts, or other regulation on e-commerce
* loss of market share if customer confidence is affected by a DoS attack

The images presented by your business, together with the brands under which you trade, are valuable assets. It is important to recognize that the use of e-commerce creates new ways for both image and brands to be attacked.

# The importance of having firewalls!

Firewall is a software or hardware device that protects your computer from being attacked over the internet by hackers, viruses, and worms. This may occur either at a large corporate network, or simply at a small home network; both have the same security issues.
Having a firewall in each company’s internet connection allows the business to setup online rules for the users. For example, with the firewall the company can control the access to certain websites, giving it the control of how employees use the network. These are the different ways of how a firewall controls the online activities:

* **Packet filtering:** small amount of data is analyzed and distributed according to the filter’s standards. .
* **Proxy service:** online Information is saved by the firewall and then sent to the requesting system.
* **Stateful** inspection: matches specific details of a data packet to a database of reliable information.

Firewalls allow you to either add or remove filters based on certain circumstances such as:

**IP addresses:** If a certain IP address, not belonging to the company’s network is accessing too many files from the server, this IP can get blocked by the firewall.

**Domain names:** with the firewall, a company is able to block or allow access to certain domains.

**Specific words and phrases:** The firewall will scan each packet of information to match the filter content. You may select any word or sentence to be blocked.

Protect your home computer at home by turning on a firewall, or if you have more than one, use a hardware firewall (such as a router) to protect your network. If you use a “public” computer, you should follow the network administrator’s policy.

Even though some firewalls offer virus protection, it is recommended to install anti-virus software on each computer. Depending on the layers of security you use, you will determine how many threats can be blocked by your firewall, and prevent any outside user to login into your private network.

In cases when you need to allow remote access from others to your network, you may create a DMZ (Demilitarized Zone). This is an option provided by most of the software firewalls; they will designate a directory on the gateway computer as a DMZ.

**Firewall components**

A firewall is a collection of hardware and software that, when used together, prevent unauthorized access to a portion of a network.

A firewall consists of the following components:

* **Hardware**. Firewall hardware usually consists of a separate computer dedicated to running the firewall software functions.
* **Software**. Firewall software can consist of some or all of these applications:
	+ Packet filters
	+ Proxy servers
	+ SOCKS servers
	+ Network address translation (NAT) services
	+ Logging and monitoring software
	+ Virtual private network (VPN) services

**Transaction Security**

Electronic commerce lets companies integrate internal and external business processes through information and communication technologies. Companies conduct these business processes over intranets, extranets, and the Internet. E-commerce lets businesses reduce costs, attain greater market reach, and develop closer partner relationships. However, using the Internet as the underlying backbone network has led to new risks and concerns. Often, industry analysts cite trust and security as the main hurdles in growing e-commerce. A number of factors have hampered the growth of e-commerce in developing countries. Yet, the main perceived obstacle to increased Internet usage is very similar in companies from both developed and developing countries. Firms already using the Internet consider the lack of network security to be the primary problem, followed by slow and unstable connections. This litany of evolutionary phases masks a number of growing technical challenges, including following.

 • Security and authentication;

 • Content management and publication;

 • Reliable systems, messaging, and data;

 • Complex interactions and transactions;

 • Business model implementation and business process enactment;

 • Distributed processing and distributed data.

 **E-commerce applications are categories into different types**

 • B2B – Business to Business E-commerce

 • B2C – Business to Consumer

 • C2C-Consumer to Consumer

 • B2E – Business to Employee

 • C2B-Consumer to Business

 • G2G- Government to Government

The online transaction requires consumers to disclose a large amount of sensitive personal information to the vendor, placing themselves at significant risk. Understanding (indeed, even precisely defining) consumer trust is essential for the continuing development of e-commerce. This paper is organized as follows. Section I is introduction which gives brief ides about E-commerce applications. Section II focused on security challenges in the E-commerce Applications. Section III discusses security-oriented transaction privacy design model for e-commerce

**Emerging Client Server**

E-Commerce involves doing transactions on the Internet be it online shopping, online banking, business to business commerce, EDI - Electronic Data Interchange, and a whole bunch of other stuff that can be handled over remote sites automatically without any human intervention.

E-Commerce Applications need not necessarily only have Web-based front-ends. They can also be an Application running on your Command Prompt that talks to server components elsewhere or it can be a typical Windows Application with a GUI front-end which may once again talk to server components elsewhere on a network.

E-Commerce Applications with Browser front-ends are called **Thin-Client** applications. E-Commerce Applications which have an Application based front-end (or more specifically native Applications that run on an OS instead of a browser) with all the native Windows-like GUI -- buttons, list-boxes, edit-controls, etc. are called **Fat-Client** E-Commerce Applications.

Creating E-Commerce Applications generally involves building and interacting with Components that are distributed all over the network. Each E-Commerce Application can be divided into multiple Tiers. These Tiers are classified depending on what tasks they perform. These are generally broadly classified into

1. **Presentation Services** or **User Interface Tier (Client Tier)**
2. **Business Logic**or **Middleware** **Tier**
3.**Database Services** or **Data Source Tier**



**Figure: A Typical 3-tier E-Commerce Application - A Banking Application (Fat-Client)**

Once again when building an E-Commerce Application you have to decide which technology you want to go with.
1. Microsoft has COM+/Windows DNA, and the .NET Framework,
2. Sun has Java/J2EE,
3. OMG has CCM/CORBA 3.0, and

**Security Threats**

Most businesses that have made the move towards an online presence have experienced some kind of security threat to their business. Since the Internet is a public system in which every transaction can be tracked, logged, monitored and stored in many locations, it is important for businesses to understand possible security threats to their business.

There are many threats to e-commerce that may come from sources within an organization or through some external channel. The following are the top corporate security threats categorized by internal and external threats.

1. Unauthorized internal users who accesses confidential information by using a stolen passwords for the purpose of committing fraud or theft.

2. Former employees of an organization that maintain access to information resources directly by creating alternative passwords, "back doors  into the computer system, or indirectly through former co-workers.

3. Weak access points in information infrastructure and security that can expose company information and trade secrets.

4. Management that undermines security is maybe the greatest risk to e-commerce as there are continuously new ˜electronic' threats to be aware of and fight.

5. Employee error or malicious act that causes data to be destroyed or corrupted.

6. Employees who receive or download inappropriate content from the Internet exposing the organization to cyber problems such as viruses

7. Contractors, partners, consultants, and temps who take advantage of even limited access to important systems.

8. Mistaken disclosure of confidential data

o Hackers who break into networks through an Internet connection and steal confidential information.

9. These security threats are the most common as they can spread across corporate networks through file sharing and can be sent automatically to all listings in a system's address book.

**What Is Network Security?**

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| What is network security? How does it protect you? How does network security work? What are the business benefits of network security?You may think you know the answers to basic questions like, What is network security. Still, it's a good idea to ask them of your trusted IT partner. Why? Because small and medium-sized businesses (SMBs) often lack the IT resources of large companies. That means [your network security](http://www.cisco.com/cisco/web/solutions/small_business/solutions/secure_my_business/index.html/tab/Need/) may not be sufficient to protect your business from today's sophisticated Internet threats.In answering the question What is network security?, your IT partner should explain that network security refers to any activities designed to protect your network. Specifically, these activities protect the usability, reliability, integrity, and safety of your network and data. Effective network security targets a variety of threats and stops them from entering or spreading on your network.What Is Network Security and How Does It Protect You?After asking What is network security?, you should ask, What are the threats to my network?Many network security threats today are spread over the Internet. The most common include:* Viruses, worms, and Trojan horses
* Spyware and adware
* Zero-day attacks, also called zero-hour attacks
* Hacker attacks
* Denial of service attacks
* Data interception and theft
* Identity theft

How Does Network Security Work?To understand What is network security?, it helps to understand that no single solution protects you from a variety of threats. You need multiple layers of security. If one fails, others still stand.Network security is accomplished through hardware and software. The software must be constantly updated and managed to protect you from emerging threats.A network security system usually consists of many components. Ideally, all components work together, which minimizes maintenance and improves security.Network security components often include:* Anti-virus and anti-spyware
* Firewall, to block unauthorized access to your network
* Intrusion prevention systems (IPS), to identify fast-spreading threats, such as zero-day or zero-hour attacks
* Virtual Private Networks (VPNs), to provide secure remote access

What are the Business Benefits of Network Security?With network security in place, your company will experience many business benefits. Your company is protected against business disruption, which helps keep employees productive. Network security helps your company meet mandatory regulatory compliance. Because network security helps protect your customers' data, it reduces the risk of legal action from data theft.Ultimately, network security helps protect a business's reputation, which is one of its most important assets. |

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# Firewall Limitations

Firewalls are a good first step in protecting your organization from hackers. But they do have their limitations. The top 10 firewall limitations include:

* Viruses. Not all firewalls offer full protection against computer viruses as there are many ways to encode files and transfer them over the Internet.
* Attacks. Firewalls can’t protect against attacks that don’t go through the firewall. For example, your firewall may restrict access from the Internet, but may not protect your equipment from dial in access to your computer systems.
* Architecture. Consistent overall organization security architecture: Firewalls reflect the overall level of security in the network. An architecture that depends upon one method of security or one security mechanism has a single point of failure. A failure in its entirety, or through a software application bug, may open the company to intruders.
* Configuration. A firewall can’t tell you if it has been incorrectly configured. Trained professionals have the talent and experience to properly configure firewalls.
* Monitoring. Some firewalls can notify you if a perceived threat occurs, however, they can’t notify you if someone has hacked into your network. Many organizations find they need additional hardware, software and network monitoring tools.
* Encryption. While firewalls and Virtual Private Networks (VPNs) are helpful, they don’t encrypt confidential documents and E-mail messages sent within your organization or to outside business contacts. Formalized procedures and tools are needed to provide protection of your confidential documents and electronic communications.
* Management. Firewalls stop incoming threats but organizations still require a formalized management, destruction, and archival procedure for their electronic documents. Electronic messages taken out of context can put an organization in financial jeopardy.
* Masquerading. Firewalls can’t stop a hacker from masquerading as an employee. Hackers have a number of ways to acquire user ids and related passwords.
* Policies. Firewalls are not a replacement for a strong Security Policy and Procedure Manual. An organization’s security structure is only as strong as its weakest link. Security professionals have the experience needed to help protect your reputation.
* Vulnerabilities. Like a deadbolt lock on a front door, a firewall can’t tell you if there are other vulnerabilities that might allow a hacker access to your internal network. Organizations frequently rely on Security Vulnerability Assessments to help them manage their risks.

 **Unit 5**

**Overview of Electronic payment**

There are different types of electronic payment systems.

## 1.1 Tamper resistance (chip cards)

You can buy without being connected. The card basically indicates you how many you've paid. The holder cannot know what are the secrets inside, what sort of information goes from the card to the remote system. Is privacy kept? For off-line systems, a chip is usually used.

What kind of usage? To take the bus, to replace coins in the physical world. Cheap cards.

The business cases for those cards are marginal.

If I put my card in a socket, I don't know how much money the system takes me.

## 1.2 Software only

There is also a completely different approach without any hardware: for example on a PC. The software can make payment to someone. You can't do off-line payment.

With the software, it is my computer. I know what it does. (I do not agree with this approach).

On the Internet, I would like to buy something without telling the vendor who I am.

You chose the information you want to give to the vendor (to prevent tele-marketing).

With the computer, you can have a negotiation. It is not the case with an off-line system. (I agree with that).

If the datas are concentrated in a central site, you can be sure the government can target individuals.

The net's terrorism is against individuals, well known persons.

## 1.3 Hybrid systems

There is an hybrid system based on a card (the money) and a mobile equipment (the wallet). With this system you can put some money on your card.

## 1.4 Conclusion

Cryptography is used in all the systems.

**SET Protocol**

The Secure Electronic Transaction protocol also knows as SET is a method for providing secure credit card transactions on the Internet. The SET protocol is designed to operate both in real times, as on the World Wide Web, and in a store-and-forward environment, such as e-mail. Furthermore, as an open standard, SET is designed to allow consumers, merchants, and banking software companies to independently develop software for their respective clienteles and to have them interoperate successfully.

However, in order for secure transactions to work SET must possess the following qualities:

* Confidentiality: others cannot eavesdrop on an exchange.
* Integrity: the messages received are identical to the messages sent.
* Authenticity: you are assured of the persons with whom you are making an exchange.
* Non-Reputability: none of the involved parties can deny that the exchange took place.

In addition to these four requirements, SET also assumes that that a hierarchy of certificate authorities that can vouch for the bindings between a user and a public key already exists. Therefore, consumers, merchants, and acquirers must exchange certificates before a party can know what public key to employ to encrypt a message for a particular correspondent.

Finally, the following is a diagram of how the Secure Electronic Transaction protocol works, and a description of each step of the transaction.
The SET protocol like any other protocol operates via a sequence of message exchanges. There is a total of ten steps (message exchanges) taken for a transaction, and the parties involved include the consumer, vendor, and a network of banks. The following are the ten steps taken during an electronic transaction:

* In the first two message exchanges between the consumer and merchant, the consumer and merchant signal their intention to do business. They then exchange certificates and establish a transaction ID number. From this both the consumer and merchant will be able to extract each other’s public key and verify that they are indeed talking to who the other side claims to be.
* In the third step following the initial handshake, the consumer sends a purchase request to the merchant containing the signed hash of the goods and services order, which is negotiated outside the protocol. This request is accompanied by the consumer's credit card information, encrypted so that only the merchant's acquiring bank can read it.
* At this point, the merchant has to choice of either acknowledging the order request of the customer first and seek authorization later, or it can perform authorization first and then confirm the customer's order request.
* Steps five and six of the protocol involve the authorization of the customer’s order request. The authorization process work as follows. The vendor will send the consumers request to its acquiring bank. The acquiring bank will reformat the request and send it over a bankcard network to bank that issued the consumers credit card. The issuer bank will then respond to the acquiring bank with its response and the acquiring bank will forward the outcome to the vendor.
* Steps seven and eight gives the consumer a query capability allowing them to check on the status information of the purchase.
* Finally, steps nine and ten allow the merchant to submit authorizations for capture and settlement. The process works as follows: At the time of the delivery of goods or services, merchant will submit a capture request to its own acquiring bank to obtain payment. This request is then forwarded by the acquiring bank over the bankcard network to issuing bank for settlement of payment.

**Payment Gateway**

## A payment gateway is an e-commerce application service provider service that authorizes credit card payments for e-businesses, online retailers, bricks and clicks, or traditional brick and mortar. Typical transaction processes

When a customer orders a product from a Payment Gateway-enabled merchant, the payment gateway performs a variety of tasks to process the transaction.

1. A customer places order on website by pressing the 'Submit Order' or equivalent button, or perhaps enters their card details using an automatic phone answering service.
2. If the order is via a website, the customer's web browser encrypts the information to be sent between the browser and the merchant's [web server](https://en.wikipedia.org/wiki/Webserver). In between other methods, this may be done via [SSL](https://en.wikipedia.org/wiki/Secure_Sockets_Layer) (Secure Socket Layer) encryption. The payment gateway may allow transaction data to be sent directly from the customer's browser to the gateway, bypassing the merchant's systems. This reduces the merchant's [Payment Card Industry Data Security Standard](https://en.wikipedia.org/wiki/Payment_Card_Industry_Data_Security_Standard) (PCI DSS) compliance obligations without redirecting the customer away from the website.
3. The merchant then forwards the transaction details to their payment gateway. This is another ([SSL](https://en.wikipedia.org/wiki/Secure_Sockets_Layer)) encrypted connection to the payment server hosted by the payment gateway.
4. The payment gateway forwards the transaction information to the [payment processor](https://en.wikipedia.org/wiki/Payment_processor) used by the merchant’s acquiring.
5. The [payment processor](https://en.wikipedia.org/wiki/Payment_processor) forwards the transaction information to the [card association](https://en.wikipedia.org/wiki/Card_association) (e.g., Visa/MasterCard/American Express). If an [American Express](https://en.wikipedia.org/wiki/American_Express) or [Discover Card](https://en.wikipedia.org/wiki/Discover_Card) was used, then the card association also acts as the [issuing bank](https://en.wikipedia.org/wiki/Issuing_bank) and directly provides a response of approved or declined to the payment gateway. Otherwise [e.g.: a MasterCard or Visa card was used], the card association routes the transaction to the correct card issuing.
6. The credit card issuing bank receives the authorization request and credit or debit checks and then sends a response back to the processor (via the same process as the request for authorization) with a response code [e.g.: approved, denied]. In addition to communicating the fate of the authorization request, the response code is used to define the reason why the transaction failed (such as insufficient funds, or bank link not available). Meanwhile, the credit card issuer holds an authorization associated with that merchant and consumer for the approved amount. This can impact the consumer's ability to further spend (e.g.: because it reduces the line of credit available or because it puts a hold on a portion of the funds in a debit account).
7. The processor forwards the authorization response to the payment gateway
8. The payment gateway receives the response, and forwards it on to the website (or whatever interface was used to process the payment) where it is interpreted as a relevant response then relayed back to the merchant and cardholder. This is known as the Authorization or "Auth"
9. The entire process typically takes 2–3 seconds.[[3]](https://en.wikipedia.org/wiki/Payment_gateway#cite_note-3)
10. The merchant then fulfills the order and the above process is repeated but this time to "Clear" the authorization by consummating the transaction. Typically, the "Clear" is initiated only after the merchant has fulfilled the transaction (e.g.: shipped the order). These results in the issuing bank 'clearing' the 'auth' (i.e.: moves auth-hold to a debit) and prepares them to settle with the merchant acquiring bank.
11. The merchant submits all their approved authorizations, in a "batch" (e.g.: end of day), to their [acquiring bank](https://en.wikipedia.org/wiki/Acquiring_bank) for settlement via its processor.
12. The acquiring bank makes the batch settlement request of the credit card issuer.
13. The credit card issuer makes a settlement payment to the acquiring bank (e.g.: the next day)
14. The [acquiring bank](https://en.wikipedia.org/wiki/Acquiring_bank) subsequently deposits the total of the approved funds into the merchant's nominated account (e.g.: the day after). This could be an account with the acquiring bank if the merchant does their banking with the same bank, or an account with another bank.
15. The entire process from authorization to settlement to funding typically takes 3 days.

Many payment gateways also provide tools to automatically screen orders for fraud and calculate tax in real time prior to the authorization request being sent to the processor. Tools to detect fraud include [geolocation](https://en.wikipedia.org/wiki/Geolocation%22%20%5Co%20%22Geolocation), velocity pattern analysis, OFAC list lookups, 'black-list' lookups, delivery address verification, computer finger printing technology, identity morphing detection, and basic [AVS](https://en.wikipedia.org/wiki/Address_Verification_System) checks.

**Digital Certificate**

Digital certificate is a digital identity of a person much like a driver license. It can also be issued to a computer or a network device identifying it while communicating. A digital certificate is issued by a Certification Authority (CA) complying with the X.509 standard and it normally contains mainly the following information:Public key of the certificate owner

* Name of the owner
* Validity “from” and “to” dates
* Name of the issuing authority
* Serial number of the certificate
* Digital signature of the issuing authority
* Digital Signature Algorithm
* Custom information

Digital certificate or digital signature relies on digital cryptography; a sophisticated, mathematically proven method of encrypting and decrypting information. A digital certificate contains information about the owner’s identity e.g., their name, email address, the date the digital certificate was issued and the name of the Certifying Authority that issued it. The certificate also contains the public key. The private key (correspond to the public key) is stored on the user's computer hard disk or on an external device such as a smart card. The user retains the control of the private key and it can only be used with the issued password or PIN.

As the above mentioned processes require a public key hence a need of a Public Key Infrastructure (PKI) arises which is responsible for managing all aspects of digital certificate issuance, publication, revocation, renewal etc, in short managing the full lifecycle of digital certificates. Every Digital certificate usually can be chained to a Root CA (which is the final trust point and issues a certificate to itself). The Root CA then issues a certificate to one or more subordinate CA s) which is used to issue certificates for end-entities, which can be human users, network devices, machines, databases or other software components. There are also different types of certificates like CA certificate, Root CA certificates, SSL server or SSL client certificates, object signing certificates (to sign code e.g. jar files) and user/end-entity certificates for document or email signing. There are also certificates for encryption purposes.

**Digital Token**

The digital token based payment system is a new form of electronic payment system which is based on electronic tokens rather than e-cheque or e-cash. The electronic tokens are generated by the bank or some financial institutions. Hence we can say that the electronic tokens are equivalent to the cash which are to be made by the bank.

Categories of Electronic Tokens:-

I. Cash or Real Time:-
In this mode of electronic tokens transactions takes place via the exchange of electronic currency (e-cash).

2. Debit or Prepaid:-
In this electronic payment system the prepaid facilities are provided. It means that for transactions of information user pay in advance. This technology is used in smart card, electronic purses etc.

3. Credit or Postpaid;-
These types of electronic token based on the identity of customers which issue a card, their authentication and verification by a third party. In this system the server authenticates the customers and then verifies their identity through the bank. After all these processing the transaction take place. Example is E-Cheques.

**Smart Card**

A smart card, typically a type of chip card, is a plastic card that contains an embedded computer chip–either a memory or [**microprocessor**](http://www.smartcardbasics.com/smart-card-types.html#microprocessor-card) type–that stores and transacts data. This data is usually associated with either value, information, or both and is stored and processed within the card's chip. The card data is transacted via a reader that is part of a computing system. Systems that are enhanced with smart cards are in use today throughout several key applications, including healthcare, banking, entertainment, and transportation. All applications can benefit from the added features and security that smart cards provide. According to Euro smart, worldwide smart card shipments will grow 10% in 2010 to 5.455 billion cards. Markets that have been traditionally served by other machine readable card technologies, such as barcode and magnetic stripe, are converting to smart cards as the calculated return on investment is revisited by each card issuer year after year.

### Applications

First introduced in Europe nearly three decades ago, smart cards debuted as a stored value tool for payphones to reduce theft. As smart cards and other chip-based cards advanced, people found new ways to use them, including charge cards for credit purchases and for record keeping in place of paper.

In the U.S., consumers have been using chip cards for everything from visiting libraries to buying groceries to attending movies, firmly integrating them into our everyday lives. Several U.S. states have chip card programs in progress for government applications ranging from the Department of Motor Vehicles to Electronic Benefit Transfers (EBTs). Many industries have implemented the power of smart cards in their products, such as the [**GSM**](http://www.gsm.org/) digital cellular phones as well as TV-satellite decoders.

### Why Smart Cards

Smart cards improve the convenience and security of any transaction. They provide tamper-proof storage of user and account identity. Smart card systems have proven to be more reliable than other machine-readable cards, like magnetic stripe and barcode, with many studies showing card read life and reader life improvements demonstrating much lower cost of system maintenance. Smart cards also provide vital components of system security for the exchange of data throughout virtually any type of network. They protect against a full range of security threats, from careless storage of user passwords to sophisticated system hacks. The costs to manage password resets for an organization or enterprise are very high, thus making smart cards a cost-effective solution in these environments. [**Multifunction cards**](http://www.smartcardbasics.com/smart-card-types.html#microprocessor-card) can also be used to manage network system access and store value and other data. Worldwide, people are now using smart cards for a wide variety of daily tasks, which include:

**Credit Card**

A **credit card** is a [payment card](https://en.wikipedia.org/wiki/Payment_card) issued to users (cardholders) as a method of payment. It allows the cardholder to pay for [goods and services](https://en.wikipedia.org/wiki/Goods_and_services) based on the holder's promise to pay for them.[[1]](https://en.wikipedia.org/wiki/Credit_card#cite_note-1) The [issuer](https://en.wikipedia.org/wiki/Credit_card_issuer) of the card (usually a bank) creates a [revolving account](https://en.wikipedia.org/wiki/Revolving_account) and grants a [line of credit](https://en.wikipedia.org/wiki/Line_of_credit) to the cardholder, from which the cardholder can borrow money for payment to a [merchant](https://en.wikipedia.org/wiki/Merchant) or as a cash.

A credit card is different from a [charge card](https://en.wikipedia.org/wiki/Charge_card), where it requires the balance to be repaid in full each month.[[2]](https://en.wikipedia.org/wiki/Credit_card#cite_note-2) In contrast, credit cards allow the consumers a continuing balance of debt, subject to [interest](https://en.wikipedia.org/wiki/Credit_card_interest) being charged. A credit card also differs from a [cash card](https://en.wikipedia.org/wiki/Cash_card), which can be used like currency by the owner of the card. A credit card differs from a charge card also in that a credit card typically involves a third-party entity that pays the seller and is reimbursed by the buyer, whereas a charge card simply defers payment by the buyer until a later date.

The size of most credit cards is 85.60 mm × 53.98 mm (3.370 in × 2.125 in),[[3]](https://en.wikipedia.org/wiki/Credit_card%22%20%5Cl%20%22cite_note-3)conforming to the [ISO/IEC 7810 ID-1](https://en.wikipedia.org/wiki/ISO/IEC_7810#ID-1) standard. Credit cards have a printed[[4]](https://en.wikipedia.org/wiki/Credit_card%22%20%5Cl%20%22cite_note-4)or embossed [bank card number](https://en.wikipedia.org/wiki/Bank_card_number) complying with the [ISO/IEC 7812](https://en.wikipedia.org/wiki/ISO/IEC_7812) numbering standard. Both of these standards are maintained and further developed by [ISO/IEC JTC 1/SC 17/WG 1](https://en.wikipedia.org/wiki/ISO/IEC_JTC_1/SC_17/WG_1). Before magnetic stripe readers came into widespread use, plastic credit cards issued by many department stores were produced on stock ("Princess" or "CR-50") slightly longer and narrower than 7810. Many modern credit cards have a chip embedded in them for security reasons.

**Magnetic Strip Card**

A magnetic stripe is the black or brown stripe that you see on your credit card, or maybe the back of your airline ticket or transit card. The stripe is made up of tiny magnetic particles in a resin. The particles are either applied directly to the card or made into a stripe on a plastic backing which is applied to the card.

The material used to make the particles defines the Coercivity (see below) of the stripe. Standard low coercivity stripes use iron oxide as the material to make the particles, high coercivity stripes are made from other materials like barium ferrite. These materials are mixed with a resin to form uniform slurry which is then coated onto a substrate. In the case of a credit card or similar application the slurry is usually coated onto a wide plastic sheet and dried. The coating is very thin and the plastic allows the coating to be handled. It is then sliced into stripe widths and applied to the card during the card manufacturing process. The methods of application include lamination (where the stripe and backing is laminated into the card), hot-stamp (where a heated die is used to transfer the oxide stripe from the backing onto the card after the card is cut to size), and cold-peel (where the oxide stripe is peeled from the backing, and then laminated into the card). Each of the methods have their own advantages and are largely irrelevant to the user of the card.

Another method of putting a stripe on a card is direct coating. In this case, the oxide slurry is coated onto the card (usually paper or card rather than plastic) during the manufacturing process for the card. There can be some manufacturing cost reductions by using this technique, though there may also be some quality trade off.

Once the slurry is coated onto the substrate (plastic backing or direct to card stock) the particles in the slurry are aligned to give a good signal to noise ratio. This is the equivalent of eliminating those pops and bangs you hear on old tape recordings. The tape with the wet slurry is passed through a magnetic field to align all the particles. With the iron oxide particles this is relatively easy for two reasons. The particles are low coercivity so do not need a large magnetic field to orient them, and the particles are acicular (needle shaped) with an aspect ratio of approximately six to one. The acicular particles have an easy axis of magnetization along the length of the particle which makes the alignment an easy process. This process is not so easy with the high coercively materials. The particles used in most of the high coercivity materials are not acicular, they are platelets. These platelets have an easy axis of magnetization through the plate, which means the alignment field has to stand the particles on edge and they have to stay that way to get the best performance from the stripe. Obviously the particles want to fall over as soon as the field is removed from the stripe so part of the skill in making a high quality stripe lies in designing a process that can keep those particles on their side until the slurry sets.

Unfortunately, the lack of alignment can cause some major problems in the read and encode process of the magnetic stripe. The wave shape of the read process can be distorted by the lack of alignment. This distortion can cause significant problems for some read systems.

In all of the above processes, the final card has the familiar brown or black stripe on it. The stripe can be encoded because the particles (like iron filings) can be magnetized in either a north or South Pole direction. By changing the direction of the encoding along the length of the stripe this allows information to be written on the stripe. This information can be read back and then changed if required as easily as the first encoding.

**E-Checks**

|  |  |
| --- | --- |
| Electronic Check Service is an E-Commerce Exchange payment service that allows online and traditional merchants to accept and process electronic check payments -- either directly from their website storefront or through the e-Commerce Virtual Terminal. | Electronic Check Service |
| Electronic Check Service makes it easy for online businesses to add an electronic check payment option to their Website. Customers who wish to pay for a purchase with an electronic check can simply select the electronic check option and enter the requested bank account information. Electronic Check Service encrypts the data using SSL 3.0 encryption technology and transmits it to the secure server for posting. Transactions are automatically settled each day. Then the system debits the consumer's account via the Electronic Check Service \* and transfers the funds to the merchant's account. If the account numbers are entered incorrectly or the account has insufficient funds, the Electronic Check Service system notifies the merchant. |
| Traditional merchants without commerce-enabled Web sites can also use Electronic Check Service to handle periodic billings. Businesses such as health clubs, tanning salons, subscription services, ISP's, membership companies, and health care practitioners are typical examples of businesses that need the ability to periodically deduct funds from their customer's checking accounts. Of course, customer approval is always recommended, and merchants must sign a separate Electronic Check Service agreement to perform these types of transactions. |
| If you would like to learn more about our Electronic Check Service please read our [Support Guide](https://firstaffiliates.com/affiliatewiz/support.aspx). |
|  |
| **Features and Benefits**These services are available 24 hours a day, 7 days a week real-time without ever needing to speak to customers. * No Credit Turn Downs: Regardless of previous credit history
* 100% Financed: No large out-of-pocket initial investment
* Fast Turnaround: Electronic check funds are transferred into your account within 48 hours
* Access and process transactions anywhere around the globe where you have Internet access
* User friendly, easy to use program
* Solution for automated processing of Internet merchants
* Electronic Check feature - transfer funds directly to merchant's bank account
* Handles recurring monthly payments from check accounts
* SSL security (best on the Internet today)
* Reporting capabilities accessible via the Internet
* Authorizes electronic check transaction within 5 seconds and emails customer's order to merchants for fulfillment
* Encourages impulse buying on the Internet
* Converts your web site from an electronic brochure to a commerce-enabled virtual storefront
* Merchants credit card processing order form can be setup to have the same look and feel as their e-commerce site
 |

**Online Banking**

Online Banking is becoming an important aspect of worldwide commerce. Online Banking is also known as ebanking, cyber banking, virtual banking, net banking, and internet banking. Online banking includes various banking activities conducted from home business, instead of at a physical bank location Customer relationship management worked as a tool increased use of e-commerce makes CRM. Online banking is based on internet or web- based interaction to create a high volatile relationship in the banking sector .Questions are related to online banking in which given options are Satisfied, Unsatisfied ,Neutral, Yes, No . After analysis and comparison of traditional banking of online banking, it is revealed that it is quite difficult, if not impossible, to suggest that which online banking is best. Online banking provide the flexibility, efficiency of work, provide the better security of net banking than net banking incresed. The future of web-based e-banking in developed areas appears bright but consumers and merchants in developing countries face in number of barriers to successful ebanking, including less reliable telecommunications infrastructure and power supplies, less access to online payment mechanisms and relatively high costs for personal computers and Internet access . The Future scope of the study of Online banking is use to reduce transaction costs.

 **Credit Card**

 It contains identification that allow you to make purchases and signatures and authorizes the person's named in it to charge purchases to his account charges to which will be billed to him at regular intervals. To purchase goods from merchants who accept credit cards such as process the payments transaction. (Shilpan D. Vyas, Tang. T 2002) [1,3] . 1.6.1 Advantages:- -Not having to carry cash. -Having a record of purchases 1.6.2 Disadvantages:- -Interest payments. -Credit card can be lost or stolen. -Membership fees. -Increasing chances of overspending. -Financial troubles if card is not managed properly

 **Debit Card**

An electronic card issued by a bank which allows bank clients access to their account to withdraw cash or pay for goods and services. This removes the needs for bank clients to go the bank to remove cash from their accounts they can now just go to an ATM. The card allows instant purchases, removing the correct balance from the user's attached bank account.

 **Features**

The ability to purchase items at stores that have automated debit or credit card machines.

 -The ability to withdraw cash from your bank account at ATM.

 **Advantages**

It is often easier to get than a credit card

. -You do not have to carry cash, a checkbook or traveler's checks.

 -You do not pay interest charges.

 **Disadvantages**

-You need enough money in your bank account to cover each purchase.

 -You have less protection if your debit card is lost or misused than with a credit card.

**EDI Application in business**

EDI is commonly defined as the direct computer-to-computer exchange of standard business forms, it clearly requires a business process. Because the key idea involved is the exchange of documents that allow a business application to take place without human intervention, data processing is clearly necessary for application processing. Data communication is then necessary for the exchange to take place. It is the marrying of these three disciplines that allows the "paperless trading" that comprises EDI technologies.

Besides the three career disciplines that are internal to the organization, three other issues are important for EDI trading to take place: standardization of formats, security, and value-added networks (VANs).

## Data processing and EDI

One of the technological fields required to implement EDI is data processing. Data processing allows the EDI operation to take information that is resident in a user application and transform that data into a format that is recognizable to all other user applications that have an interest in using the data. In the EDI environment, data processing will handle both outgoing and incoming data, as depicted in figure 1.



**Figure 1: Data Processing and EDI**

The user-defined files in figure 1 are the flat files that are produced by a business application. These files may or may not be formatted by the user. These are the business files that need to be translated into the X12 format.

The translation software in figure 1 is the software that maps the elements of a user-defined file into the ANSI X12 or EDIFACT standard format. This software is available through commercial retailers on various platforms from PCs to mainframes.

The mapping of the user-defined data elements into the translation software requires some skill in mapping. The mapping itself requires knowledge of both the translation software and the EDI standards being used so new mapping and processing rules can be set up for the translator. If a new trading partner places no new requirements on the translator, the new trading partner is simply set up under existing mapping rules. However, when the trading partner requires that additional or different data fields be sent, a new mapping scheme needs to be identified and associated with that trading partner

**Applications of EDI**

The business process examined here to which to apply EDI concepts is the procurement process. This business process was chosen for two reasons. First, within industry itself, new EDI technology is developing fastest in this area. Second, the President has issued an initiative to streamline government procurement through the use of EC. Since the initiative was announced in October 1993, the thrust within the government has been to implement the initiative using EDI technologies. These factors make the procurement process the most relevant business process to examine at this time

 **A typical small purchasing application**

The business application depicted in figure 2 is a simple purchasing application.

And then 

**Figure 2: Business Application and EDI**

As shown in figure 2, the procurement process normally begins with the buyer being made aware of a need within the organization to make a purchase. As soon as a need is established and precisely described, the buyer begins the process of selecting the supplier that will be used. Routine items may be purchased using suppliers that have already been contracted with. New items or high-value items may require investigation by the buyer in selecting an appropriate supplier.

The buyer will select a preliminary group of suppliers and then employ the methods of competitive bidding, negotiation, or a combination of the two to secure the final supplier. When competitive bidding is used, the buyer issues an RFQ to the suppliers that the buyer might be willing to do business with. Typically, the RFQ will contain the same basic information that will be included on the purchase order.

When a supplier receives an RFQ that the supplier has an interest in bidding on, the supplier issues a quotation to the buyer. The quotation will contain pricing information so the buyer can do a price comparison between the suppliers. For instance, an RFQ might be issued for 200 gallons of white, latex-based paint. The supplier who is issuing a quotation may quote a price of $xxx.xx.

Once a supplier has been selected, the purchasing department issues a serially numbered purchase order. The purchase order itself becomes a legally binding contract. For this reason the buyer will carefully prepare the purchase order and ensure that the wording is precise and specific. Any drawings, diagrams, or related documentation that is necessary to precisely describe the item being purchased will be incorporated or referenced in the purchase order. Additionally any conditions or sampling plans will be stated precisely.

Normally a list of terms and conditions designed to give legal protection to the buyer on various matters prescribed by law are incorporated in, or attached to, all purchase orders as boilerplate to those orders. These boilerplate terms and conditions cover a wide range of concerns including, contract acceptance, delivery performance and contract termination, shipment rejections, assignment and contracting or the order, patent rights and infringements, warranties, compliance with regulations, and invoicing and payment procedures.

Change orders are required when a company makes a change in the contract after a purchase order has been issued. The buyer will issue the change order and, when accepted by the supplier, the change order either supplements or replaces the original purchase order.

The original copy of the purchase order constitutes a legal offer to buy. The purchase contract then comes into existence when the contract is performed or when formal acknowledgment of acceptance of the offer is made.

Normal business methods suggest that the supplier may not bother to acknowledge the offer if the items are immediately shipped to the buyer. When the items are not immediately shipped, then the supplier should send the acknowledgment back to the buyer.

The supplier may acknowledge the buyer's order accepting the buyer's terms and conditions, or may acknowledge and incorporate the supplier's own terms and conditions in the acknowledgment. If the seller's terms are different than the buyer's, the law allows them to be incorporated into the contract as long as they do not alter the buyer's intent or unless the buyer files a written objection to the inclusion of new terms and conditions. In general, terms and conditions that are in conflict between buyer and seller are excluded from the contract, leaving the settlement to negotiation or suit. For this reason it is imperative that the buyer beware of the terms and conditions in the order acceptance.

**Forms of Agreement**

Electronic commerce offers new opportunities to improve the efficiency of business operations and to reduce costs associated with trade procedures, providing increased competitive advantages to the commercial actors ready to embrace new methods of work and trade. Emerging electronic commerce platforms and the use of the Internet provides users with a combination of technologies to communicate data, to contract electronically as well as to manage new business processes leading to new business models. The legal framework, which traditionally relies on paper-based business procedures and requirements such as hand-written signatures, is in the process of being adapted to these new technologies. At the global level, the availability of the United Nations Commission on International Trade Law (UNCITRAL) Model Law on electronic commerce adopted in 1996 provides a framework to adapt legislation. International organizations such as the World Trade Organization (WTO), UNCITRAL, the Organization for Economic Co-operation and Development (OECD), the United Nations Conference on Trade and Development (UNCTAD), and the International Chamber of Commerce (ICC) are actively involved in discussions with governments and businesses to address a number of key legal issues raised by the emergence of a global marketplace for electronic commerce. At regional or local level, new laws are being proposed or enacted to address a number of these issues. Though the emerging legal framework of the global marketplace for electronic commerce, once completed, will contribute to the building of trust required for its further development, the use of electronic commerce still raises a number of issues which can be better addressed through a contractual process.

**Objectives**

With the objective of contributing to the building of trust between business entities and taking advantage of the experience gained with the EDI Interchange Agreement (UN/ECE Recommendation No. 26), UN/CEFACT adopted the following Recommendation at its sixth session in March 2000. The list of countries and organizations present at the session can be found in the Annex . UN/CEFACT is proposing with this Recommendation a model for a contractual approach of electronic commerce operations. This approach takes into consideration the need for a framework of basic provisions to be agreed by business entities combined with the flexibility required to conduct day to-day commercial transactions. The Electronic Commerce Agreement, hereinafter referred to as the "E-Agreement", is intended to serve the commercial requirements of business to business electronic commerce partners. It contains a basic set of provisions which can ensure that one or more electronic commercial transactions, hereinafter referred to as "E-Transactions", may subsequently be concluded by commercial partners within a sound legal framework. The E-Agreement aims at addressing all forms of electronic communications available to conclude Transactions. Commercial partners engaged into contractual relations based exclusively on EDI are recommended to continue to use the EDI Interchange Agreement. Commercial partners engaged in contractual relations based on the use of a combination of electronic commerce technologies including EDI are recommended to use the Agreement and, to the extent necessary, replace the use of an EDI Interchange Agreement by the Agreement

**The E-Agreement consists of two parts:**

 **A.** the Instrument of Offer, whereby a Party offers to enter into commercial contractual relationships by electronic means and sends to the other Party, or makes available to the other Party, the terms under which it is prepared to do this. This instrument can also be used by someone who does not find the initial terms proposed acceptable and sends a new Instrument of Offer to the initial sender, incorporating the proposed changes.

 **B.** the Instrument of Acceptance is submitted by the Accepter of the terms proposed in the Instrument of Offer if the terms proposed in the Instrument of Offer are acceptable.

**Policies and Agenda**

As the world moved from autarky to globalization, international trade policy is now designed at Geneva under the auspices of the World Trade Organization, with some influence from the other two Breton Woods institutions: The World Bank and the International Monetary Fund. These are pursuing economic reforms in developing countries, of which trade liberalization is an important part. Partly as a result of these persuasions and otherwise, the WTO resulted from a hectic 7-years’ negotiation under the General Agreement on Tariffs & Trade, also known as the Uruguay Round. This concluded in 1995 as a decision of the 124 members of the GATT community.

The GATT was founded in 1948 as an arrangement to govern trade relations between member countries. Of the 23 founding members, India is one. She is also a founding member of the WTO.

The new GATT, 1994 is a much larger agreement covering many new areas, other than tariffs alone, for which agreements have been also entered into. Two new areas to the GATT discipline are agriculture, and textiles and clothing, both affecting consumers directly. Three issues entirely new to the GATT discipline are Trade Related aspects of Intellectual Property Rights (TRIPs), Trade Related Investment Measures (TRIMs) and the General Agreement on Trade in Services (GATS). All these also have a direct bearing on consumers and their welfare. TRIPs in particular has been a subject of much controversy, because of the provision of patents which has the potential of creating monopolies on consumer goods like pharmaceuticals, and on agricultural goods like seeds and fertilizers. Exploitation by such monopolistic or oligopolistic market structures can increase the cost of production, and thus affect consumer welfare directly.

The WTO agreements have had both good and bad effects on people of India. In some cases opportunities have increased leading to growth and thus creating more jobs, while in some cases it has had adverse effects. However the economy as a whole has gained.

In the WTO agreement there is a provision to review the progress at the Ministerial level every two years. The first review meeting was held in Singapore in December 1996, which threw up several ‘new’ issues for being examined by the members, and deliberated whether there is a need to incorporate them into the WTO acquits: investment policy, competition policy, transparency in government procurement and trade facilitation. However a plurilateral agreement on Information Technology Products was launched, to which India is also a party.

The second ministerial meeting was held at Geneva in May 1998 to coincide with the golden jubilee of the multilateral trading system, which did not throw up any new issue, except an understanding on studying e-commerce while agreeing to not levy any new taxes on it. The third ministerial meeting was held in Seattle though nothing was concluded in it.

In the recently held fourth Ministerial meeting in Doha, India secured major gains in several areas of the hard fought agenda. A dispassionate analysis of the Ministerial Declaration from the perspective of India's basic trade interests reveals that India bargained hard on agriculture, implementation, TRIPs and trade & transfer of technology among other areas and got a fair amount of success. However we have to keep in mind that environment is now in the agenda and the issue of labor standards is also not dead as understood by some. On the other hand we will have to gear up to tackle the Singapore issue as well, in future.

Having said that CUTS feel that India will have to do some major restructuring in current trade policy formulation process, as it is an integral component of the overall economic policy of any government. The government will have to make the system more professional, by bringing in trade experts rather than depending on transferable civil servants.

CUTS has prepared the following agenda for India to be pursued both at international as well as domestic level. The international agenda talks about what India should do at the international forums, in the best interest of its people in the context of the WTO. There is a domestic agenda too, which requires our Government to take note of, in implementing our commitments under the WTO as also to make the best out of it. We have to attend this huge domestic agenda before we can reap any perceived gains that future negotiations can throw up.

CUTS also want to attract attention of the members of the advisory committee towards para. 10 of the Doha Declaration, wherein we have agreed to ensure more effective and prompt dissemination of information related to WTO, and to improve dialogue with the public. We also agreed to promote a better public understanding about the WTO and to communicate the benefits of a liberal, rule bases multilateral trading system.

**1. STRATEGIC ISSUES**

• Certain strategic issues are to be taken into account while putting forward an agenda. They cut across the board, and their importance lie in facilitating the process.

• The civil society is now in the mainstream of international economic policy making. NGOs in the North have enough resources and endowed, and are thus very effective.

• Besides being well funded, NGOs in many of the Northern countries are represented in, the consultative mechanisms of their governments and also participate in official delegations to WTO meetings.

• On the other hand, while many in the South are also resourceful, it is through donors or governments in the North, and it is always a tight situation. Besides, they are 'accused' of singing the donor's tune.

 Therefore, the following strategic issues are important.

**International Agenda**

 To advocate and ensure the formation of a viable political alliance between Northern consumers and Southern producers, so that our producers can take full advantage of their market access potential, and thus enhance sustainable development across the world.

 To guarantee the transparency of the operations of the WTO and participation of international non-governmental organizations as well as non-governmental representatives from developing and least developed countries.

 To develop a multilateral fund for giving financial assistance to participants from developing and least developed countries at international meetings.

 To develop guidelines for regional and national consultations, including the establishment of national contact points to facilitate the access and input of civil society organizations into the trade debate.

**Domestic Agenda**

Government of India should provide resources and build capacity of NGOs in India so as to create a well-informed citizenry and a balancing force at international fora.

To ensure an effective interaction between the Indian business and consumer organizations so that they can take forward the concerns of India with their counterparts in developed countries.

The Ministry of Commerce & Industry should include representatives from consumer and other non-governmental organizations in trade delegations/missions.

To facilitate public debate on WTO issues by establishing focal points at sub-national/regional levels.

To promote rolling studies on WTO issues through research institutions, universities and civil society with the aim of providing policy guidelines to the government and for analyzing different issues in a holistic manner.

Consumers’ interest should not be sidelined while dealing with anti-dumping issues.

The Government of India needs to fund NGOs who work on these issues to enhance their capacity. NGOs also need to develop accountability.

Financial assistance from the Consumer Welfare Fund should be made available to consumer organizations to work on trade policy issues.