**ntroduction**

Two thousand years ago, Roman roads brought trade and commerce to Europe in an unprecedented manner. A thousand years ago, the spice routes linked the cultures of East and West. At the dawn of the second millennium, the Internet, the world’s largest computer network, the network of networks, is making fundamental changes to the lives of everyone on the planet-changing forever the way business is conducted.

Internet has become an important medium for doing global business based on the state of the art technology. Global business was conducted in a new way: electronically, using networks and the Internet. The availability of Internet has led to the development of **E-Commerce (Electronic commerce)**, in which business transactions take place via telecommunication networks. E-Commerce has two major aspects: economical and technological. The stress of this course will show you how to get started in the complex and exciting world of Electronic Commerce. New standards and new facilities are constantly emerging and their proper understanding is essential for the success of an operation and especially for those who are assigned a duty to select, establish, and maintain the necessary infrastructure.

**Brief History Of E-Commerce**

The history of E-commerce is a history of how Information Technology has transformed business processes. Some authors will track back the history of E-commerce to the invention of the telephone at the end of last century. The Internet was conceived in 1969, when the Advanced Research Projects Agency (a Department of Defence organization) funded research of computer networking. The Internet could end up like EDI (Electronic Data Interchange) without the emergence of the World Wide Web in 1990s. EDI (Electronic Data Interchange) is widely viewed as the beginning of E-commerce if we consider E-Commerce as the networking of business communities and digitalization of business information.

EDI, which expanded from financial transactions to other transaction processing and enlarged the participating companies from financial institutions to manufacturers, retailers, services, and so on. Many other applications followed, ranging from stock trading to travel reservation systems .Such systems were described as telecommunication applications and their strategic value was widely recognized. With the commercialization of the Internet in the early 1990s and its rapid growth to millions of potential customers, the term electronic commerce was coined, and EC applications expanded rapidly. One reason for the rapid expansion of the technology was the development of networks, protocols, software, and specifications. The other reason was the increase in competition and other business pressures. From 1995 to 1999 we have witnessed many innovative applications ranging from advertisement to auctions and virtual reality experiences. Almost every medium- and large-sized organization in the United States already has a Web site many are very extensive; for example, in 1999 General Motors Corporation offered 18,000 pages of information that included 98,000 links to its products, services, and dealers.

**Definition Of E-Commerce:**

Concepts of E commerce

**Electronic commerce**is an emerging model of new selling and merchandising tools in which buyers are able to participate in all phases of a purchase decision, while stepping through those processes electronically rather than in a physical store or by phone (with a physical catalogue). The processes in electronic commerce include enabling a customer to access product information, select items to purchase, purchase items securely, and have the purchase settled financially. It is an emerging concept that describes the process of buying and selling or exchanging of products, services; and information via computer networks including the Internet.

E-commerce is basically, doing business-as-usual, but across the Internet. You advertise your products or services on your Web site, as you would in any other media like newspapers, TV or brochures. Advertising on your Web site can be done in two ways.

* The first is by use of a relatively simple Web site consisting of a few pages whereby you tell potential customers who you are, what you do, where you are and how they can contact you ( easiest done by giving them your email address).
* The second way of enabling world-wide customers to buy from you is to provide them with an **On-Line Catalogue**of your products which they can browse at their leisure without having to go to your place of business.

***On-Line Catalogue:***

On-Line Catalogue is that catalogue where people access via the Internet. On-Line Catalogue is an integral part of website, enabling customers to...

* Browse through stock list, read about an item or service;
* Look at photographs of the products.
* Select which items they want to purchase
* And drop them into a shopping cart as they go along.
* When they have completed their shopping, they go to the
* Check-Out.

The next step is to request the order by filling in their details and method of payment on a form which is waiting for them at the Check-Out. The form is already partially completed with a breakdown of the items in their shopping cart, prices inclusive of tax, and shipping & handling charges, if any. If they choose to pay by credit card, the form includes a place for them to fill in their credit card number. And then, with one press of a button, they send the order to you.

***Electronic Commerce under different perspectives:***

Let’s see how Electronic Commerce (EC) is defined under each perspective.

***1. Communications Perspective***

EC is the delivery of information, products /services, or payments over the telephone lines, computer networks or any other electronic means.

***2. Business Process Perspective***

EC is the application of technology toward the automation of business transactions and work flow.

***3. Service Perspective***

EC is a tool that addresses the desire of firms, consumers, and management to cut service costs while improving the quality of goods and increasing the speed of service delivery.

***4. Online Perspective***

EC provides the capability of buying and selling products and information on the internet and other online services.

**Classifications of E-Commerce Applications**

Electronic Commerce (e-Commerce) is a general concept covering any form of business transaction or information exchange executed using Information and Communication Technologies (ICTs). E-Commerce takes place between companies, between companies and their customers, or between companies and public administrations. Electronic Commerce includes electronic trading of goods, services and electronic material.

E-Commerce systems include commercial transactions on the Internet but their scope is much wider than this; they can be classified by application type:

***Electronic Markets:***

The principle function of an electronic market is to facilitate the search for the required product or service. Airline booking systems are an example of an electronic market.

***Electronic Data Interchange (EDI):***

Electronic Data Interchange (EDI) is the electronic exchange of business documents in a standard, computer processable, universally accepted format between-trading partners.

EDI is quite different from sending electronic mail, messages or sharing files through a network. In EDI, the computer application of both the sender and the receiver, referred to as Trading Partners (TPs) have to agree upon the format of the business document which is sent as a data file over electronic messaging services.

The two key aspects of EDI that distinguish it from other forms of electronic communication, such as electronic mail, are:

1. The information transmitted is directly used by the recipient computer without the need for human intervention is rarely mentioned but often assumed that EDI refers to interchange between businesses. It involves two or more organization or parts of organization communicating business information with each other in a common agreed format.
2. The repeated keying of identical information in the traditional paper-based business.

Communication creates a number of problems that can be significantly reduced through the usage of EDI. These problems include: -

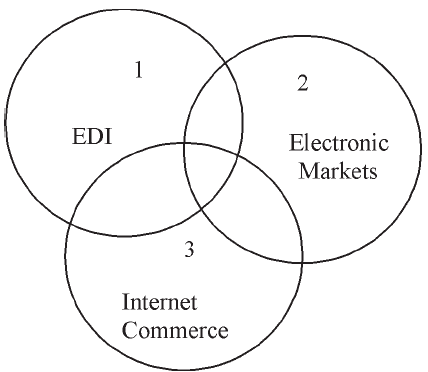
* Increased time
* Low accuracy
* High labour charges
* Increased uncertainty.

To take full advantage of EDI’s benefits, a company must computerize its basic business applications. Trading partners are individual organization that agrees to exchange EDI transactions. EDI cannot be undertaken unilaterally but requires the cooperation and active participation of trading partners. Trading partners normally consists of an organization’s principal suppliers and wholesale customers. Since large retail stores transact business with a large number of suppliers they were among the early supporters of EDI. In the manufacturing sector, EDI has enabled the concept of Just-In-Time inventory to be implemented. JIT reduces inventory and operating capital requirements.

EDI provides for the efficient transaction of recurrent trade exchanges between commercial organizations. EDI is widely used by, for example, large retail groups and vehicle assemblers when trading with their suppliers.

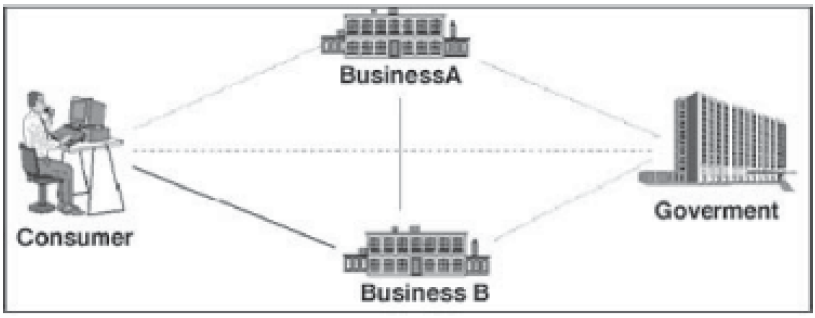
***Internet Commerce***

The Internet (and similar network facilities) can be used for advertising goods and services and transacting one-off deals. Internet commerce has application for both business to- business and business to consumer transactions.

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***The three categories of E Commerce***

***Types of e-commerce***

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There are a number of different types of E-Commerce

* B2B - Business to Business
* B2C - Business to Consumer
* C2B - Consumer to Business
* B2E - Business to Employee
* C2C - Consumer to Consumer

***B2B - Business to Business***

E-commerce has been in use for quite a few years and is more commonly known as EDI (electronic data interchange). In the past EDI was conducted on a direct link of some form between the two businesses where as today the most popular connection is the internet. The two businesses pass information electronically to each other. B2B e-commerce currently makes up about 94% of all e-commerce transactions.

Typically in the B2B environment, E-Commerce can be used in the following processes:

* Procurement;
* order fulfilment;
* Managing trading-partner relationships.

**B2C - Business to Consumer**

Business to Consumer e-commerce is relatively new. This is where the consumer accesses the system of the supplier. It is still a two way function but is usually done solely through the Internet.

B2C can also relate to receiving information such as share prices, insurance quotes, on-line newspapers, or weather forecasts. The supplier may be an existing retail outlet such as a high street store; it has been this type of business that has been successful in using E-Commerce to deliver services to customers. These businesses may have been slow in gearing-up for E-Commerce compared to the innovative dot.com start ups, but they usually have a sound commercial structure as well as in-depth experience of running a business - something which many dotcoms lacked, causing many to fail.

***Example***: A home user wishes to purchase some good quality wine. The user accesses the Internet site to read a report on the recommended wines. After reading the tasting notes the user follows the links to place an order along with delivery and payment details directly into the merchants’ inventory system. The wine is then dispatched from the supplier’s warehouse and in theory is delivered to the consumer without delay.

***C2B - Consumer to Business***

Consumer to Business is a growing arena where the consumer requests a specific service from the business. ***Example***: Harry is planning a holiday in Darwin. He requires a flight in the first week of December and is only willing to pay Rs. 250. Harry places a submission with in a web based C2B facility. Dodgy Brothers Airways accesses the facility and sees Harry’s submission. Due to it being a slow period, the airline offers Harry a return fare for Rs. 250.

***B2E - Business to Employee***

Business to Employee e-commerce is growing in use. This form of E-commerce is more commonly known as an ‘Intranet’. An intranet is a web site developed to provide employees of an organisation with information. The intranet is usually access through the organisations network, it can and is often extended to an Entrant which uses the Internet but restricts uses by sign on and password.

***C2C - Consumer to Consumer***

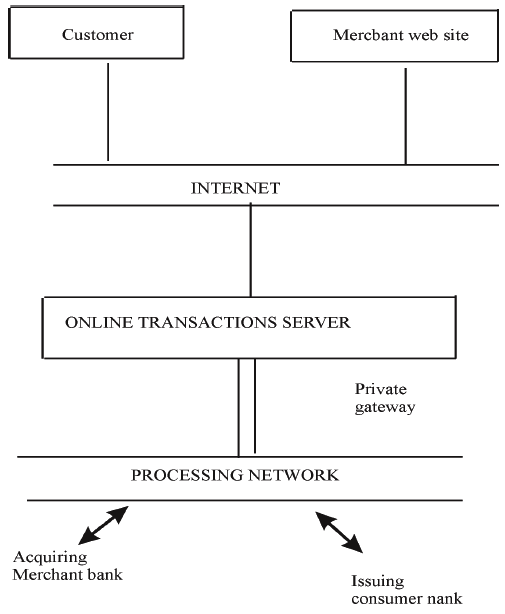
These sites are usually some form of an auction site. The consumer lists items for sale with a commercial auction site. Other consumers access the site and place bids on the items. The site then provides a connection between the seller and buyer to complete the transaction. The site provider usually charges a transaction cost. In reality this site should be call C2B2C.

B2A is the least developed area of E-Commerce and it relates to the way that public sector organisations, at both a central and local level, are providing their services on-line. Also known as e-Government, it has the potential to increase the domestic and business use of e-Commerce as traditional services are increasingly being delivered over the Internet. The UK government is committed to ensuring this country is at the forefront of e-Commerce and it is essential that e-Government plays a significant part in achieving this objective.

**Scope of E-Commerce**

* Selling can be focussed to the global customer
* Pre-sales, subcontracts, supply
* Financing and insurance
* Commercial transactions: ordering, delivery, payment
* Product service and maintenance
* Co-operative product development
* Distributed co-operative working
* Use of public and private services
* Business-to-administrations (e.g. customs, etc)
* Transport and logistics
* Public procurement
* Automatic trading of digital goods
* Accounting
* Dispute resolution

**E- Commerce in Action**

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***How E-Commerce Works***

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

From there, the consumer decides that he wants to purchase something, so he enters all pertinent credit card information and a sales order is produced. Depending on the ecommerce implementation, the sales order can now take two totally different paths for confirming to the consumer that the order is officially placed.

***Scenario 1***

The consumer’s credit card information goes directly through a private gateway to a processing network, where the issuing and acquiring banks complete or deny the transaction. This generally takes place in no more than 5-7 seconds and the consumer is then informed that the order was received, the credit card was authorized, and that the product will ultimately be shipped.

***Scenario 2***

The consumer’s entire order and credit card information is electronically submitted back to the merchant’s server (usually via email, FTP, or SSL connection) where the order can be reviewed first and then approved for credit card authorization through a processing network. The consumer then receives an email shortly afterwards, confirming the order being received, the credit card being authorized, and status on when the product will exactly be shipped.

In both scenarios, the process is transparent to the consumer and appears virtually the same. However, the first scenario is a more simplistic method of setting up a shopping cart application and does not take into consideration any back office issues that may delay shipment (i.e., items out of stock, back orders, orders submitted after office hours or during holidays, etc.). ManageMore’s eCommerce Manager relies on the second scenario to handle all of its ecommerce orders. This second scenario keeps the consumer accurately informed throughout the entire ordering process.

Let us assume an ecommerce implementation that uses the second scenario mentioned above.

There are several basic steps you will need to accomplish before becoming Commerce enabled.

1. Getting a Merchant Bank Account
2. Web Hosting
3. Web Design Considerations
4. Registering a Domain Name
5. Obtaining a Digital Certificate

***Getting a Merchant Bank Account***

In order to be able to accept credit cards, you must apply for an account with a credit card merchant account provider. This can be relatively easy or somewhat difficult, depending on which country you live in, and the type of business you are running.

When choosing a merchant account provider, the following should also be noted:

* In order for credit card authorization to be automatic from within ManageMore, you must ensure that your merchant account provider has credit card processors that connect with IC Verify™, PC Charge™, or AuthorizeNet™ (i.e.Intellicharge Interface) software. These products are sold separately from ManageMore and eliminate the need for merchant terminal devices or separate time consuming steps to approve credit cards.
* Your merchant account provider must allow you to handle non-swiped credit card transactions. This refers to transactions where the customer is not present and only the credit card number and expiration date are being used for approving the charges.
* When choosing a merchant account provider, you should do a little research on the company’s reputation, years in business, and company size. Constantly changing to a new merchant account provider when your old one goes out-of business can be costly and time consuming.
* Avoid merchant account providers that ask for a non-refundable fee before you get approved.
* Avoid merchant account providers that require 1 or 2 year contract terms. Since there are so many merchant account providers available, it doesn’t make sense to lock your company into a commitment for any period of time.
* Expect merchant account providers to have some form of a sign up fee after being approved only. These fees can come in the form of an application fee, processing fee, software fee, etc. Typically expect to pay around $100 to $500 for getting an account setup to accept credit cards and sometimes electronic checks.
* You should be able to find a merchant account provider that can offer you discount credit cards rates ranging from 1.75% to 2.75% and no more than .25 cent per transaction. If not, contact Intellisoft regarding our merchant account provider affiliates and the free Intellicharge Interface just for signing up with them.
* You will need a dedicated phone line or data line for processing credit cards and electronic checks. Note: If your computer or local area network is already connected to the internet, a separate data line will not be necessary if you use the Intellicharge Interface for electronic payment.

***Web Hosting***

Web hosting is a very important step in this process, as this is how you gain a presence on the internet in the first place. There are actually two scenarios that can be used for web hosting. Scenario1 involves setting up and maintaining your own web server, while Scenario 2 involves farming out all web hosting administration to an ISP. An Internet Service Provider (ISP) is a company that provides you with internet access and limited hard drive space on their web servers for hosting your web site.

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

1. Always try to find an ISP that can provide a local telephone number for you to connect to the internet.
2. Choose an ISP that is known for having few interruptions of service.
3. Choose an ISP that is known for good technical support and has knowledgeable people familiar with ecommerce sites.
4. Choose an ISP that consistently has fast connection speeds.
5. As with any company you do business with, make sure the ISP is reputable.

The online transaction providers that offer the actual web store itself can sometimes be hosted by your same ISP or may require a completely different provider, referred to as a Commerce Service Provider (CSP). Many small businesses tend to choose CSP’s for creating a web store because it gives them the flexibility of choosing a provider that offers competitive pricing and the best shopping cart application for their needs. Online transaction providers will usually provide one shopping cart solution they feel is better than the many others that exist and differ by price, appearance, layout, functionality, and ease of use.

The following should be noted when dealing with shopping cart applications:

1. Online transaction providers will either sell or rent you the use of an online shopping cart application for your business. Be forewarned that purchasing an online shopping cart application is very expensive. Most businesses will rent these online web store programs rather than committing to such a steep investment.
2. Rental pricing for the use of shopping cart programs vary depending on number of transactions generated a month, number of products listed on the shopping cart application, and the sophistication of the shopping cart application itself.
3. There are a lot of online transaction providers out there, and they all have varying packages. Deciding on a provider’s package that fits your needs is perhaps the most important aspect.

***Web Design Considerations***

With little knowledge of HTML and a lot of patience, you can probably create your own corporate web site with the help of products like Microsoft FrontPage™ or DreamWeaver™. However, when adding a web store to your web site, you may want to seek the help of professional web designers to make the look and feel of your web store consistent with the rest of your corporate web site. Most shopping cart applications, like SoftCart by Mercantec, allow its templates to be modified just for this purpose. In many cases, the same ISP or CSP you choose can provide web design and consultation.

***Registering a Domain Name***

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

Registering a domain name is one of the most important decisions you can make for your online identity. Your domain name says who you are to your clients, your peers - the whole world. The basics for registering a domain name are:

Contact a domain name registrar on the internet to register for a domain name.There are many to choose from, just do a web search on “domain name registrar” to get you started.

2. Select a unique domain name you would like others to use for finding your web site.

***Obtaining a Digital Certificate***

A digital certificate, also known as a SSL Server Certificate, enables SSL (Secure Socket Layer encryption) on the web server. SSL protects communications so you can take credit card orders securely and ensure that hackers cannot eavesdrop on you. Any ecommerce company that provides you with an online web store will require you to have SSL before you can use their services. Thankfully, for most people obtaining a digital certificate is not a problem. For a minimal fee, one can usually use the certificate owned by the web hosting company where your page resides. If you are a larger company, however, you may want to get your own digital certificate.

**Architectural Framework of E Commerce**

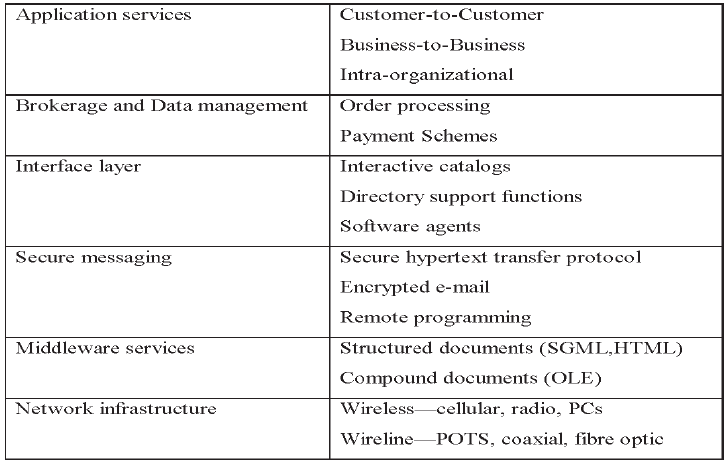
A framework is intended to define and create tools that integrate the information found in today’s closed systems and allows the development of e-commerce applications. It is important to understand that the aim of the architectural frame-work itself is not to build new database management systems, data repository, computer languages, software agent based transaction monitors, or communication protocols. Rather, the architecture should focus on synthesizing the diverse resources already in place in corporations to facilitate the integration of data and software for better applications. The electronic commerce application architecture consists of six layers of functionality, or services:

1. applications;
2. brokerage services, data or transaction management;
3. interface, and; support layers”
4. secure messaging, security and electronic document interchange;
5. middle ware and structured document interchange; and
6. network infrastructure and basic communications services.

These layers co-operate to provide a seamless transition between today’s computing resources and those of tomorrow by transparently integrating information access and exchange within the context of the chosen application. As seen in Fig., electronic commerce applications are based on several elegant technologies. But only when they are integrated do they provide uniquely powerful solutions.

In the ensuing discussion of each of these layers, we will not elaborate on the various aspects of the network infrastructure that transports information. These were discussed extensively earlier and will not be addressed here. We begin our discussion with the application level services.

***Table Electronic Commerce: A conceptual framework***



***Electronic Commerce Application Services***

The application services layer of e-commerce will be comprised of existing and future applications built on the innate architecture. Three distinct classes of electronic commerce application can be distinguished: customer to business, business-to-business, and intra organization

***Consumer-to-Business Transactions***

We call this category marketplace transaction. In a marketplace transaction, customers learn about products differently through electronic publishing, buy them differently using electronic cash and secure payment systems, and have them delivered differently.

Also, how customers allocate their loyalty may also be different. In light of this, the organization itself has to adapt to a world where the traditional concepts of brand

Differentiation no longer hold-where “quality” has a new meaning, where “content” may not be equated to “product,” Where “distribution” may not automatically mean “physical Transport.” In this new environment, brand equity can rapidly evaporate forcing firms to develop new ways of doing business

***Business-to Business Transactions***

We call this category market-link transaction. Here, businesses, governments, and other organizations depend on computer - to-computer communication as a fast, an economical, and a dependable way to conduct business’ transactions. Small companies are also beginning to see the benefits of adopting the same methods. Business-to-business transactions include the use of EDI and electronic mail for purchasing goods and services,buying information and consulting services, submitting requests for proposals, and receiving proposals. Examine this scenario.

The current accounts payable process occurs through the exchange of paper documents. Each year the trading partners exchange millions of invoices, checks, purchase orders, financial reports, and other transactions. Most of the documents are in electronic form at their point of origin but are printed and key-entered at the point of receipt. The current manual process of printing, mailing is costly, time consuming, and error-prone. Given this situation and faced with the need to reduce costs, small businesses are looking toward electronic commerce as a possible savior. *Intra-organizational Transactions*We call this category market-driven transactions. A company becomes market driven by dispersing throughout the firm information about its customers and competitors; by spreading strategic and tactical decision making so that all units can participate; and by continuously monitoring their customer commitment by making improved customer satisfaction an ongoing objective. To maintain the relationships that are critical to delivering superior customer value, management must pay close attention to service, both before and after sales. In essence, a market-driven business develops a comprehensive understanding of its customers’ business and how customers in the immediate and downstream markets perceive value.

Three major components of market-driven transactions are

* customer orientation through product and service
* customization; cross-functional coordination through enterprise
* integration; and advertising, marketing, and customer service.

***Information Brokerage and Management***

The information brokerage and management layer provides service integration through the notion of information brokerages, the development of which is necessitated by the increasing information resource fragmentation. We use the notion of information brokerage to represent an intermediary who provides service integration between customers and information providers, given some constraint such as a low price, fast service, or profit maximization for a client. Information brokers, for example, are rapidly becoming necessary in dealing with the voluminous amounts of information on the networks. As on-line databases migrate to consumer information utilities, consumers and information professionals will have to keep up with the knowledge, and owner-ship of all these systems.

Most professionals have enough trouble keeping track of files of 1 interest on one or two database services. With all the complexity associated with large numbers of on-line databases and service bureaus, if it is impossible to expect humans to do the searching. It will have to be software programs-information brokers or software agents, to use the more popular term-that act on the searcher’s behalf. Information brokerage does more than just searching. It addresses the issue of adding value to the information that is retrieved. For instance, in foreign exchange trading, information is retrieved about the latest currency exchange rates in order to hedge currency holdings to minimize risk and maximize profit. In other words, the act of retrieving the information is the input to other transactions. With multiple transactions being the norm in the real world, service integration becomes critical.

Taking the same foreign exchange example further, service integration allows one to link the hedging program (offered on a time-sharing basis by a third party) with the search program (could be another vendor) that finds the currency rates from the cheapest on-line service to automatically send trades to the bank or financial services company. In effect, a personalized automated trading system can be created without having to go to any financial institution. 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. These tools include software agents, distributed query generator, the distributed transaction generator, and the declarative resource constraint base which describes a business’s rules and-environment information.

At the heart of this layer lies the work-flow scripting environment built on a software agent model that coordinates work and data flow among support services. As pointed out earlier, software agents are used to implement information brokerages. Software agents are mobile programs that have been called “healthy viruses,” “digital butlers/” and “intelligent agents.” Agents are encapsulations of users’ instruction that perform all kinds of tasks in electronic market places spread across networks.

Information brokerages dispatch agents capable of information resource gathering, negotiating deals, and performing transactions. The agents are intelligent because they have contingency plans of action. They examine themselves and their environment and if necessary change from their original course of action to an alternative plan. For example, suppose you send an agent to an on-line store with a request to order a bouquet of roses for Rs. 25 or less. If the shop offers roses starting at Rs. 30, your agent can either choose a different bouquet or find a different store by consulting an online

“Yellow Pages” directory, depending on prior instructions. Although the notion of software agents sounds very seductive, it will take a while to solve the problems of interregna communication, interoperable agents, and other headaches that come with distributed computing and net-working. To some critics, the prospect of a single-agent language like Telescript as a world standard is disturbing. They worry that agents sound a bit too much like computer viruses, which instead of running errands may run amok.

Vendors such as General Magic go to great lengths to explain the precautions it has taken to make this impossible: the limits placed on the power of agents, the “self-destruct” mechanism built into their codes. Yet until electronic commerce services are up and running on a large scale, it is impossible to know how well software agents will work.

***Interface and Support Services***

The third layer, interface and support services will provide interfaces for electronic commerce applications such as interactive catalogs and will sup-port directory servicesfunctions necessary for information search and access. These two concepts are very different.

Interactive catalogs are the customized interface to consumer applications such as home shopping. An interactive catalog is an extension of the paper-based catalog and incorporates additional features such as sophisticated graphics and video to make the advertising more attractive. Directories, on the other hand, operate behind the scenes and attempt to organize the enormous amount of information and transactions generated to facilitate electronic commerce. Directory services databases make data from any server appear as a local file. A classic example of a directory is the telephone White Pages, which allows us to locate people and telephone numbers. In the case of electronic commerce, directories would play an important role in information management functions.

For instance,take the case of buying an airline ticket with several stopovers with the caveat that the time between layovers be minimized. This search would require several queries to various online directories to-find empty seats on various airlines and then the avail-ability of seats would; be coordinated with the amount of time spent in the air-port terminals. The primary difference between the two is that unlike interactive catalogs, which deal with people, directory support services interact directly with soft-ware applications. For this reason, they need not have the multimedia glitter and jazz generally associated with interactive catalogs. From a computing perspective, we can expect that there will be no one common user interface that will glaze the surface of all electronic commerce applications, but graphics and object manipulation will definitely dominate. Tool developers and designers might incorporate common tools for interface building, but the shape of catalogs or directories will depend on the users’ desires and functional requirements.

***Secure Messaging and Structured Document Interchange Services***

The importance of the fourth layer, secured messaging, is clear. Everyone in business knows that electronic messaging is a critical business issue. Consider a familiar business scenario:

You hand over an urgent fax Monday and find out Tuesday that it’s still sitting on your fax operator’s desk. What happened?

The line was busy and he thought he’d try again later. Or, the number was wrong,but he forgot to let you know. Or you’re in London and you need to send a spreadsheet that details a marketing plan for a product introduction strategy to a co-worker in New York. This must be done today, not tomorrow when the courier service would deliver.

There is a solution to these common and frustrating problems. It’s called Integrated Messaging: a group of computer services that through the use of a network send, receive, and combine messages, faxes, and large data files. Some better-known examples are electronic mail, enhanced fax, and electronic data interchange.

Broadly defined, messaging is the software that sits between the network infrastructure and the clients or electronic commerce applications, masking the peculiarities of the environment. Others define messaging as a frame-work for the total implementation of portable applications, divorcing you from the architectural primitives of your system. In general, messaging products are not applications that solve problems; they are more enablers of the applications that solve problems. Messaging services offer solutions for communicating non formatted (unstructured) data-letters, memos, and reports as weft asformatted (structured) data such as purchase orders, shipping notices, and invoices. Unstructured messaging consists of fax, e-mail, and form-based systems like Lotus Notes.

Structured documents messaging consist of the automated inter-change of standardized and approved messages between computer applications, via telecommunications lines. Examples of structured document messaging include EDI. Messaging is gaining momentum in electronic commerce and seems to have many advantages. It supports both synchronous (immediate) and asynchronous (delayed) message delivery and processing. With asynchronous messaging, when a message is sent, work continues (software doesn’t wait for a response).This allows the transfer of messages through store-and-forward methods.

Another advantage of messaging is that it is not associated with any particular communication protocol. No pre-processing is necessary, although there is an increasing need for programs to interpret the message. Messaging is well suited for both client server and peer-to-peer computing models. In distributed systems, the messages are treated as “objects” that pass between systems.

Messaging is central to work-group computing that is changing the way businesses operate. The ability to access the right information at the right time across diverse work groups is a challenge. Today, with the messaging tools, people can communicate and work together more effectively-no matter where they are located. When an employee sends an electronic mail form, the information travels along with the form. So one person can start the form, mail it to the next person, fill it in/ sign it, mail it to the next, and so on. This is known as message-enabled work-flow solutions.

The main disadvantages of messaging are the new types of applications it enables which appear to be more complex, especially to traditional programmers and the jungle of standards it involves. Because of the lack of standards, there is often no interoperability between different messaging vendors leading to islands of messaging. Also, security, privacy, and confidentiality through data encryption and authentication techniques are important issues that need to be resolved for ensuring the legality of the message-based transactions themselves.

***Middleware Services***

Middleware is a relatively new concept that emerged only recently. Like so many other innovations, it came into being out of necessity. Users in the 1970s, when vendors, delivered homogeneous systems that worked, didn’t have a need for middleware3&heR conditions changed-along with the hardware and the software the organizations couldn’t cope: The tools were inadequate, the backlog was enormous, and the pressure was overwhelming. And, the users were dissatisfied. Something was needed to solve all the interface, translation, transformation, and interpretation problems that were driving application developers crazy. With the growth of networks, client-server technology, and all other forms of communicating between/among unlike platforms, the problems of getting all the pieces to work together grew from formidable to horrendous.

As the cry for distributed computing spread, users demanded interaction between dissimilar systems, networks that permitted shared resources and applications that could be accessed by multiple software programs. In simple terms, middleware is the ultimate mediator between diverse software pro-grams that enables them talk to one another. Another reason for middleware is the computing shift from application centric to data centric. That is, remote data controls all of the applications in the network instead of applications controlling data. To achieve data-centric computing, middleware services focus on three elements: transparency, transaction security and management, and distributed object management and services.

***Transparency***

Transparency implies that users should be unaware that they are accessing multiple systems. Transparency is essential for dealing with higher-level issues than physical media and interconnection that the underlying network infrastructure is in charge of. The ideal picture is one of a “virtual” network: a collection of workgroup, departmental, enterprise, and inter enterprise LANs that appears to the end user or client application to be a seamless and easily accessed whole.

Transparency is accomplished using middleware that facilitates a distributed computing environment. This gives users and applications transparent access to data, computation, and other resources across collections of multi-vendor, heterogeneous systems. The strategic architectures of every major system vendor are now based on some form of middleware. The key to realizing the theoretical benefit of such architecture is transparency. Users need not spend their time trying to understand where something is. Nor should application developers have to code into their applications the exact locations of resources over the network. The goal is for the applications to send a request to the middleware layer, which then satisfies the request any way it can, using remote information.

***Transaction Security and Management***

Support for transaction processing (TP) is fundamental to success in the electronic commerce market. Security and management are essential to all layers in the electronic commerce model. At the transaction security level, two broad general categories of security services exist: authentication and authorization.

Transaction integrity must be a given for businesses that cannot afford any loss or inconsistency in data. Some commercial sites have had gigantic centralized TP systems running for years. For electronic commerce, middleware provides the qualities expected in a standard TP sys-tem: the so-called ACID properties (atomicity, consistency, isolation, and durability).

***Distributed Object Management and Services***

Object orientation is proving fundamental to the proliferation of network-based applications for the following reasons: It is too hard to write a net-work-based application without either extensive developer retraining or a technology that camouflages the intricacies of the network. Objects are defined as the combination of data and instructions acting on the data. Objects are an evolution of the more traditional programming concept of functions and procedures. A natural instance of an object in electronic commerce is a document.

A document carries data and often carries instructions about the actions to be performed on the data. Today, the term object is being used interchangeably with document resulting in a new form of computing called document oriented computing. Here, the trend is to move away from single data-type documents such as text, pictures, or video toward integrated documents known as com-pound document architectures. The best example of this approach is an active document. If you create a new document that is an integration of the spreadsheet, word processor, and presentation package, what you’ll see in the next generation of operating systems is that as you scroll through your document, the tool bar will automatically change from a spreadsheet too bar,to a word processing tool bar, to a presentation package tool bar. These applications will also be able to access and retrieve data from any file in the computing network.

**Advantages of E-Commerce**

* Electronic Commerce can increase sales and decrease costs.
* Advertising done well on the web can get even a small firm’s promotional message out to potential customers in every country in the world.
* Businesses can use electronic commerce to identify new suppliers and business partners.
* Electronic Commerce increases the speed and accuracy with which businesses can exchange information, which reduces costs on both sides of transactions.
* E-Commerce provides buyers with a wider range of choices than traditional commerce because buyers can consider many different products and services from a wider variety of sellers.
* Electronic payments of tax refunds, public retirement and welfare support cost less to issue and arrive securely and quickly when transmitted over the Internet.

**Disadvantages of E-Commerce**

* Some business processes such as perishable foods and high-cost, unique items such as custom-designed jewelry might be impossible to inspect adequately from a remote location.
* Costs, which are a function of technology, can change dramatically even during short-lived electronic commerce implementation projects because the technologies are changing so rapidly.
* Many firms have trouble recruiting and retaining employees with the technological, design and business process skills needed to create an effective electronic commerce presence.
* Firms facing difficulty of integrating existing databases and transaction processing software designed for traditional commerce into the software that enables electronic commerce.
* Companies that offer software design and consulting services to tie existing systems into new online business systems can be expensive.
* Consumers are fearful of sending their credit card numbers over the Internet and having online merchants. Consumers are simply resistant to change and are uncomfortable viewing merchandise on a computer screen rather than in person.