UNIT – I

UNIT – I E-Commerce Infrastructure

E-Commerce framework – Media Convergence – Anatomy of E-Commerce Applications – Consumer and Organization Applications – Market forces influencing the I-way – Components of the I-way – Network Access Equipment – Distribution Networks – Issues – Internet Terminology – NSFNET – Research and Education network – Internet Governance.

E-Commerce Framework

E-Commerce application will be built on the existing technology infrastructure

A myriad of computers

Communication networks

Communication software

Common business services for facilitating the buying and selling process .Messaging & information distribution as a means of sending and retrieving information. Multimedia content & network publishing, for creating a product & a means to communicate about it.The information superhighway- the very foundation-for providing the high way system along which all e-commerce must travel

The two pillars supporting all e-commerce applications & infrastructure

Any successful e-commerce will require the I-way infrastructure in the same way that regular commerce needs I-way will be a mesh of interconnected data highways of many forms

Telephone,wires,cable TV wire .

Radio-based wireless-cellular & satellite

Movies=video + audio

Digital games=music + video + software

Electronic books=text + data + graphics + music + photographs + video

In the electronic 'highway system' multimedia content is stores in the form of electronic documents

These are often digitized

On the I-way messaging software fulfills the role, in any no. of forms: e-mail, EDI, or point-to-point file transfers Encryption & authentication methods to ensure security Electronic payment schemes developed to handle complex transactions

These logistics issues are difficult inlong-established transportation

Media Convergence

In a technological sense, **media convergence** is all about integration and inter-operability; the coming together of computing networks, information and communication technologies, and digital forms of information that are inherently adaptabledelivered by 'intelligent' platforms, applications and devices.

Anatomy of E-Commerce applications

E-Commerce applications are:

1. Multimedia Content for E-Commerce Applications 2.

Multimedia Storage Servers & E-Commerce Applications

i. Client-Server Architecture in Electronic

Commerce ii. Internal Processes of Multimedia

Servers iii. Video Servers & E-Commerce

3. Information Delivery/Transport & E-Commerce Applications

4. Consumer Access Devices

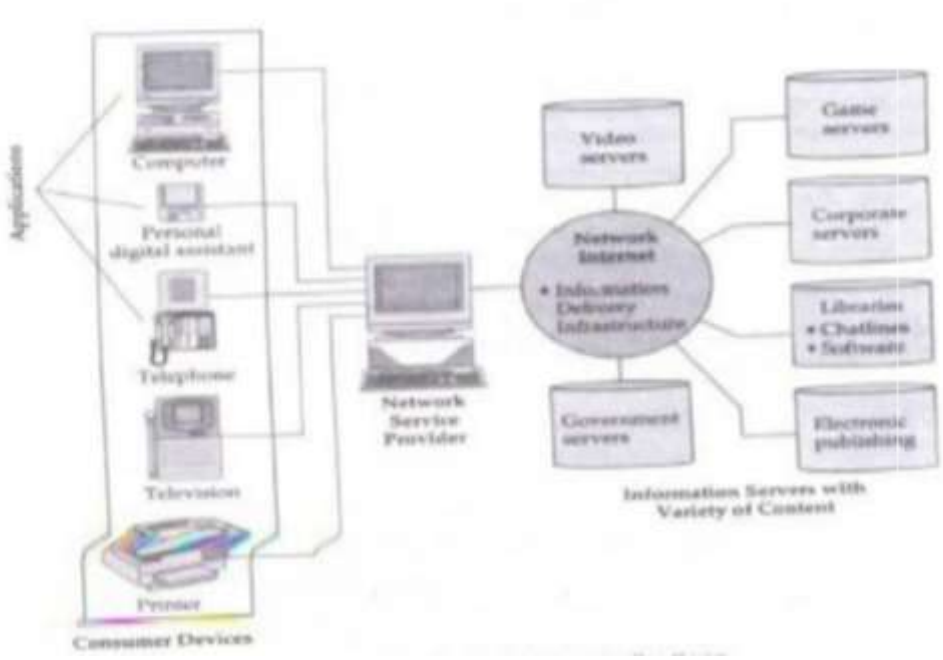


Fig 1.1 Elements of E-CommerceApplication

MultimediaContentforE-CommerceApplications

Multimedia content can be considered both fuel and traffic for electronic commerce applications.

The technical definition of multimedia is the use of digital data in more than one format, such as the combination of text, audio, video, images, graphics, numerical data,

holograms, and animations in a computer file/document.

Multimedia is associated with Hardware components in different networks. The Accessing of multimedia content depends on the hardware capabilities of the customer.

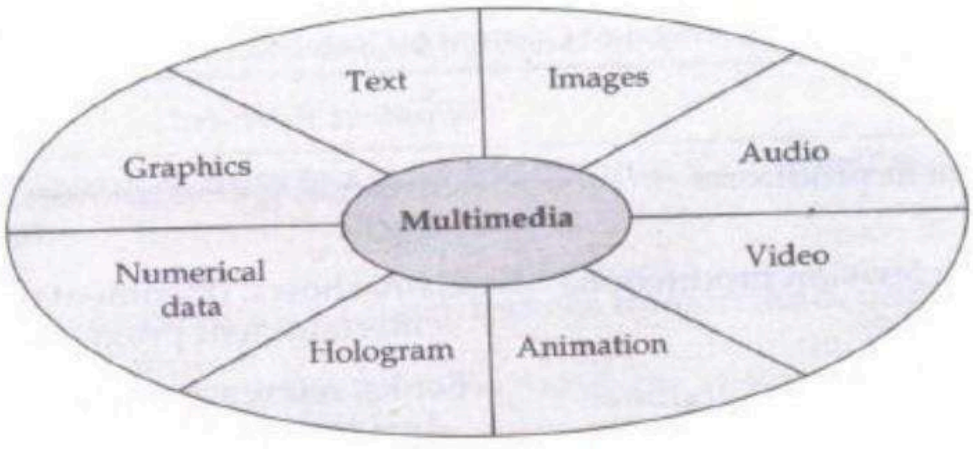


Fig 1.2 Possible components of multimedia

MultimediaStorageServers&E-CommerceApplications:

i. E-Commerce requires robust servers to store and distribute large amounts of digital content to consumers.

ii. These Multimedia storage servers are large information warehouses capable of handling various content, ranging from books, newspapers, advertisement catalogs, movies,games, & X-ray images. iii. These servers, deriving their name because they serve information upon request, must handle large-scale distribution, guarantee security, & complete reliability

Consumer-OrientedApplications

The wide range of applications envisioned for the consumer marketplace can be broadly classified into:

(i) Entertainment

(ii) Financial Services and Information

(iii) Essential Services

(iv) Education and Training

ConsumerLife-StyleNeed	ComplementaryMultimediaServices
Entertainment Financial Services and Financial news. Essential Services Remote diagnostics. Education and Training conferencing, on-line databases.	Movies on demand, video cataloging, interactive Ads, Multi-user games, on-line discussions. Home Banking, Financial services, Information, Home Shopping, Electronic Catalogs, telemedicine, Interactive education, multiuser games, video

1. Personal Finance and Home Banking Management

(i) Basic Services

(ii) Intermediate Services

(iii) Advanced services

2. Home Shopping

(i) Television-Based Shopping

(ii) Catalog-Based Shopping

3. Home Entertainment

(i) Size of the Home Entertainment Market

(ii) Impact of the Home Entertainment on Traditional Industries 4. Micro transactions of Information

1. Personal Finance and Home Banking Management:

The newest technologies are direct deposit of payroll, on-line bill payment and telephone transfers.The technology for paying bills whether by computer or telephone is infinitely more

sophisticated than anything on the market a few years ago .In 1980s were the days of “stone age” technology because of technology choices for accessing services were limited .For home banking, greater demands on consumers and expanding need for information, it’s services are often categorized as basic, intermediate and advanced

(i) Basic services

a) These are related to personal finance

b) The evolution of ATM machines from live tellers and now to home banking

c) The ATM network has with banks and their associations being the routers and the ATM machines being the heterogeneous computers on the network.

d) This interoperable network of ATMs has created an interface between customer and bank

that changed the competitive dynamics of the industry. See in next figure Increased ATM usage and decrease in teller transactions

e) The future of home banking lies with PC's

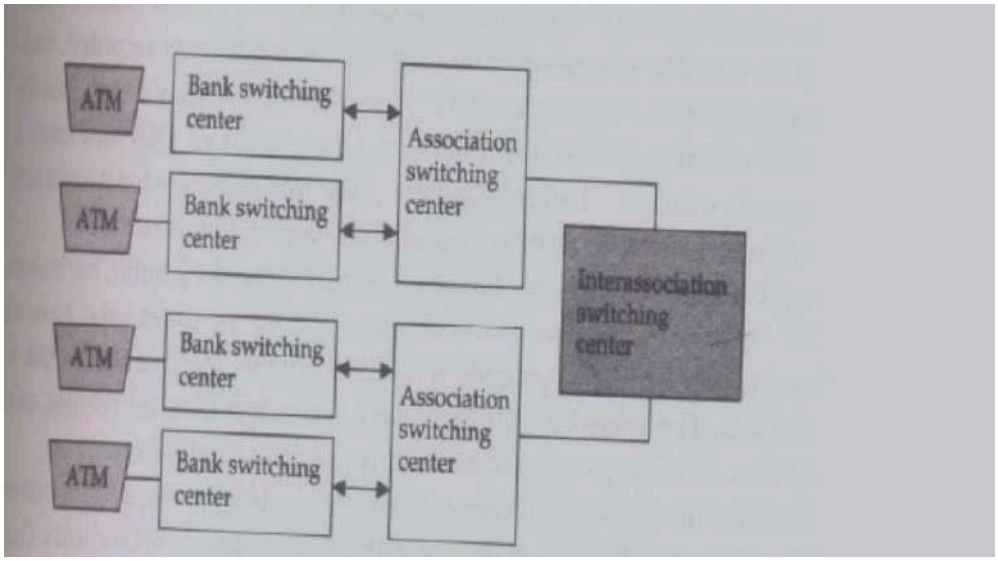


Fig : Structure of ATM network

(ii) Intermediate Services

The problem with home banking in 1980 is, it is expensive service that requires a PC, a modem and special software

As the equipment becomes less expensive and as bank offers broader services, home banking develop into a comprehensive package that could even include as insurance entertainment

Consider the computerized on-line bill-payment system

It never forgets to record a payment and keeps track of user account number, name,amount and the date and we used to instruct with payment instructions.

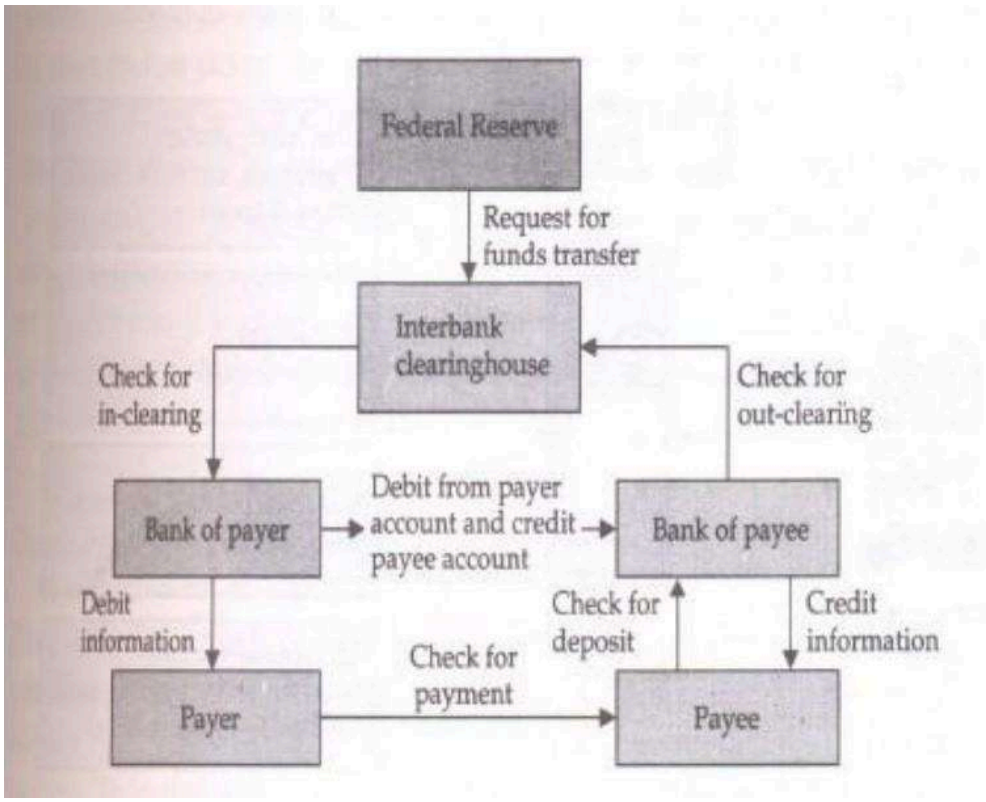


Fig : Check clearing Process

(iii)Advanced Services

• The goal of advanced series is to offer their on-line customers a complete portfolio of life, home, and auto insurance along with mutual funds, pension plans, home financingand other financial products. The Figure explains the range of services that may well be offered by banks in future. The services range from on-line shopping to real-time financial information from anywhere in the world. In short, home banking allows consumers to avoid long lines and gives flexibility

2. Home Shopping:

It is already in wide use.

This enable a customer to do online shopping

(i) Television-Based Shopping:

It is launched in 1977 by the Home Shopping Network (HSN).

It provides a variety of goods ranging from collectibles, clothing, small electronics, house wares, jewelry, and computers.

When HSN started in Florida in 1977, it mainly sold factory overruns and discontinueditems

It works as, the customer uses her remote control at shop different channels with touch of button. At this time, cable shopping channels are not truly interactive

(ii) Catalog-Based Shopping

In this the customer identifies the various catalogs that fit certain parameters such as safety, price, and quality

The on-line catalog business consists of brochures , CD-ROM catalogs, and on-line interactive catalogs

3. Home Entertainment:

It is another application for e-commerce

Customer can watch movie, play games, on-screen catalogs, such as TV guide.

In Home entertainment area, customer is the control over programming

In Table tells the, What will be required in terms of Television-based technology for this telemart to become a reality

Advanced Services

Size of the home Entertainment Market:

i. Entertainment services are play a major role in e-commerce ii. This prediction is underscored by the changing trends in consumer behavior. It is shown in Table

Impact of Home entertainment on traditional industries:

This will have devastating effects on theater business . Economic issues might allow theatersto maintain an important role in the movie industry .Industry Estimates of consumer Expenditures

	1980 ($4.7 bin)	1990 ($31.0 bin)	1993 ($37.8 bin)
Theaters	49.0% $2.3	14.5% $4.5	13.2% $5.0
Basic cable	35.0% $1.6	34.5% $10.7	36.9% $13.9
Premium cable	16.0% $0.8	16.5% $5.1	14.0% $5.3
Home video	— —	33.8% $10.5	34.8% $13.2
Pay per view	— —	0.7% $0.2	1.1% $0.4

4. Micro transactions of information:

One change in traditional business forced by the on-line information business is the creation of a new transaction category called small-fee transactions for micro services

The customer by giving some information away for free and provide information bundles that cover the transaction overhead.

The growth of small-money transfers could foster a boom in other complementary information services

The complexity is also increased in micro services when an activity named,reverification is entered.

It means checking on the validity of the transaction after it has been approved

Desirable Characteristics of an Electronic marketplace

-Critical mass of Buyers and sellers: To get critical mass, use electronic mechanisms

Market forces influencing the I-Way:

Demands and Requirements of market participants. The failure and success of any product or service is a factor of market forces. To become a reality, E-Commerce needs a network infrastructure to transport the content also known as the electronic interactive or multimedia I-Way. The I-Way has become the leading word. The principle drawback of existing communication infrastructure lies in its inabilities to provide integrated voice, data and video services. Thus a business user requiring voice , data and video conferencing services often had to use three separate networks such as voice network, data network and video conferencing network. This understanding is important because e-commerce applications are dependent on the underlying I-way. Until recently the market place was fragmented into communication , entertainment and information sectors. the following two points worth considering are

1. The boundaries among communication are not absolute. Ex: Video is a part of Information, entertainment and communication.

2. The boundaries among equipment are absolute. Ex: Today technology exists to allow television sets and pcto interact or exchange any sort of data. The emerging compatibility results in the flexibility needed to take advantage of new services. The expectations of I-way are on demand publishing, real time video conferencing, telemarketing, tele medicine, tele communication etc. The cable industry wants to expand services from tv programming or paper view services such that the consumer can pay bills, shop or check stock prices.

Definition of I-Way: I – Way is defined as universal affordable access to high performance network capable of carrying billions of bits per second in the context of e-commerce. Components of I-Way: The major components of I-way are

1. Consumer access equipments.

2. Ramps

3. Global Information Distribution Network.

1. Consumer Access Equipment : It is often ignored component of I-way but represent critical category. The absence of slow progress in which holding of up other segments of I-way. This segment of I-way includes hardware and software vendors who provide physical devices such as computer software platforms such as browsers and operating system.

2. Ramps: they simplify the leakages to schools and home to the communication backbone. This component is often called as last mile because they provide links. The providers of access ramps can be differentiated into four categories viz. telecom based , cable tv based, wireless based & computer based. Online information services. The backbone access provides links and uses e-commerce application providers.

3.Global Information Distribution Networks: The development of new communication technologies and continued employment of fiber optic facilities has resulted in higher transmission speeds at significantly low cost. The end result is a seamless web called the I-way of communication network, computer digital libraries and compute electronics that will put vast amount of information at users finger tips. The two major technologies under pinning high speed global information distribution networks are

i. long distance networks ii.

satellite networks.

a) Long distance network: Long distance connectivity is available through cable (coaxial) or (fiber) owned by long distance interchange carriers (Ixc) Submarine cables provide an attractive economic advantage for selected rules, where growth advantage for selected rules, where growth is in demand and communication capacity is high. The Ixc's also play a significant role in the local access market by teaming with firms in the wireless and cable tv business. Ixc's are exploring alternative arrangements that would lower the cost

of using the local network. Uniform speed efficiency, levels of technology and cost of telecom services are necessary for both voice and data services. Fibre optics have emerged as technology of choice because it is capable of providing higher bandwidth than satellite also it is immuned to electro magnetic interference. Long distance network infrastructure is now been deployed under seas to carry international traffic.

b) Satellite network: Satellite networks have advantages over terrestrial network and they are accessible from any point on the globe. Satellite networks can provide broadband digital services including voice, data and video to many points without the cost of wide installation. Wide range of services include broadcast radio, video and overseas telephone links. Thus communication satellites are the crucial part of the global communication and infrastructure

Network Access Equipment

CPE (Customer Premises Equipment) or terminal equipment is a generic term for privately owned communications equipment that is attached to the network. This can be divided into three parts:Cable TV set-top boxes;computer based telephony; and hubs, wiring closets, and routers or digital switches.

Set-Top Boxes:

A key hardware platform for I-way access will be cable converter boxes, also known as set-top boxes, converter boxes, and converters/descramblers. These boxes will have greater intelligence and more features than the existing converter boxes, such as enabling users to make phone calls, surf the interner, and even plan their viewing schedule for the week.

Compuer-Based Telephony:

The largest CPE product sectors are private branch exchanges(PBXx), telephones, facsimile

products, modems, voice processing equipment and video communication equipment.

Digital switches, Routers and Hubs

The digital switching industry has a major impact on the I-way. All digital bits and data pass

through switches that route them to their intendended destination- either one or multiple recipents.Since the bundles of data known as packets and the packets moves through a network at very high speeds, this routing technique is known as fast packet switching.

Routers are internetworking devices that intelligently connect the local are networks(LANs) and backbone wide are networks(WANs) or various providers.

Hubs act as the wiring centres for large LANs- they can diagnose line failures,measures and

manage traffic flow, and greatly simplify reconfiguring large LANs.

GLOBAL INFORMATION DISTRIBUTION NETWORKS

The two major technologies used in high-speed global information distribution networks are fiber optic long-distance networks and satellites.

Long-Distance Networks

Long-distance connectivity is available via cable (coaxial or fiber) owned by long-distance or

interexchange carriers(IXCs). The current large-scale capacity of fiber optic connections between the US and Europe is being operate at gigabit rates. US long distance services are provided by AT&T, MCI, Sprint, WilTel.

Satellite Networks

Initially, satellites were used to transport long-distance telecommunications and one-wayvideo broadcasts. The advent of fiber optics in the 1980s, changed the role of satellites in the global communications industry. Satellite networks do have some advantages over terrestrial networks. They are accessible from any spot on the globe; can provide broadband digital services, including voice,data and video to many points . In the 1980s, industry introduced a new class of satellite using a narrow beam to focus the transmitted energy on a small geographic area known as very small aperture terminal (VSAT) satellite. VSAT networks are being using by large corporations to link hundreds of retail sites.

THE INTERNET TERMINOLOGY

The Internet is a global system of interconnected computer networks that use the standard Internet protocol suite (TCP/IP) to serve several billion users worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks, of local to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies. The Internet carries an extensive range of information resources and services, such as the inter-linked hypertext documents of the World Wide Web (WWW), the infrastructure to support email, and peer-to-peer networks.

Most traditional communications media including telephone, music, film, and television are being reshaped or redefined by the Internet, giving birth to new services such as voice over Internet Protocol (VoIP) and Internet Protocol television (IPTV). Newspaper, book and other print publishing are adapting to website technology, or are reshaped into blogging and web feeds.

The Internet has enabled and accelerated new forms of human interactions through instant messaging, Internet forums, and social networking. Online shopping has boomed both for major retail outlets and small artisans and traders. Business-to-business and financial services on the Internet affect supply chains across entire industries.

The origins of the Internet reach back to research commissioned by the United States government in the 1960s to build robust, fault-tolerant communication via computer networks. While thiswork together with work in the United Kingdom and France led to important precursor networks, they were not the Internet. There is no consensus on the exact date when the modern. Internet came into being, but sometime in the early to mid-1980s is considered reasonable. The funding of a new U.S. backbone by the National Science Foundation in the 1980s, as well as private funding for other commercial backbones, led to worldwide participation in the development of new networking technologies, and the merger of many networks.

The Internet has no centralized governance in either technological implementation or policies for access and usage; each constituent network sets its own policies. Only the overreaching definitions of the two principal name spaces in the Internet, the Internet Protocol address space and the Domain Name System, are directed by a maintainer organization, the Internet Corporation for Assigned Names and Numbers (ICANN). The technical underpinning and standardization of the core protocols (IPv4 and IPv6) is an activity of the Internet Engineering Task Force (IETF), a non-profit organization of loosely affiliated international participants that anyone may associate with by contributing technical expertise.

Issues

The vastness of Internet advertising offers a solid platform for Electronic Commerce (or e-commerce) to explode. E-Commerce has the ability to provide secure shopping transactions coupled with instant verification and validation of credit card transactions. E-Commerce is not about the technology itself, it is about doing business leveraging the technology.

A technological innovation is followed by frequent incorporation of ethical standards into law. New forms of E-Commerce that enables new business practices have many advantages but also bring numerous risks. Let's discuss about the ethical and legal issues related to e-business.

Ethical Issues

In general, many ethical and global issues of Information Technology apply to e-business. So, what are the issues particularly related to e-commerce? Let's list some of the ethical issues spawned with the growing field of e-commerce.

Web tracking

E-businesses draw information on how visitors use a site through log files. Analysis of log file means turning log data into application service or installing software that can pluck relevant information from files in-house. Companies track individual's movement through tracking software and cookie analysis. Programs such as cookies raise a batch of privacy concerns. The tracking history is stored on your PC's hard disk, and any time you revisit a website, the computer knows it. Many smart end users install programs such as Cookie cutters, Spam Butcher, etc which can provide users some control over the cookies.

The battle between computer end users and web trackers is always going on with a range of application programs. For example, software such as Privacy Guardian, My Privacy, etc can protect user's online privacy by erasing browser's cache, surfing history and cookies. To detect and remove spyware specially designed programs like Ad-Aware are present. A data miner application, SahAgent collects and combines Internet browsing history of users and sends it to servers. The battle goes on!

Privacy

Most Electronic Payment Systems knows the identity of the buyer. So it is necessary to protect the identity of a buyer who uses Electronic Payment System.

A privacy issue related to the employees of company is tracking. Monitoring systems are installed in many companies to monitor e-mail and other web activities in order to identify employees who extensively use business hours for non-business activities. The e-commerce activities performed by a buyer can be tracked by organizations. For example, reserving

railway tickets for their personal journey purpose can be tracked. Many employees don't want to be under the monitoring system even while at work.

As far as brokers and some of the company employees are concerned, E-Commerce puts them in danger zone and results in elimination from their jobs. The manner in which employees are treated may raise ethical issues, such as how to handle displacement and whether to offer retraining programs.

Disintermediation and Reintermediation

Intermediation is one of the most important and interesting e-commerce issue related to loss of jobs. The services provided by intermediaries are (i) Matching and providing information.

(ii) Value added services such as consulting.

The first type of service (matching and providing information) can be fully automated, and this service is likely to be in e-marketplaces and portals that provide free services. The value added service requires expertise and this can only be partially automated. The phenomenon by which Intermediaries, who provide mainly matching and providing information services are eliminated is called Disintermediation.

The brokers who provide value added services or who manage electronic intermediation (also known as infomediation), are not only surviving but may actually prosper, this phenomenon is called Reintermediation.

The traditional sales channel will be negatively affected by disintermediation. The services required to support or complement e-commerce are provided by the web as new opportunities for reintermediation. The factors that should be considered here are the enormous number of participants, extensive information processing, delicate negotiations, etc. They need a computer mediator to be more predictable.

Legal Issues

Internet fraud and its sophistication have grown even faster than the Internet itself. There is a chance of a crime over the internet when buyers and sellers do not know each other and cannot even see each other. During the first few years of e-commerce, the public witnessed many frauds committed over the internet. Let's discuss the legal issues specific to e-commerce.

Fraud on the Internet

E-commerce fraud popped out with the rapid increase in popularity of websites. It is a hot issue for both cyber and click-and-mortar merchants. The swindlers are active mainly in the area of stocks. The small investors are lured by the promise of false profits by the stock promoters. Auctions are also conductive to fraud, by both sellers and buyers. The availability of e-mails and pop up ads has paved the way for financial criminals to have access to many people. Other areas of potential fraud include phantom business opportunities and bogus investments.

Copyright

The copyright laws protect Intellectual property in its various forms, and cannot be used freely. It is very difficult to protect Intellectual property in E-Commerce. For example, if you buy software you have the right to use it and not the right to distribute it. The distribution rights are with the copyright holder. Also, copying contents from the website also violates copy right laws.

Domain Names

The competition over domain names is another legal issue. Internet addresses are known as domain names and they appear in levels. A top level name is qburst.com or microsoft.com. A second level name will be qburst.com/blog. Top level domain names are assigned by a central non-profit organization which also checks for conflicts or possible infringement of trademarks. Problems arise when several companies having similar names competing over the same domain name.The problem of domain names was alleviated somewhat in 2001 after several upper level names were added to com.

Another issue to look out for is Cybersquatting, which refers to the practice of registering domain names with the desire of selling it at higher prices.

Security features such as authentication, non-repudiation and escrow services can protect the sellers in e-commerce.

One needs to be careful while doing e-commerce activities. The need to educate the public about the ethical and legal issues related to e-commerce is highly important from a buyer as well as seller perspective.

Internet Terminologies

List of Basic Internet Terminologies

Browser:

A program used on a computer connected to the Internet that provides access to the World Wide Web. The browser translates the documents stored on the World Wide Web into a format you can read on your screen.

Download:

To transfer a file from a remote computer to your computer through a modem and a telephone line, cable, or wirelessly.

E-mail (Electronic Mail):

Electronic mail messages you send over the Internet from one computer to another.

FAQ (Frequently Asked Questions):

On a Web site, a list of questions commonly asked by users and the answers to those questions to assist people using the site.

Internet:

A worldwide system of linked computers that allows users to send and receive e-mail and documents from one computer to another.

URL (Universal Resource Locator):

The address of a Web page on the World Wide Web.

Web (World Wide Web or WWW):

A subset of the Internet that allows people to view documents called Web pages using a browser and click items called links on a Web page to open another Web page anywhere on the Web identified by the link.

NSFNET: ARCHITECTURE AND COMPONENTS:

·National Science Foundation (NFS) has created five super computer centers for complex and wider range of scientific explorations in mid-1980s. Until then, supercomputers were limited to military researchers and other who can afford to buy.

·NSF wanted to make supercomputing resources widely available for academic research and the logic is that the sharing of knowledge, databases, software, and results was required.

So NSF initially tried to use the ARPANET, but this strategy failed because of the military bureaucracy and other staffing problems. So, NSF decided to build its own network, based on the ARPANET's IP technology.

·The NFSNER backbone is initially connected to five supercomputing networks with initial speed 56 kbps telephone leased lines. It was considered fast in 1985 but it is too slow according to modern standards.

·Since every university could not be connected directly to the center, need of access structure was realized and accordingly each campus joined the regional network that was connected to the closest center. With this architecture, any computer could communicate with any other by routing the traffic through its regional networks, where the process was reserved to reach the destination. This can be depicted in the three level hierarchical models

This abstraction is not completely accurate because it ignores commercial network providers, international networks, and interconnections that bypass the strict hierarchy.

· Water distribution systems may be useful analogy in understanding the technology and economics of the NSFNET program.

1. We can think of the data circuits as pipes that carry data rather than water.
2. The cost to an institution was generally a function of the size of the data pipe entering the campus.

3. The campuses installed plumbing and appliances such as computers, workstations and routers. And Service cost as an infrastructure cost such as classrooms, libraries and water fountains.

·But there is no extra charge for data use.

·The mid-level networks acted like cooperatives that distributed data from the nationalbackbone to the campuses. They leased data pipes from the telephone companies, and added services and management. So each member could access the pipe and either consume or send data.

·Some funding was also provided by the federal government.

· This model was a huge success but became a victim of its own success and was no longer effective. One main reason for it was-the network's traffic increased until, eventually, the computer controlling the network and the telephone lines connecting them became saturated. The network was upgraded several times over the last decade to accommodate the increasing demand.

The NSFNET Backbone

· The NSFNET backbone service was the largest single government investment in the NSF-funded program. This backbone is important because almost all network users

throughout the world pass information to or from member institutions interconnected to the U.S. NSFNET.

·The current NSFNET backbone service dated from 1986, when the network consisted of a small number of 56-Kbps links connecting six nationally funded supercomputer centers.

In 1997, NSF issued a competitive solicitation for provision of a new, still faster network service.

·In 1988, the old network was replaced with faster telephone lines, called T-1 lines that had a capacity of 1.544 Mbps compared to the earlier 56 Kbps, with faster computers called routers to control the traffic.

·By the end of 1991, all NSFNET backbone sites were connected to the new ANS-provided T-3 backbone with 45 Mbps capacity. Initial 170 networks in July 1988 to over 38,000 and traffic of initial 195 million packets to over 15 terabytes. Discussions of electronic commerce were due to the economic factor. The cost to the NSF for transport of information across the network decreased.

· It fell from approximately $10 per megabyte in 1987 to less than $1.0 in 1989. At the end of 1993, the cost was 13 cents. These cost reduction occurred gradually over a six-year period. Cost reductions were due to new faster and more efficient hardware and software technologies.

Mid-Level Regional Networks

· Mid level Regional Networks are often referred to as regional networks, are one element of the three-tier NSFNET architecture.

·They provide a bridge between local organizations, such as campuses and libraries, and the federally funded NSFNET backbone service.·The service of Mid Level Regional Networks tends to vary from sub state, statewide and multistate coverage.

State and Campus Networks

·State and campus networks link into regional networks.

·The mandate for state networks is to provide local connectivity and access to wider area services for state governments, K-12 schools, higher education, and research institutions.

· Campus networks include university and college campuses, research laboratories, private companies, and educational sites such as K-12 school districts.

· These are the most important components of the network hierarchy, as the investment in these infrastructures far exceeds that of the government's investments in the national and regional networks.

NATIONAL RESEARCH AND EDUCATIONAL NETWORK

The NREN is a five-year project appoved by Congress as part of the High performance computing and communications Act in fall 1991.NREN represents the first phase of the HPCC project. The intent is to create a next-generation Internet to interconnect the nation's education and research communities.

Development and deployment of NREN is planned to occur in three phases. The first phase, begun in 1988, involved upgrading all telecommunicatons links within the NSFNET backbone to 1.544 Mbps(T-1). The second phase also provides upgraded services for 200 to 300 research facilities directly linked to the backbone. The third phase, which will result in a phased implmentation of a gigabit-speed network operating at 20-50 times T-3 speeds. NREM activities can be broadly split into two classifications:

1. Establishment and deployment of a new network architecture for very high bandwidth networks(vBNS).

2. Research to yield insights into the design and develpment of gigabit network technology.

Internet governance

Internet governance is defined as 'the development and application by governments, the private sector, and civil society, in their respective roles, of shared

principles, norms, rules, decision-making procedures, and programs that shape the evolution and use of the Internet

UNIT - II

UNIT - II E-Commerce and Web

E-Commerce and Web: Architecture frame work for E- Commerce – WWW as the architecture – Hypertext publishing – Technology and Security on Web – Consumer Oriented Applications – Mercantile Process Model – Mercantile Models from the perspective of Consumer and merchants.

Architectural framework for E-Commerce

A Frame Work is intended to define and create tools that integrate the information found in today's closed system and allow the development of E-commerce applications. Architectural framework should focus on synthesizing the diverse resources already in place incorporation to facilitate the integration of data and software for better use and application. The Ecommerce applications architecture consists of 6 layers of functionality or services. They are

1. Application Services
2. Brokerage Services
3. Interface support layer
4. Secure messaging & EDI
5. Middleware, structured document interchange.
6. Network infrastructure and providing communication services.

1. Application services: It will be composed of existing and future applications based on innate architecture. The three distinct classes of E-commerce applications can be distinguished as

(a) Consumer to Business

(b) Business to Business

(c) Intra organization.

(a) Consumer to Business: We call this enterprise market place transaction. In market place transaction customer learn about product differently through Electronic publishing by them differently using Electronic cash and secure payment and have them developed differently.

(b) Business to Business: This is called as market link transaction. Here business, govt and

other organizations depend on computer to computer communication as a fast, economical dependable way to conduct business transactions. They include the use of EDI and E-mail for Purchasing goods and services, buying information and consulting services, submitting requests for proposals and receiving proposals.

(c) Intra Organizational transactions: This is called as market driven transaction. A company becomes market driven by dispersing throughout the firm information about his customers and competitors by spreading strategic and tactical decision making so that all units can participate and by continuously monitoring their customer commitment. To maintain relationships that are critical, to deliver superior customer value management, most pay close attention to both before and after sales. A market driven business develops a comprehensive understanding of its customer business and how customers in the immediate and downstream markets perceive value. Three major components of market driven transactions are

(i) Customer orientation through product and service customization

(ii) Cross functional coordination through enterprise integration, marketing and advertising.

(iii) Customer service.

2. Information Brokerage and management: This layer provides service integration through the notion of information brokerages. Information brokerage is used to represent an intermediary which provides service integration between customer and information providers, given some constraints such as low price, fast service, profit maximization for a client.Information brokerage addresses the issue of adding value to the information that is retrieved. Brokerage function can support data management and traditional transaction services. Brokerage may provide tools to accomplish more sophisticated tasks such as time delay updates or feature comparative transaction. At the heart of this layer lies the work flow scripting environment that built on software agent model that coordinate work and data flow among support services. Software agents are mobile programmers that have been called as “healthy viruses” , “digital butlers” , and “intelligent agents”. Agents are encapsulations of users instructions that perform all kinds of tasks in electronic market places spread across the network.

3. Interface support service: The third layer interface and support services will provide interface for e-commerce applications such as interactive catalogues and will support directory services etc., functions necessary for information search and access. Interactive catalogues are customized interface to consumer applications such as home shopping. An

interactive catalogue is an extension of paper based catalogues and incorporates additional features such as sophisticated graphics and video to make advertising more attractive. Directories on the other hand operate behind the scenes and attempt to organize the huge amounts of information and transactions generated to facilitate electronic commerce.

Directory services databases .make data from any server appear as a local file. Thus directories play an important role in information management functions.

4. Secure messaging and structure document interchange service: The importance of fourth layer is secured messaging. Messaging is a software that sits between the network infrastructure and the clients or e-commerce applications. Messaging services offer solutions for communicating non formatted data such as letters, memo, reports etc as well as formatted data such as purchase order, shipping notices and invoice etc. messaging support both for synchronous (immediate) and asynchronous (delay) messaging. When a message is sent work continuous (software does not wait for response). This allows the transfer of messages through store and forward methods. With messaging tools people can communicate and work together more effectively, no matter where they are located. The main disadvantages of messaging are the new types of applications it enables , which appear to be more complex especially to traditional programmers.

5. Middleware services: Middleware is a relatively new concept that emerged only recently. Middleware is a mediator between diverse software programs that enable them to talk with one another. It solves all the interface, translation, transformation and interpretation problems that were driving application programmers crazy. Another reason for Middleware is the computing shift from application centric to data centric. i.e., 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.

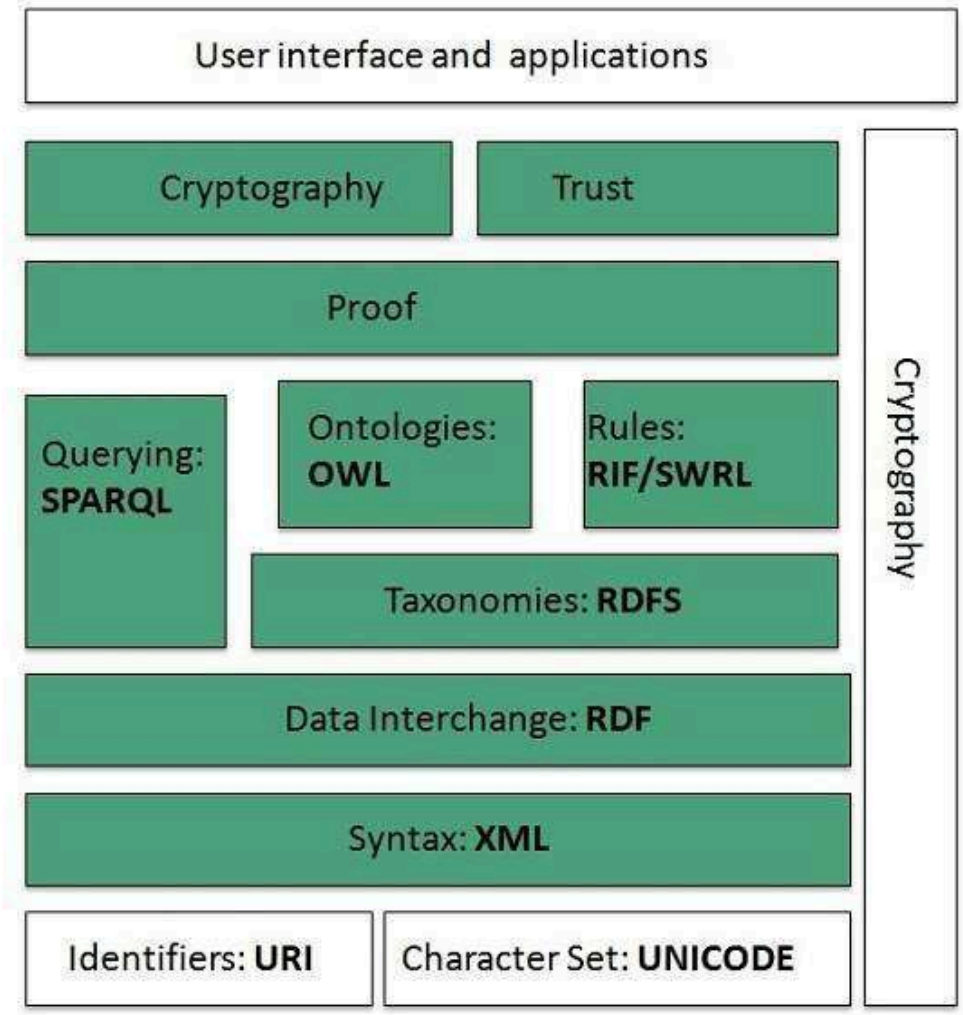
- ♦ Transparency
- ♦ Translation security management
- ♦ Distributed object management and services

(1) 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 interconnections that the underlying network infrastructure is in charge of. 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 collection of multi vendor heterogeneous systems.

(2) Transaction security management: The two broad categories of security (management) services for transaction processing are (a) Authentication (b) Authorization. Transaction integrity must be given for business that cannot afford any loss or inconsistency in data. For E-commerce , middleware provides qualities expected in a standard transaction processing (T.P) system i,e. the so called ACID (Atomocity, consistency, isolation, Durability). . (3) Distributed Object Management: Object orientation is proving fundamental to the proliferation of network based application for the following reasons. It is hard to write a network based application without either extensive developer retaining or technology that adopts the difficulties of the network. objects are defined as combination of data and instructions acting on the data. objects are an evolution of more traditional programming concept of functions and procedures. A natural instance of an object in E-commerce is a document. A document carries data and often carries instructions about the action to be performed on the data. Middleware acts as an integrator for various standard protocols such as TCP(transmission control protocol) IP (Internet protocol), OLL

WWW as the Architecture

WWW architecture is divided into several layers as shown in the following diagram:



- Identifiers and Character Set

  Uniform Resource Identifier (URI) is used to uniquely identify resources on the web and **UNICODE** makes it possible to built web pages that can be read and write in human languages.

- Syntax

  XML (Extensible Markup Language) helps to define common syntax in semantic web.

- Data Interchange

Resource Description Framework (RDF) framework helps in defining core representation of data for web. RDF represents data about resource in graph form.

- Taxonomies

RDF Schema (RDFS) allows more standardized description of **taxonomies** and other **ontological** constructs.

- Ontologies

Web Ontology Language (OWL) offers more constructs over RDFS. It comes in following three versions:

- OWL Lite for taxonomies and simple constraints.
- OWL DL for full description logic support.
- OWL for more syntactic freedom of RDF

Hypertext Publishing

Hypertext Publishing Web provides a functionality necessary for e-commerce. The web has become an umbrella for wide range of concepts and technology that differ markedly in purpose and scope which include hypertext publishing concept, the universalreader concept and the client server concept. Hypertext publishing promotes the idea of seamless information world in which all online information can be accessed and retrieved. In a constant and simple way hypertext publishing is a primary application of web interest in hypermedia. On the internet (called distributed or global hypermedia). As accelerated shortly following the success of web media and browser. This success has been aided by more powerful work station high resolution graphic display faster network communication and decreased cost for large online service.

Hypertext Vs hypermedia

Hypertext: Hypertext is an approach information management in which data are shared in the network of document connect by links (this link represents relationship between nodes.

Hypermedia: A hypermedia system is made up of nodes (documents) and links (pointers). A node generally represents a simple concept and idea. Nodes can contain texts, graphics,

audio, video images etc. nodes are connected to other nodes by links. The movement between nodes is made by activating links which connect related concept or nodes links can be bidirectional. Hypertext is a simple context based on the association of nodes through links. A node from which a link is originated is called the reference or the anchor link and a node at which a link ends is called referent. The movement between the links is made possible by activating links. The promise of hypertext lies in the ability to produce large complex richly connected and crossed reference bodies of information.

Benefits of Hypermedia

1. hypermedia documents are much more flexible than conventional documents.
2. hypermedia documents offer video sequences animation and even compute programs.
3. its power and appeal increases when it is implemented in computing environments that include network , micro computers , work stations, high resolution displays and large online storage.
4. it provides dynamic organization.
5. hypermedia systems provides non-linear innovative way of accessing and restricting network documents. Technology behind the web: Information providers (publishers) run programs called servers from which the browsers can obtain information. These programs can either be web servers that understand the hypertext transfer protocol (HTTP) , “gateway” programs that convert an existing information format to hypertext, or a non-HTTP server that web browsers can access i.e FTP or Gopher servers.

Web servers are composed of two major parts.

- the hypertext transfer protocol (HTTP) for transmitting documents between servers and clients .
- HTML format for documents. The link between HTML files & HTTP server is provided by Uniform Resource Locator (URL).

Uniform Resource Locator: The documents that the browsers display are hypertext that contains pointers to other documents. The browser allows us to deal with the pointer in a transparent way that is select the pointer we are presented with a text to which it points.

This pointer is implemented by using a concept which is central to web browser known as URL. URL's are streams used as address of objects (documents, images etc) on the web. URL marks the unique location on the internet so that a file or a service can be found. URL's follow a consistent pattern that the first part describes the type of the resources, second part gives the name of the server posting the resources and the third part gives the full name of resources. e.g : FTP://server.address / complete file.name URL are central to web architecture. That fact is that it is easy to address an object anywhere on the internet is essential for the system to scale & for the information space to be independent os network and server topology.

Technology on web

In the present scenario, the most important thing is to develop a rapport with both your already existent or prospective clients. Websites and apps have become indispensable for businesses and corporate entities to showcase their services, goods, brand, and purpose. For this, you require a website that is well designed with apps brimming with features. The contemporary E-commerce web technologies have attained a height where businesses are not required to design or develop ecommerce web or apps right from scratch.

Below we have discussed ten latest E-commerce web technologies that will help you make a sensible decision while selecting the best for your E-commerce website.

Magento

Shopify

WooCommerce

BigCommerce

OpenCart

Drupal Commerce

Volusion

OsCommerce

SimpleCart

Squarespace

List of Latest Ecommerce Web Technologies:

Magento

Magento is to date the most popular and dependable E-commerce platforms when it comes to B2B & B2C customers. Magento is a strong SEO friendly platform with several functions that can be easily customized. The ability of Magento to integrate with third-party products & services makes it a favorite among the community of customers.

Shopify

Shopify is a very popular SEO compliant and constantly evolving web technology for an ecommerce website. Besides an attractive professionally made template for your storefront, there are several add-ons with Shopify with responsive checkout being one of them. Another great feature is that your customers can use Bitcoins to make payments.

WooCommerce

WooCommerce is unquestionably an amazing choice for problem free setups. It is an Ecommerce plugin free of charge that can integrate with WordPress allowing store owners to sell their products quickly and easily. It is estimated that around 30% online store owners depend on WooCommerce plugin for not only selling their products but shipping them and collecting payments too.

BigCommerce

BigCommerce is quite popular due to it having several new features and functions like builtin blogging, an improved SEO and customer support round the clock. Its main advantages are a simple to use interface along with an extensive knowledge base.

OpenCart

OpenCart is a practical and simple open source CMS for E-commerce supported by exceptional developers. Its features include several plug-ins with a simple back-end. Editing CSS can be done within the admin. But the support system of OpenCart is not very detailed in comparison to other platforms.

Drupal Commerce Drupal

Commerce is an exceptional open-source online content marketing platform. It ensures a great experience for customers using the E-commerce website. It can easily implement SEO strategy and blog integration as it can seamlessly integrate with Drupal CMS framework.

Volusion

Volusion is widely used due to several features with one of them being an interface that is easy to use. Although the add-on store of Volusion is not as big as Shopify and there is no availability of a blog set up but the account specialists give you personalized services. As against a responsive design Volusion stores use the mobile site.

OsCommerce

OsCommerce is one of the first available open source platforms with a large support database and an active forum. Its popularity is due to its easy installation and a simple to use interface. Although some users find the design and software update of OsCommerce to be a littleoutdated store owners have full control over their store and database.

SimpleCart

SimpleCart is best suited to the needs of small online stores. It works on HTML having a small footprint but supporting several currencies.

Squarespace

Squarespace allows you to design attractive websites with images and rich templates. With Squarespace clients have total control over inventories, product variants, generating coupons and shipping configuration. Squarespace inculcates all essential tools to make a universal E-commerce store.

To conclude all platforms and CMS have their merits and demerits, but selecting the best one depends on your specific business requirements. Shopify might be a good option for hosted platform or Magento for a Content Management but experience alone can help to judge the most suitable one for your business model.

Security on the web The frequency and sophistication of cyber attacks has skyrocketed in recent years. Ecommerce security refers to the measures taken to protect your business and your customers against cyber threats.Let's look at some terminology and common acronyms you should know:

Payment Card Industry Data Security Standard (PCI DSS):

PCI DSS (often referred to as just "PCI") is an industry standard that ensures credit card information collected online is being transmitted and stored in a secure manner.

International Organization for Standardization (ISO):

ISO is an international standard-setting body that creates requirements that guide businesses in making sure their products and processes are fit for purpose. One of their standards, ISO/IEC 27001:2013, covers data security. Achieving this certification means a business has high quality management systems, data security, risk-aversion strategies and standardized business practices.

Personal Data:

Personal data or personal information refers to any data that can be linked back to a specific individual most simply, this includes names, email addresses, and phone numbers. But it can get a little bit more complex as well. Any data set even scrubbed of specific names or numbers that can identify a particular person is considered personal data. Protecting personal data is particularly important when it comes to data privacy regulations like GDPR (more on that later).

Transport Layer Security (TLS), Secure Sockets Layer (SSL) and HTTPS authentication:

Utilizing SSL helps to authenticate and encrypt links between networked computers. Once you have an SSL certificate for your ecommerce site, you can move from HTTP to HTTPS, which serves as a trust signal to customers that your site is secure.

Multi-factor authentication (MFA), 2-factor authentication (2FA), or 2-step verification (2SV):

MFA, 2FA, and 2SV are sometimes used interchangeably and they are similar but there are differences among them. In addition to entering a username and password, all three of these methods require at least one further method of identity verification of a user logging in to a site like your ecommerce store.

Here's a high-level explanation of the differences:

- 2SV may require the user to enter a one-time code, delivered via an email, text message or phone call.

- 2FA goes a step further and may require the user to acknowledge their login attempt through another device like opening a specific app on a mobile device while logging in from a laptop.
- MFA is similar to 2FA but can refer to the implementation of more than two factors of authentication.

Distributed Denial of Service (DDoS):

A DDoS attack refers to a disruption of server, service or network traffic by overwhelming it with a flood of traffic. This resource on Cloudflare which offers more detailed information on DDoS attacks compares it to a traffic jam. Imagine trying to pull out into a major roadway (those are your customers and legitimate traffic) during rush hour all those cars are the compromised traffic, blocking customers out of your store.

Consumer Oriented Applications

The convergence of money, commerce, computing and networks is laying the foundation for a global consumer market place. Some fundamental business issues must be addressed before consumer oriented e-commerce can become widespread, including:

1. Establishment of standard business processes for buying and selling products and services in electronic markets.

2. Development of widespread and easy-to-use implementations of mercantile protocols for order-taking, online payment, and service delivery similar to those found in retail/ credit card based transactions.

3. Development of transport and privacy methods that will allow parties that have no reason to trust one another to carry on secure commercial exchanges. In other words, to make consumer-oriented e-commerce more effective we need a better understanding of the components of the business process from the initial search and discovery of the product/services via on-line catalogs to the management of the order-to-delivery cycle including the all-important payment/settlement component. The wide range of applications envisioned from the consumer market place can be broadly classified into. Consumer Life style needs Complementary multimedia services. Entertainment Movies on demand, video cataloging, interactive ads, multi user games, on-line discussions. Financial services and

information Home banking, financial services, financial news. Essential services Home shopping, electronic catalogs, telemedicine, remote diagnostics Education and training Interactive education, multi user games, video conferencing, on-line databases.

Personal Finance and Home Banking Management:

Home banking services are often classified as

Basic Services

Intermediate services

Advanced services

1. Basic services: it is related to personal finance i.e. checking savings account statement around the clock, banking with ATM's (Automated Teller Machines). Bill payment, balancing cheque book status of payment or stock payment requested etc.

2. Intermediate services: it includes a broader array of financial management services which include non-banking activities. Also bank activities such as household banking, tax return preparations etc.

3. Advanced services: it includes stock and mutual funds brokerage or trading services such as currency trading and credit card or debit card management.

Home shopping : One of the example often sighted about e-commerce is home shopping which is widely used and had generated substantial revenue for many companies racing to develop on-line malls. The malls will enable a customer to enter an online store look at products, try on computerized clothes, see a reflection in a digital mirror and purchase with overnight delivery against credit card billing. The exact operating method of these services has yet to be determined, but the retailers are well aware of the potential opened up by the ability to transmit huge amounts of digital information into home and to provide interactive control to the shopper.

Television based shopping: TV shopping has evolved over years to provide a wide variety of goods ranging from clothing, small electronic house ware, jewelry and computing.

Catalog based shopping: The online catalog business consists of brochures, CD ROM catalogs and online interactive catalogs. Most online catalogs are some form

of electronic brochure. Electronic brochures are multimedia replacement for direct mail, paper & brochures used in the business to business marketing. Basically electronic catalog contains highly interactive programs using still images, graphics, animation, sound, text & data. One of the disadvantages of this catalog is its prohibitive cost.

Home Entertainment: It is another application area of E-commerce, the most important services provided under. These are movies on demand, interactive games. The online gaming industry in turn parallels the TV industry where the customer is primarily interested in good quality programming & is not faithful to any one network. In0 the entire home entertainment area, the key element is the notion of customer control under programming entertainment on demand as expected to give each viewer total control over what, when and where to watch. In addition to game technology we also witness the emerging services of entertainment support function such as on screen catalogues, TV guide that inform users what is on TV.

Micro Transaction of Information: To serve the information needs of the consumer, services providers whose product is information delivered over the I-way are creating an entirely new industry. Most sell any form of digital information and can be sent down the network of one sort or another such as data, picture, images, sounds, computer programs and services. A few sell products such as music books, clothing etc through on-line catalogues. One significant change in the traditional business forced by is online information. Business is the creation of new transaction catalogues called small fee transactions for micro services.

Desirable characteristics of E-Market Space: The following characteristics are essential for consumer oriented E-commerce.

1. critical mass of buyers and sellers: the trick is getting a critical mass of cooperation and consumers to use electronic mechanism i.e., the E-market place should be the first place for the customer to go to the right product & service they need.

2. Opportuinity for independent evaluation and for customer dialogue and Discussion: the ability to openly evaluate the wares offer is a fundamental principle of viable market place

i.e. the users compare notes on who has best products and whose prices are outrageous.

3. Negotiation and bargaining: no marketplace is complete if it does not support negotiation. 4. New products and services: in a viable market place consumer can request a product and services which are not currently offered i.e. the viable market place is an interactive information service that supports the entire innovation process.

5. Seamless Interface: biggest barriers to E-market Place is having all the pieces work together so that information can flow seamlessly from one source to another. This requires standardization

6. Recourse for disgruntled buyers: viable market place must have a recognized mechanism for resolving disputes among buyers and sellers. Markets typically include a provision for resolving this and agreement by replacing the product.

Mercantile Process Models:

It defines the interaction between the consumer and the merchant for online commerce. This is necessary because to buy and sell goods a buyer, a seller and other parties must interact in ways that represent standard business process. A well established standard process for processing credit card purchasers has contributed to the wide spread dissemination of credit cards. The establishment of common mercantile process model is expected to increase the convenience for consumers.

Mercantile models from the Perspective of consumers and merchants

Mercantile models from the Consumers Perspective:

The online consumer expects quality and convenience, value, low price etc. to meet their expectations and understand the behaviour of online shopper there is a need for the business process models that provides the standard product / service purchasing process. The process model for a consumer point of view consists of seven activities that can be grouped into three phases. They are

1. Pre phase

2. purchase consumption

3. post purchase interaction phase.

Steps taken by customer in purchasing: Prepurchase determination Purchase consummation Postpurchase interaction

1. Pre purchase Determination: this phase includes search and discovery for a set of products in the larger information space applicable of meeting customers Product or service search and discovery in the information space Comparison shopping and product selection based on various attributes Negotiation of terms E.G Price , Delivery times Placement of order Authorization of Payment Receipt of Product Customer service and support requirements and product selection from the smaller set of products based on attribute comparision.

2. Purchase Consumption: this phase includes mercantile protocols that specify the flow of information and documents associated with purchasing and negotation with merchants for suitable terms such as price availability and delivery dates.

3. Post Purchase interaction: this phase includes customer service and support to addresses customers complaints, product returns & product defects.

Pre Purchase Preparation: From the consumer point of view any major purchase can be assumed to involve some amount of pre purchase deliberation. Pre purchase deliberation is defined as elapsed time between the consumer's first thinking about buying and actual purchase itself. Information search should constitute the major part of duration but comparison of alternatives and price negotiations would be included in continuously evolving information search and deliver process. To deliberate, consumers have to be watchful for the new or existing information which are essential for purchase decision process. Information on consumer characteristics with reduced purchase deliberation time can be quite valuable when attempting to target, selective communications to desired audience properly. Thus not much attention have been paid to this important research area which may dictate success or failure of online shopping. Consumers can be categorized into three types

Impulsive buyers

Patient buyers

Analytical buyers

1. Impulsive buyers: these buyers purchase the product quickly.

2. Patient buyers: who purchase products after making some analysis or comparision.

3. Analytical buyers: who do substantial research before making the decision to purchase product or services. Marketing researchers have isolated several types of purchasing.

1. Specifically planned purchase: the need was recognized on entering the store and the shopper brought the exact item planned.

2. Generally planned purchases: the need was recognized, but the shopper decided instore on the actual manufacture of the item to satisfy the need.

3. reminder purchases: the shopper was reminded of the need by some store influence. This shopper is influenced by in-store advertisements and can substitute products readily.

4. Entirely unplanned purchases: the need was not recognized entering the store.

Purchase Consumption:

After identifying the product to be purchased by the buyer and the seller must interact in some way (e-mail, on-line) to carry out the mercantile transactions. The mercantile transaction is defined as the exchange of information between the buyer and seller followed by necessary payment depending upon the payment model mutually agreed on they may interact by exchanging currently i.e. backed by the third party such as the central bank, master card, visa card etc. A single mercantile model will not be sufficient to meet the needs of everyone. In very general terms a simple mercantile protocol would require the following transaction where the basic flow remains the same .

1. Through e-mail, online the buyer contacts the vendors to purchase a product or service. This might be done online through e-mail (or) through e-catalogue etc.

2. Vendor states the price.

3. Buyer and vendor may or may not engage in a transaction.

4. If satisfied buyer authorizes payment to the vendor with an encrypted transaction containing the digitalsignature.

5.Vendor contacts the billing service of the buyer to verify the encrypted authorization for authentication.

6. Billing service decrypts the authorization and checks the buyer account balance and puts a hole on the amount transfer.
7. Billing service give the vendor green signal to deliver the product.
8. On notification of adequate funds to cover financial transaction, vendor delivers the goods to buyer or in the case of information purchase provides a crypto key to unlock the file.
9. on receiving the goods the buyer signs and delivers receipt. Vendors then tell billing service to complete the transaction.
10. At the end of the billing cycle buyer receives a list of transactions. The following are the two types of mercantile protocols where the payment is in the form of electronic cash and credit cards.

1. Mercantile process using digital cash: a bank mints (prints) electronic currency or ecash. Such a currency is simply a series of bits that the issuing bank can be verified to be valid. This currency is kept secured by the use of cryptographic techniques. After being issued some e-cash a buyer can transfer to a seller in exchange for goods upon receiving a ecash the sellers can verify authenticity by sending it to the issuing bank for verification. Ecash issuing banks make money by charging either buyer or seller or both. A transaction fee for the use of their E-cash. E-cash is similar to paper currency and has the benefits of being anonymous (hidden) and easily transmitted electronically. It still entails the risk of theft or loss. However, and so requires significant security by the buyer when storing e-cash.

2. Mercantile Transaction Using Credit Cards: two major components of credit card transaction in the mercantile process are

Electronic Authorization Settlement

In the authorization process in the retail transaction, the 3rd party processor (tpp) captures the information at the point of sale and transmit the information to the credit card issue for authorization, communicated a response to the merchant and electronically stores the information for the settlement and reporting. Once the information leaves the merchants premises the entire process takes few seconds. The benefits of electronic processing include a reduction of credit card losses, lower merchant transaction costs, faster consumer

checkout. 6 IIMC Credit card authorization is processed at the point of sale terminal using dial-up phone access into the TPP networks. The credit card no is checked against the database and the transaction is either approved typically in a few seconds. A similar procedure is used for debit cards and check verification once the electronic authorization function is completed. The information is processed within the system for client reporting. The data are then transmitted for settlement to the appropriate institution processor.

After the transaction is completed a set of activities related to account settlement are initiated. In a credit card or debit card transaction the merchant account number is credited and or either credit card issuer is notified to enter the transaction or the card holders checking account is debited automatically. A settlement institution then enter the transaction data into the settlement process. In addition to the data computer also takes cars of the settlement function through electronic transaction processing. This electronic transaction processing also provides other services such as 24 hr network, helpdesk which response to enquires from merchant location etc.

Post Purchase Interaction:

As long as there is payment for services there will be references, disputes, other customer service issues that need to be considered. Returns and claims are an important part of purchasing process that impact the administrative costs, scrap and transportation expenses and customers relations. To overcome these problems many companies design their mercantile process for one way i.e., returns and claims must flow upstream. The following are the complex customer service challenges that arise in the customized retaining which have not fully understood or resolved.

1. Inventory Issues: to serve a customer properly a company should inform a customer right from when an item is ordered to it is sold out, otherwise the company will have a disappointed customer.

2. database Access and Compatibility Issues: unless the customer can instantly access all the computers of all the direct response vendors likely to advertise on the information super highway on a real time basis, with compatible software to have an instant access to the merchants inventory and database. 3. Custome r service issues: Customers often have

questions about the product such as colour, size, shipment etc. and other things in mind can resolved only by talking to an order entry operator.

Mercantile process model from merchants perspective:

E-commerce order management cycle: To order to deliver cycle from the merchant perspective has been managed with an eye towards standardization and cost. This is based on assumption that an organization must create a set of operating standard for service and production. They perform to those standards while minimizing the cost. To fully realize and maintain a competitive advantage in the online environment it is necessary to examine the order management cycle (OMC) that also includes the traditional order to delivery cycle.
However the OMC has the following generic steps.

1. Pre sale Interaction:

a) Order planning and order generation: The business process begins long before an actual order placed by the customer. The production planners develops the final forecast used to high workers and built inventory. Order planning leads into order generation. Orders are generated into number of wages into e-commerce environment such as sales force broad cast.
Since personalized e-mail to customer or creates WWW web page.

b) Cost Estimation and Pricing: Pricing is the bridge between the customer needs and company capabilities pricing at the individual order level depends on understanding value to the customer i.e, generated by each order etc. through order based pricing it is difficult to generate greater profits that are indicated by pricing

2. Product service purchase and delivery:

a) Order Receipt and entry: After the acceptable price code the customer enters the order receipts and entries paid in OMC.

b) Order selection and prioritization: customer service representatives are responsible for choosing which to accept and order to decline. Not all customer order created equal, some or better business and some are fit into the companies capabilities and offers healthy profits. Companies also make gains by the way they handle over priority i.e, to check which orders to execute faster.

c) Order Scheduling: during this phase prioritized orders get slotted into an actual production or operational sequence. Production people seek to minimize equipment change over communication between various function units is most essential in this phase of OMC.

d) Order fulfillment and delivery: during order fulfillment and delivery the actual provision of product or service is made. While the details vary from industry to industry in almost in every company this step has become increasingly complex. Often order fulfillment involves multiple functions and location. Different parts of any order may be created in different manufacturing facilities and merged yet another site or order may be manufactured in one location warehoused in a second and installed in the third. In some businesses fulfillment includes third party vendor. In service operations it can mean sending individuals with different talent to the customers site. The more complicated task the more coordination required across the organization.

e) Order billing and payment : after the order has been fulfilled and delivered billing is typically handled by the finance staff who view their job as getting the bill out effectively and collecting quickly i.e, the billing function is designed to serve the needs of the company not the customer service.

Post Sale Interaction:

a) Customer service and support: this phase plays an interestingly important role in all Elements of a company's profit equation, customer value, price and cost. Depending on the specifications of business it can include elements such as physical installation of a product, repair and maintenance, customer training, equipment upgrading and disposal. Thus post sale service can affect customer satisfaction and company profitability of the year. But in most companies the post sale service people are not linked to any marketing operation, internal product development effort or quality assurance team. Electronic payment systems: Electronic payment systems are emerging in banking, retail, healthcare, online markets And even government organizations and infact anywhere money needs to change hands. The emerging payment technology was labeled as electronic fund transfer(EFT). EFT was defined as any transfer of funds initiated through an electronic terminal telephonic instrument or computer or magnetic tape so as to order, instruct or authorize a financial institution to debit or credit an account. It utilizes computer telecommunication components both to supply and to transfer money or financial assets. EFT can be segmented into three broad categories.

1. Banking and financial Payments (such as ATM)

2. Retail payments (such as debit cards)

3. Online E-commerce payments.

Online E-Commerce Payments:

(a) Token Based Systems :

1. E-Cash (Digi-cash)

2. E-cheque (Net Cheques)

3. Smart cards or debits cards.

(b) Credit card based systems:

1. Encrypted credit cards.

2. Third party Authorization numbers

(c) Digital Token based Electronic payments systems:

It is a new financial instrument. The electronic token which will be in the form of e-cash or e-cheques. They are designed in various forms of payments packed by a bank or a financial institution. E-tokens are of three types

1.Cash or real type: transactions are settled with exchange of electronic currency. An example of online currency is e-cash.

2. Debit or prepaid: Users pay in advance for the privilege of getting information. Examples of prepaid payment mechanisms are smart cards, electronic purses that store electronic money.

3. Credit or postpaid: the server authentication the customers and verifies with the bank that funds are adequate before purchase examples of postpaid mechanisms are credit or electronic cheques.

E-cash: E-cash is a new concept in online payment systems because it combines computersied convenience with security and privacy that improve all paper cash. Its versatility opens up a host of new market and applications.

E-cash focuses on replacing cash as a principle payment system in consumer oriented epayments. To displace cash the electronic payment systems need to have some qualities of cash that current credit and debit cards lack. Cash can be held and used by anyone even those who don't have an account in a bank and cash places no risk on the part of the acceptor that the medium of exchange may not be good.

Properties of E-cash: e-cash must have the following four properties.

1. Monetary value

2. Interoperability.

3. Retrievability.

4. Security.

Monetary value: e-cash must have monetary value. It must be backed by either cash bank authorized credit card or bank certified cashier cheque. When e-cash is created by one bank, is accepted by others reconsideration must occur without any problems.

Interoperability: E-cash must be interoperable i.e., exchangeable. It must be operatable in place of other e-cash, paper cash, goods and services, electronic benefit transfer etc.

Retrievability: E-cash must be storable and retrievable. Remote storage and retrieval would allow users to exchange e-cash from home or office or while traveling. The cash could be stored on a remote computers memory in smart cards or in other easily transported standard or special purpose devices.

Secuirty: E-cash may not be easy to copy or tamper with while being exchange. This includes preventing or detecting duplication and double spending. E-cash in action: E-cash is based on cryptography systems called digital signatures. This method involves a pair of numeric keys. One for locking(encoding) and the other for unlocking(decoding). Messages encoded with one numeric key can only be decoded with other numeric key.

Unit- III

UNIT – III Electronic Payment Systems and EDI

Types of Electronic payment systems – Digital token based system – Smart cards – Credit card based system – Risk factors – Designing Electronic payment systems. EDI – EDI Applications in business – Legal, Security and Privacy issues – Standardization in EDI – EDI software implementation - EDI envelope – VANs – Internet based EDI.

Types of Electronic Payment Systems

- Electronic payment systems are proliferating in banking, retail, health care, on-line markets, and even government—in fact, anywhere money needs to change hands.
- Organizations are motivated by the need to deliver products and services more cost effectively and to provide a higher quality of service to customers.
- The emerging electronic payment technology labeled electronic funds transfer (EFT).
- EFT is defined as any transfer of funds initiated through an electronic terminal, telephonic instrument, or computer or magnetic tape so as to order, instruct, or authorize a financial institution

EFT can be segmented into three broad categories:

- Banking and financial payments
  - Large-scale or wholesale payments (e.g., bank-to-bank transfer)
  - Small-scale or retail payments (e.g., automated teller machines)
  - Home banking (e.g., bill payment)
- Retailing payments
  - Credit Cards (e.g., VISA or MasterCard)
  - Private label credit/debit cards (e.g., J.C. Penney Card)

  - Charge Cards (e.g., American Express
- On-line electronic commerce payments
  - 1. Token-based payment systems
- Electronic cash (e.g., DigiCash)
- Electronic checks (e.g., NetCheque)
- Smart cards or debit cards (e.g., Mondex Electronic Currency Card))
  - 2. Credit card-based payments systems

Encrypted Credit Cards (e.g., World Wide Web form-based encryption)
Third-party authorization numbers (e.g., First Virtual)

1) Digital Token-Based Electronic Payment Systems

Electronic tokens are three types:

1. Cash or Real-time

Transactions are settled with exchange of electronic currency.

Ex: on-line currency exchange is electronic cash (e-cash).

2. Debit or Prepaid

Users pay in advance for the privilege of getting information.

Ex: prepaid payment mechanisms are stored in smart cards and electronic purses that store electronic money.

3. Credit or Postpaid

The server authenticates the customers and verifies with the bank that funds are adequate

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- before purchase.
- Ex: postpaid mechanisms are *credit/debit cards* and *electronic checks*.

Properties of Electronic Cash:

- There are many ways that exist for implementing an e-cash system, all must incorporate a few common features.
- Specifically, e-cash must have the following four properties:

1. Monetary value

2. Interoperability

3. Reliability

4. Security

Electronic Cash in Action

Electronic Cash is based on cryptographic systems called —digital signatures‖.

This method involves a pair of numeric keys: one for locking (encoding) and the other for unlocking (decoding). (Through public key and private key).

Purchasing E-cash from Currency Servers

The purchase of e-cash from an on-line currency server (or bank) involves two steps:

Establishment of an account and

Maintaining enough money in the account to bank the purchase.

Some customers might prefer to purchase e-cash with paper currency, either to maintain anonymity or because they don‘t have a bank account.

Using the Digital Currency

Once the tokens are purchased, the e-cash software on the customer‘s PC stores digital money undersigned by a bank.

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- The users can spend the digital money at any shop accepting e-cash, without having to open an account there or having to transmit credit card numbers.

- As soon as the customer wants to make a payment, the software collects the necessary amount from the stored tokens.

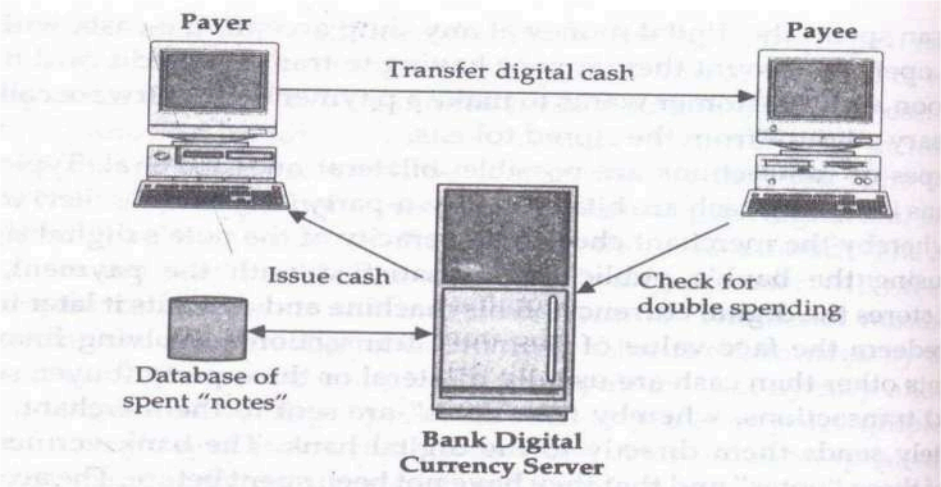

Figure 8.1 Detection of double spending

Electronic Checks

- It is another form of electronic tokens.
- In the given model shown in fig, buyers must register with third-party account server before they are able to write electronic checks.
- The account server acts as a billing service.
- The advantages are:

1. They work in the same way as traditional checks.
2. These are suited for clearing micropayments
3. They create float & availability of float is an important for commerce
4. Financial risk is assumed by the accounting server & may result in easier acceptance.

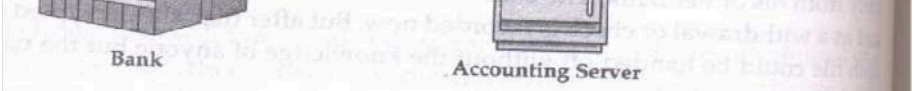

Figure 8.2 Payment transaction sequence in an electronic check system

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Smart Cards & Electronic Payment Systems

Smart cards have been in existence since the early 1980s and hold promise for secure transactions using existing infrastructure.

Smart cards are credit and debit cards and other card products enhanced with microprocessors capable of holding more information than the traditional magnetic stripe.

The smart card technology is widely used in countries such as France, Germany, Japan, and Singapore to pay for public phone calls, transportation, and shopper loyalty programs.

Smart cards are basically two types:

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– Relationship-Ba

– Electronic Purs
electronic mone

sed Smart Credit Cards

es, which replace money, are also known as debit cards and

Relationship-Based Smart Credit Cards

– It is an enhancement of existing cards services &/ or the addition of new services that a financial institution delivers to its customers via a chip-based card or other device

– These services include access to multiple financial accounts, valueadded marketing programs, or other information card holders may want to store on their card

- It includes access to multiple accounts, such as debit, credit, cash access, bill payment & multiple access options at multiple locations

Electronic Purses

• To replace cash and place a financial instrument are racing to introduce ―electronic purses‖, wallet-sized smart cards embedded with programmable microchips that store sums of money for people to use instead of cash for ~~everyth~~ing

The electronic purse works in the following manner:

It verifies card is authentic & it has enough money, the value is deducted from balance on the card & added to an e-cash & remaining balance is displayed by the vending machine.

Payment cards are all types of plastic cards that consumers use to make purchases:

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1. After purse is loaded with money at an ~~ATM~~, it can be used ~~to pay~~ for candy in a vending machine with a card reader.

2.

2) Credit Card-Based Electronic Payment Systems

– Credit cards

[redacted] ~~r's cr~~edit limit.
[redacted]

_ [redacted]

- Such as a Visa or a use

Debit cards

- Removes the transfers it to the seller‘s bank.

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Charge cards

MasterCard, has a preset spending limit based on the

amount of the charge from the cardholder‘s account and

- Such as one from American Express, carries no preset spending limit.

Advantages:

– Payment cards provide fraud protection.

– They have worldwide acceptance (nearly!).

– They are good for online

transactions. Disadvantages:

– Payment card service companies charge merchants per-transaction fees and monthly processing fees.

Payment Acceptance and Processing

- Open loop (such as VISA) and closed loop (such as American Express) systems will accept and process payment cards.

- A merchant bank or acquiring bank is a bank that does business with merchants who want to accept payment cards.

Software packaged with your electronic commerce software can handle payment card processing automatically.

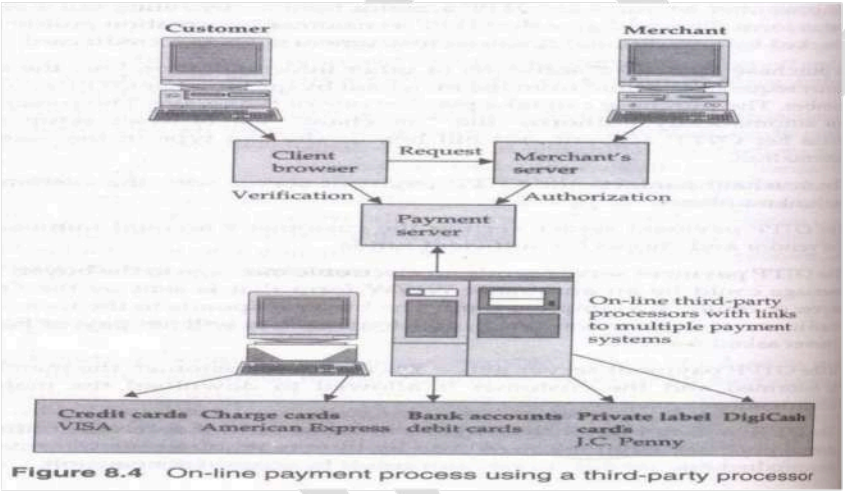

Figure 8.4 On-line payment process using a third-party processor

Electronic cash is a general term that describes the attempts of several companies to create value storage and exchange system that operates online in much the same way that government-issued currency operates in the physical world.

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- Concerns about electronic payment methods include:
  - Privacy
  - Security
  - Independence
  - Portability
  - Convenience

Electronic Cash Issues

- Primary advantage is with purchase of items less than £5
- Credit card transaction fees make small purchases unprofitable
- Facilitates Micropayments – eg for items costing less than £1
- Must be anonymous, just like regular currency
- Safeguards must be in place to prevent counterfeiting
- Must be independent and freely transferable regardless of nationality or storage mechanism.

Electronic Cash Storage

Two methods

- On-line

Individual does not have possession personally of electronic cash

Trusted third party, e.g. e-banking, bank holds customers' cash accounts

- Off-line
  - Customer holds cash on smart card or electronic wallet
  - Fraud and double spending require tamper-proof encryption

Risks in Electronic Payment systems

- Customer's risks
  - Stolen credentials or password
  - Dishonest merchant
  - Disputes over transaction
  - Inappropriate use of transaction details

Merchant‘s risk •

- Forged or copied instruments
- Disputed charges
- Insufficient funds in customer‘s account
- Unauthorized redistribution of purchased items

Main issue: Secure payment scheme

Electronic payments Issues

Secure transfer across internet

High reliability: no single failure point

Atomic transactions

Anonymity of buyer

Economic and computational efficiency: allow micropayments

Flexibility: across different methods

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- Scalability in number of servers and users

Designing Electronic Payment systems

It includes several factors:

- **Privacy**. A user expects to trust in a secure system; just as a telephone is a safe
- **Security.** A secure system verifies the identity of two-party transactions through ―user authentication‖ & reserves flexibility to restrict information/services through access control
- **Intuitive interfaces**. The payment interface must be as easy to use as a telephone.

- **Database integration**. With home banking, for ex, a customer wants to play with all his accounts.

Pricing. One fundamental issue is how to price payment system services. For e.g., from cash to bank payments, from paper-based to e-cash. The problem is potential waste of resources.

Standards. Without standards, the welding of different payment users into different networks & different systems is impossible.

Electronic Data Interchange

Electronic Data Interchange (EDI) - interposes communication of business information in standardized electronic form

Prior to EDI, business depended on postal and phone systems that restricted communication to those few hours of the workday that overlap between time zones

Why EDI

Reduction in transaction costs

Foster closer relationships between trading partners

- **Brokers.** A ―network banker‖-someone to broker goods & services, settle conflicts, & financial transactions electronically must be in place

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EDI & Electronic Commerce

- Electronic commerce includes EDI & much more
- EDI forges boundary less relationships by improving interchange of information between trading partners, suppliers, & customers

EDI & Electronic Commerce

- Electronic commerce includes EDI & much more
- EDI forges boundary less relationships by improving interchange of information between trading partners, suppliers, & customers

Benefits of EDI

Cost & time savings, Speed, Accuracy, Security, System Integration, Just-In-Time Support.

Reduced paper-based systems, i.e. record maintenance, space, paper, postage costs

Improved problem resolution & customer service

Expanded customer/supplier base or suppliers with no EDI program lose business

EDI layered architecture

Semantic (or application) layer

Standards translation layer

Packing (or transport) layer
Physical network infrastructure layer

EDI semantic layer:

Describes the business application

Procurement example

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    - Requests for quotes
    - Price quotes
    - Purchase orders
    - Acknowledgments
    - Invoices
- Specific to company & software used

Standards translation:

- Specifies business form structure so that information can be exchanged

Two competing standards

- American National Standards Institute(ANSI)X12
- EDIFACT developed by UN/ECE, Working Party for the Facilitation of International Trade Procedures

EDI transport layer

How the business form is sent, e.g. post, UPS, fax

Increasingly, e-mail is the carrier

Differentiating EDI from e-mail

- Emphasis on automation
- EDI has certain legal status

Physical network infrastructure layer

Dial-up lines, Internet, value-added network, etc.

EDI in Action

The fig shows the information flow when paper documents are shuffled between organizations via the mailroom

- When the buyer sends a purchase order, then relevant data extracted & recorded on a hard copy.
- This hard copy is forwarded to several steps, at last manually entered into system by the data entry operators
- This process is somewhat overhead in labor costs & time delays.

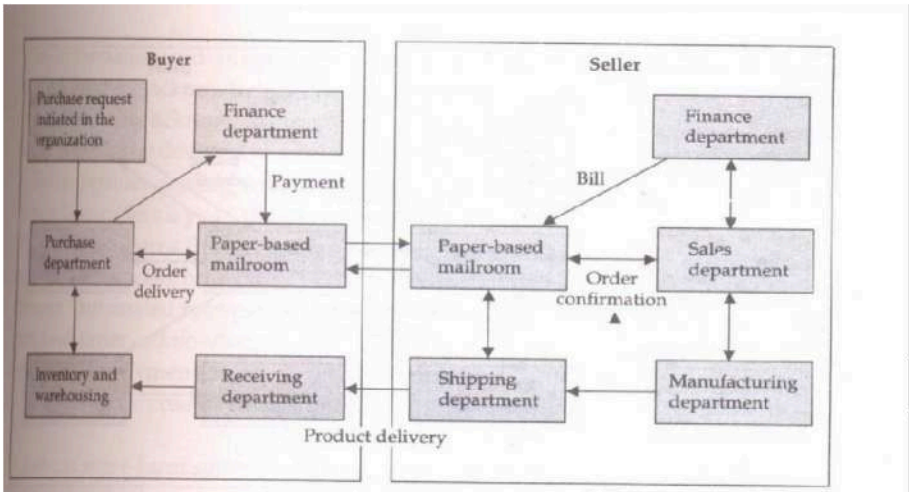

Figure 9.2 Information flow without EDI

EDI in Action

- Information flow with EDI are as follows:

1. Buyer sends purchase order to seller computer
2. Seller sends purchase order confirmation to buyer
3. Seller sends booking request to transport company
4. Transport company sends booking confirmation to seller

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5. p notice to buyer.
6. s status to seller.
7. ice to seller.
8. Seller sends invoice to buyer

9. Buyer sends payment to seller

Benefits of EDI

- Cost & time savings, Speed, Accuracy, Security, System Integration, Just-In-Time Support.
- Reduced paper-based systems, i.e. record maintenance, space, paper, postage costs
- Improved problem resolution & customer service
- Expanded customer/supplier base or suppliers with no EDI program lose business

EDI Applications in Business

Four different scenarios in industries that use EDI extensively:

1. International or cross-border trade
2. Electronic funds transfer
3. Health care EDI for insurance claims processing
4. Manufacturing & retail procurement

5. International or cross-border trade

- EDI has always been very closely linked with international trade.

Trade efficiency, which allows faster, simpler, broader & less costly transactions

Role of EDI in international trade

EDI facilitates the smooth flow of information

It reduces paper work

EDI benefits for international trade are

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1. Reduced transaction expenditures
2. Quicker movement of imported & exported goods
3. Improved customer service through “track & trace” programs
4. Faster customs clearance & reduced opportunities for corruption, a huge problem in trade

2. Interbank Electronic Funds Transfer (EFT)

- EFTS is credit transfers between banks where funds flow directly from the payer’s bank to the payee’s bank.
- The two biggest funds transfer services in the United States are the Federal Reserve’s system, Fed wire, & the Clearing House Interbank Payments System (CHIPS) of the New York clearing house

Automated Clearinghouse (ACH) Transfers

- ACH transfers are used to process high volumes of relatively small-dollar payments for settlement in one or two business days
- It provides services: preauthorized debits, such as repetitive bill payments; & consumer-initiated payments.

3. Health care EDI for insurance EDI

- Providing good & affordable health care is a universal problem
- EDI is becoming a permanent fixture in both insurance & health care industries as medical provider, patients, & payers

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- Electronic claim processing is quick & reduces the administrative costs of health care.

- Using EDI software, service providers prepare the forms & submit claims via communication lines to the value-added network service provider

- The company then edits sorts & distributes forms to the payer. If necessary, the insurance company can electronically route transactions to a third-party for price evaluation

- Claims submission also receives reports regarding claim status & request for additional information

4. Manufacturing & retail procurement using EDI

- These are heavy users of EDI

  In manufacturing, EDI is used to support just-in-time.

- In retailing, EDI is used to support quick response

Just-In-Time & EDI

- Companies using JIT & EDI calculates how many parts are needed each day based on the production schedule & electronically transmit orders.

- Delivery has to be responsive, or it will cost too much in money & time.

Getting data to suppliers quickly

A major benefit of JIT & EDI is a streamlined cash flow.

Quick Response & EDI

For the customer, QR means better service & availability of a wider range of products

For the retailer & supplier, QR may mean survival in a competitive marketplace

Much focus of QR is in reduction of lead times using event-driven EDI.

In QR, EDI documents include purchase orders, shipping notices, invoices, inventory position, catalogs, & order status

EDI: Legal, Security, & Privacy Issues

Legal Status of EDI Messages

- To understand the legal framework, let's take a look on three modes of communication
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- types: Instantaneous communication, delayed communication via the U.S. Postal Service (USPS), & delayed communication via non-USPS couriers;

1. Instantaneous. If the parties are face to face or use an instantaneous communication medium such as the telephone

2. Delayed (USPS). The "mailbox rule" provides that an acceptance communicated via USPS mail is effectively when dispatched

3. Delayed (non-USPS). Acceptances transmitted via telegram, mailgram, & electronic messages, are communicated & operable upon receipt.

Digital Signatures & EDI

- Digital signatures might be time-stamped or digitally notarized to establish dates & times

- If digital signatures are to replace handwritten signatures, they must have the same legal

status as handwritten signatures.

It provides a means for a third party to verify that notarized object is authentic.

EDI & Electronic Commerce

New types of EDI are traditional EDI & open EDI

Traditional EDI

It replaces the paper forms with almost strict one-to-one mappings between parts of a paper form to fields of electronic forms called transaction sets.

It covers two basic business areas:

1. Trade data Interchange (TDI) encompasses transactions such as purchase orders, invoice & acknowledgements.

2. Electronic Funds Transfer (EFT) is the automatic transfer of funds among banks & other organizations

It is divided into 2 camps: old EDI & new EDI.

Old EDI is a term created by those working on the next generation of EDI standards in order to differentiate between the present & the future.

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Old EDI

- Automating the exchange of information pertinent to business activity
- It is referred as the current EDI-standardization process where it allows every company to choose its own, unique, proprietary version

New EDI

- It is refocusing of the standardization process.
  In this, the structure of the interchanges is determined by the programmer who writes a program.
- It removes long standardization process.

Open EDI

- It is a business procedure that enables e-commerce to occur between organizations where

the interaction is of short duration.

It is process of doing EDI without the upfront trading partner agreement that is currently signed by the trading partners.

The goal is to sustain ad hoc business or short-term trading relationships using simpler legal codes.

It is a law of contract within the context of e-commerce where transactions are not repeated over long period of time.

Standardization & EDI

Standards translation

Specifies business form structure so that information can be exchanged

Two competing standards

- American National Standards Institute (ANSI) X12
- EDIFACT developed by UN/ECE, Working Party for the Facilitation of International Trade Procedures

Structure of EDI transactions

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  - Transaction set is equivalent to a business document, such as a purchase order
  - Data Segments are logical groups of data elements that together convey information
  - Data elements are individual fields, such as purchase order no.

Comparison of EDIFACT & X.12 Standards

- These are comprised of strings of data elements called segments.
- A transaction set is a set of segments ordered as specified by the standard.
- ANSI standards require each element to have a very specific name, such as order date or

invoice date.

EDIFACT segments, allow for multiuse elements, such as date.

EDIFACT has fewer data elements & segments & only one beginning segment (header), but it has more composites.

It is an ever-evolving platform

EDI Software Implementation

- EDI software has 4 layers:

1. Business application

2. Internal format conversion.

3. EDI Translator.

4. EDI envelope for document messaging

- These 4 layers package the information & send it over the value-added network to the target business, which then reverses the process to obtain the original information

EDI Business Application Layer

1. It creates a document, an invoice.

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2. Sends to EDI translator, reformats the invoice into an EDI standard.

3. If there are on the same type of computer, the data move faster.

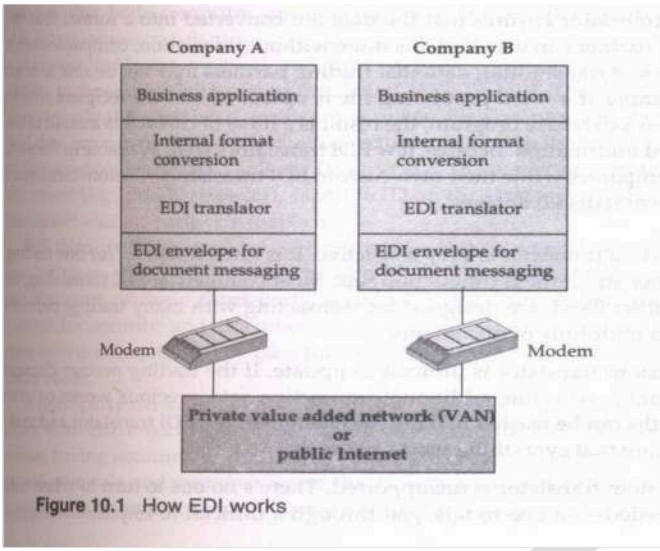

Figure 10.1 How EDI works

EDI Envelope for Message Transport

The X.400 & X.435 Envelopes

- The X.400 standard was meant to the universal answer to e-mail interconnectivity
- It promises much & to date, delivers little.
- The work on X.400 began in1980
- It is the open standard for mail interchange
- The standard exists in 3 versions: 1984, 1988, & 1992.

EDI Software Implementation

- The X.435 inserts a special field in an X.400 envelope to identify an EDI message
- It includes data encryption; integrity; notification of message delivery & non delivery; & Non repudiation of delivery.
- It is secure, reliable way to send EDI & accompanying files within the same message.
- Purchase orders, invoices, drawings, e-mail- all could be sent with end-to end acknowledgment of message receipt.
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Value-Added Networks (VANs)

- A VAN is a communication network that typically exchanges EDI messages among trading partners.

- It provides services, including holding messages in "electronic mailboxes", interfacing with other VANs

  Disadvantage is EDI-enabling VANs is that they are slow & high-priced, charging by the no. of characters transmitted.

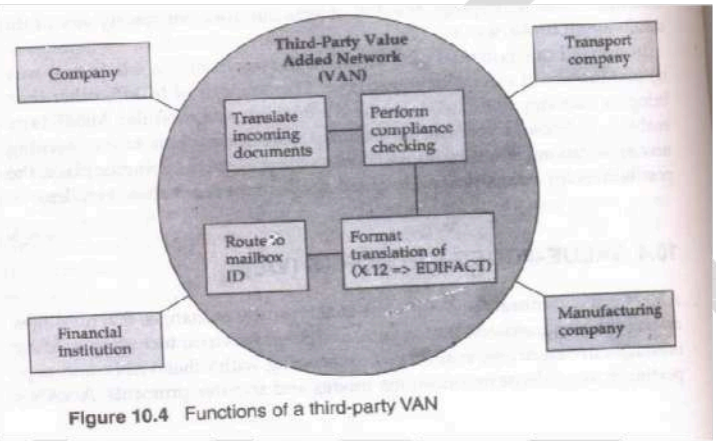

Figure 10.4 Functions of a third-party VAN

Internet-Based EDI

Several factors make internet useful for EDI:

Flat-pricing that is not dependent on the amount of information transferred

Cheap access with low cost of connection- often a flat monthly fee for leased line 0r dial-up access

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- Common mail standards & proven networking & interoperable systems
- Security--public-key encryption techniques are being incorporated in various electronic mail systems.

UNIT - IV

UNIT - IV Inter Organizational E-Commerce and Marketing

Internal Information Systems - Macro forces and Internal Commerce – Work-flow automation – Customization – SCM – Corporate Digital Library: Dimensions, Making a business case, Types of Digital Documents – Advertising on Internet – Charting the online marketing process – Market Research.

INTERORGANIZATIONAL ELECTRONIC COMMERCE

Internal commerce is the application of electronic commerce to processes or operations.

Specifically, we define internal commerce as using methods and pertinent technologies for supporting internal business processes between individuals, departments, and collaborating organizations. It is of two types

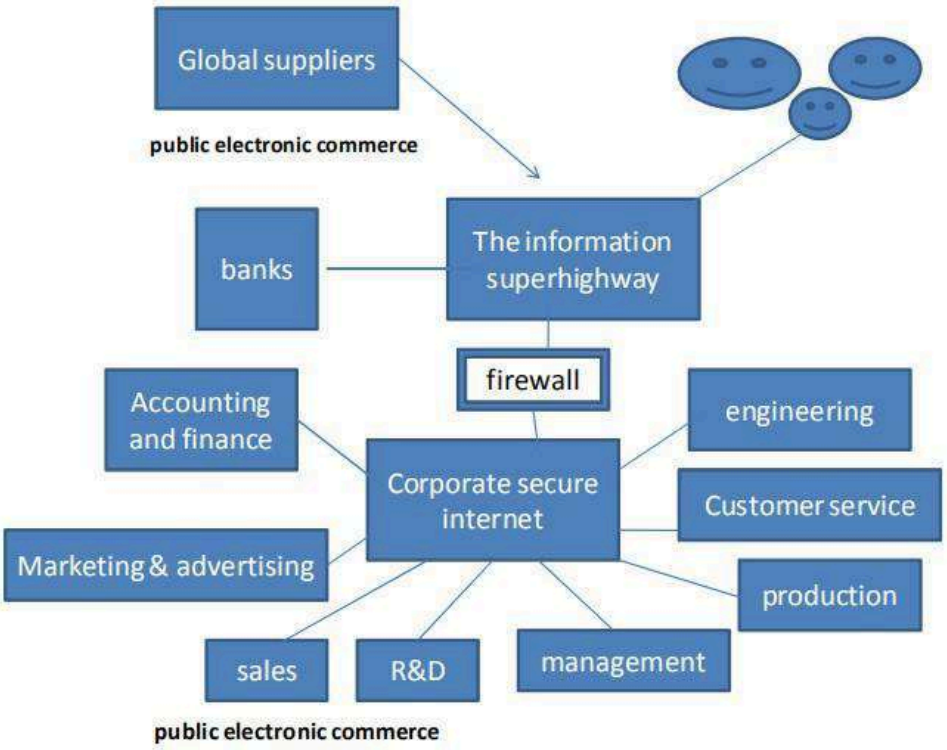
1. Private commerce
2. Public commerce

In a general sense, the term Information System (IS) refers to a system of people, data records and activities that process the data and

information in an organization, and it includes the organization's manual and automated processes.

In a narrow sense, the term *information system* (or computer-based information system) refers to the specific application software that is used to store data records in a computer system and automates some of the information-processing activities of the organization.

These forces are commanding a rethinking of the importance of the networks-computers and communications and their role in the better utilization of corporate information in operational and analytical decision making.



Information architecture (**IA**) is the art of expressing a model or concept of information used in activities that require explicit details of complex systems.

Among these activities are library systems, content Management Systems, web development, user interactions, data base development, programming, technical writing, enterprise architecture, and critical system software design.

Most definitions have common qualities: a structural design of shared environments, methods of organizing and labelling websites, intranets, and online communities, and ways of bringing the principles of design and architecture to the digital landscape

What Is Cross-functional Management?

Cross-functional management (CFM) manages business processes across the traditional boundaries of the functional areas.

CFM relates to coordinating and sneering the activities of different units for realizing thesuper ordinate cross-functional goals and policy deployment.

It is concerned with building a better system for achieving for achieving such crossfunctional goals as innovation, quality, cost, and delivery.

MACROFORCES AND INTERNAL COMMERCE

Macro forces and internal commerce highlights the changes taking place in organization structure and explores how technology and other economic forces are molding arrangements within firms.

The common focus in most of these modern management particles is the use of technology for improving efficiency and eliminating wasteful tasks in business operations.

Efficient operations of the macro forces and internal commerce are:

Total quality management

Business process improvement or business process reengineering.

The words improvement and reengineering are often used interchangeably, creating confusion.

Although the goal of these two are same i.e. productivity gains, cost savings, quality and service improvements, cycle-time reduction.

One main reason for reengineering is to better complete in global markets.

Global Markets: Definition and Characteristics Definition:

The Oxford University Press defines **global marketing** as "marketing" on a worldwide scale reconciling or taking commercial advantage of global operational differences, similarities and opportunities in order to meet global objectives." **Global marketing**:

When a company becomes a global marketer, it views the world as one market and creates products that will only require weeks to fit into any regional marketplace.

Marketing decisions are made by consulting with marketers in all the countries that will be affected. The goal is to sell the same thing the same way everywhere.

The Four elements of global marketing of marketing:

Product:

A global company is one that can create a single product and only have to tweak elements for different markets. For example coca-cola uses two formulas (one with sugar, one with corn syrup) for all markets.

Price:

Price will always vary from market to market. Price is affected by many variables: cost of product development (produced locally or imported), cost of ingredients, cost of delivery (transportation, tariffs, etc.), and much more. **Placement:**

How the product is distributed is also a country-by-country decision influenced by how the competition is being offered to the target market.

Using Coca-Cola as an example again, not all cultures use vending machines.

Promotion:

After product research, development and creation, promotion is generally the largest line item in a global company's marketing budget. At this stage of a company's development, integrated marketing is the goal. The global corporation seeks to reduce costs, minimize redundancies in personnel and work, maximize speed of implementation, and to speak with one voice.

Global marketing Advantages and Disadvantages

Advantages:

Economies of scale in production and distribution

Power and scope

Consistency in brand image

Ability to leverage good ideas quickly and efficiently .

Uniformity of marketing practices

Helps to establish relationships outside of the "political arena"

Disadvantages:

Differences in consumer needs, wants, and usage patterns for products

Differences in consumer response to marketing mix elements.

Differences in brand and product development and the competitive environment.

Differences in administrative procedures and Differences in product placement.

Marketing Research:

It involves the *identification*, collection, analysis, *and dissemination of information*.

Each phase of this process is important.

Finally, the findings, implications and recommendations are provided in a format that allows the information to be used for management decision making and to be acted upon directly.

It should be emphasized that marketing research is conducted to assist management in decision making and is not: a means or an end in itself.

Marketing Research Characteristics:

First, marketing *research is systematic*. Thus systematic planning is required at all the stages of the marketing research process.

The procedures followed at each stage are methodologically sound, well documentedas much as possibleplanned in advance.

Marketing research uses the scientific method in that data are collected and analyzed to test prior notions or hypotheses.

Marketing research is *objective*. It attempts to provide accurate information that reflects a true state of affairs. It should be conducted impartially.

An **organizational structure** is a mostly hierarchical concept of subordination of entities that collaborate and contribute to serve one common aim.

Organizations are a number of clustered entities. The structure of an organization is usually set up in one of a variety of styles, dependent on their objectives and ambience.

Organizational structure allows the expressed allocation of responsibilities for different functions and processes to different entities.

Common success criteria for organizational structures are:

-Decentralized reporting

-Flat hierarchy

-High transient speed -High transparency **Vertical Organization**:

Hierarchically structured organization where all management activities are controlled by a centralized management staff.

Vertical organization has two problems:

First, it creates boundaries that discourage employees in different departments from interacting with one another.

Second, departmental goals are typically set in a way that could cause friction among departments.

A **vertical market** is a group of similar businesses and customers which engage in trade based on specific and specialized needs.

An example of this sort of market is the market for point-of-sale terminals, which are often designed specifically for similar customers and are not available for purchase to the general public.

A vertical market is a market which meets the needs of a particular industry: for example, a piece of equipment used only by semiconductor manufacturers. It is also known as a niche market.

Vertical market software is software aimed at addressing the needs of any given business within a discernible vertical market.

Horizontal organization:

A **horizontal market** is a market which meets a given need of a wide variety of industries, rather than a specific one.

Examples

In technology, horizontal markets consist of customers that share a common need that exists in many or all industries.

For example, customers that need to purchase computer security services or software exist in such varied industries as finance, healthcare, government, etc.

Horizontal marketing participants often attempt to meet enough of the different needs of vertical markets to gain a presence in the vertical market.

An example could be software that manages services in hotels - amenities solutions.

Vertical organization Comparison with horizontal organization: A vertical market is a market which meets the needs of a particular industry: for example, a piece of equipment used only by semiconductor manufacturers.

A horizontal market is a market which meets a given need of a wide variety of industries, rather than a specific one: for example, word processing software.

New forms of organizational structure:

Two new forms of organizational structures are:

Prominent-virtual organizational structure:

In recent years, virtual enterprises have gained much attention as more and more firms from computer chip manufacturing to aircraft manufacturing.

Virtual organization is defined as being closely coupled upstream with its suppliers and downstream with its customers.

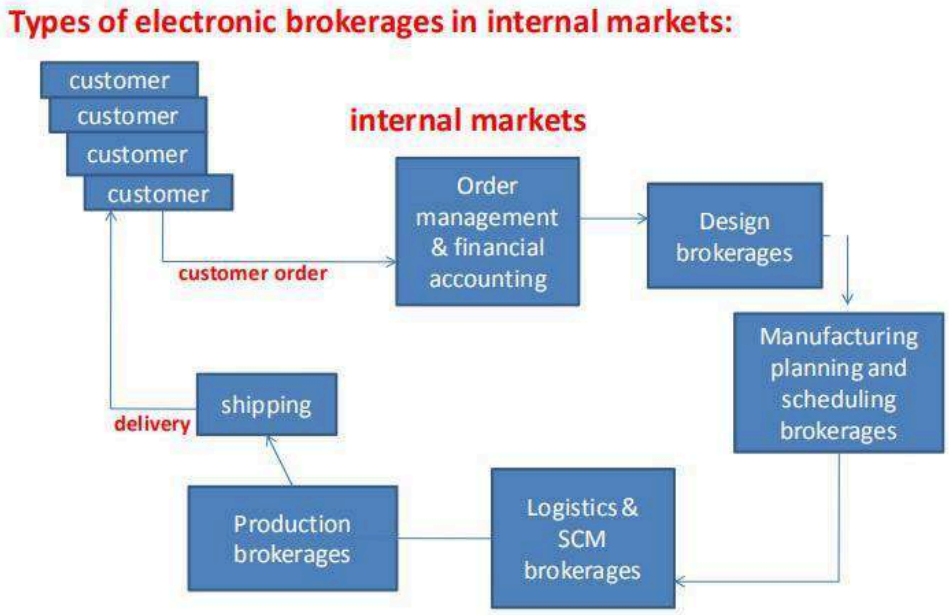
Virtual organization has been variously referred to as network organizations, organic networks, hybrid networks and value-adding partnership.

Brokerages organizational structure:

The main goal of electronic brokerages organization is to increase the efficiency of the internal marketplace.

Internal markets are beginning to appear not only in corporations but even in non business institutions like the government.

They are created inside organizations, allowing firms, suppliers, government agencies to meet the new challenges of the fast-changing environment.



WORK FLOW AUTOMATION AND COORDINATION

In last decade, a vision of speeding up or automating routine business tasks has come to be known as "work-flow automation.

This vision has its root in the invention of the assembly line and the application of Taylor's scientific management principles.

Today, a similar trend is emerging in the automation of knowledge-based business processes called work-flow automation.

The goal of work-flow automation is to offer more timely, cost-effective,and integrated ways to make decisions.

Typically, work-flows are decomposed into steps or tasks, which are task oriented.

Work-flows can be simple or complex.

Simple work-flows typically involve one or two steps or tasks.

Another way of looking at work-flow is to determine the amount of cross-functional activity.

In other words, companies must adopt an integrated process view of all the business elements

Organizational integration is extremely complex and typically involves three steps

Improving existing processes by utilizing technology where appropriate.

Integrate across the business function offer identifying the information needs for each process.

Integrating business functions, application program interface, and database across departments and groups.

Complex work-flows involve several other work-flows some of which Executes simultaneously.

Work-Flow Coordination:

The key element of market-driven business is the coordination of tasks and other resources throughout the company to create value for customer.

To this end, effective companies have developed horizontal structures around small multifunctional teams that can move more quickly and easily than businesses that use the traditional function-by-function, sequential approach.

Some of the simplest work-flow coordination tools are electronic forms routing applications such as lotus notes.

As the number of parties in the work flow increases, good coordination becomes crucial.

Work-flow related technologies:

Technology must be the "engine" for driving the initiatives to streamline and transform business interactions.

Large organizations are realizing that they have a middle-management offer all the drawn sizing and reorganization of fast few years.

Pressures for more comprehensive work-flow systems are building rapidly.

Work-flow system are limited to factory like work process.

Middleware is maturing:

By this users or third-party providers need to learn how to develop work-flow applications within middleware environment.

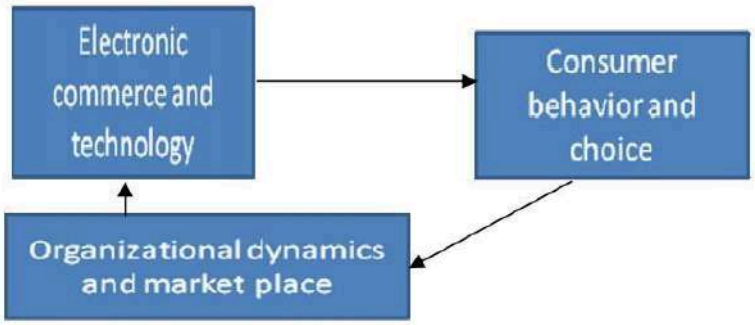
Organizational memory is becoming practical:

The new tools for memory becoming advancing towards what can be called the "corporate digital library".

CUSTOMIZATION AND INTERNAL COMMERCE

Technology is transforming consumer choices, which in turn transform the dynamics of the marketplace and organizations themselves. Technology embodies adaptability, programmability, flexibility, and other qualities so essential for customization.

Customization is explained as :



Mass customization, in marketing, manufacturing, and management, is the use of flexible computer-aided manufacturing systems to produce custom output.

Those systems combine the low unit costs of mass production processes with the flexibility of individual customization

"Mass Customization" is the new frontier in business competition for both manufacturing and service industries.

Implementation:

Many implementations of mass customization are operational today, such as softwarebased product configurations which make it possible to add and/or change functionalities of a core product or to build fully custom enclosures from scratch.

Companies which have succeeded with mass-customization business models tend to supply purely electronic products.

However, these are not true "mass customizers" in the original sense, since they do not offer an alternative to mass production of material goods.

Four types of mass customization:

Collaborative customization - Firms talk to individual customers to determine the precise product offering that best serves the customer's needs.

Adaptive customization - Firms produce a standardized product, but this product is customizable in the hands of the end-user.

Transparent customization - Firms provide individual customers with unique products, without explicitly telling them that the products are customized.

Cosmetic customization - Firms produce a standardized physical product, but market it to different customers in unique ways.

i. Most of the written materials and thinking about customization has neglected technology.

ii. It has been about management and design of work processes.

iii. Today technology is so pervasive that it is virtually impossible to make clear distributions among management, design of work and technology in almost all forms of business and industry.

iv. Technology has moved into products, the workplace, and the market with astonishing speed and thoroughness.

v. Mass customization, not mass production.

vi. Today the walls that separated functions in manufacturing and service industries alike are beginning to fall like dominoes.

vii. Customization need not be used only in the production of cars, planes, and other traditional products.

viii. It can also be used for textiles and clothing.

ix. Technology is also enabling new forms of customized production in apparel industry.

What is Supply chain?

Consists of all parties involved, directly or indirectly in fulfilling acustomer request.

SUPPLY CHAIN MANAGEMENT (SCM)

Supply chain management (SCM) is the management of a network of interconnected business involved in the ultimate provision of product and service packages required by end customers.

Supply Chain Management spans all movement and storage of raw materials, work-inprocess inventory, and finished goods from point-of-origin to point-of-consumption.

Supply Chain Management can also refer to supply chain management software which is tools or modules used in executing supply chain transactions, managing supplier relationships and controlling associated business processes.

The Management Components of SCM

The literature on business process re-engineering, buyer-supplier relationships, and SCM suggests various possible components that must receive managerial attention when managing supply relationships.

Lambert and Cooper (2000) identified the following components which are:

-Planning and control

-Work structure

-Organization structure

-Product flow facility structure

-Information flow facility structure

-Management methods

-Power and leadership structure

-Risk and reward structure
-Culture and attitude

Reverse Supply Chain Reverse logistics is the process of planning, implementing and controlling the efficient, effective inbound flow and storage of secondary goods and related information opposite to the traditional supply chain direction for the purpose of recovering

The Corporate Digital Library

Dimensions Of The Internal Electronic Commerce System

Marketing A Business Case For A Document Library

Types Of Digital Documents

Issues Behind Document Infrastructure

Corporate Data Warehouses

Dimensions Of The Internal Electronic Commerce System

These are the following dimensions for internal electronic commerce organization:

User modeling and interaction:

User models are interposing between the user interface and information sources to filter the available information according to the needs of the task and user.

It associates with each task or each person is a user agent or set of user agents.

Tasks of user agents are:

- Maintaining of model & current state of the task
- Determining of information for each step of the task -

Appropriate combining of information with user.

Addressing the issue of displaying information to the user.

Considering of wide range of display devices.

Determining the most appropriate methods for display. In this user agent tackle two issues:

1. Generation of documents 2. Presentation of documents.

Effective utilization of information

Organization decision making cannot be supported with a single tool, a set technology tools are required for effective utilization of information. Organization needs online –transactions for design, production, logistics and profitability.

Types of On-line transaction:

Two types of on-line transaction are :

1. On-line transaction processing (OLTP).
2. On-line analytical processing (OLAP).

OLTP involves the detailed, day-to-day procedures such as order entry & order management.

OLAP refers to the activity involved in searching the wealth of data residing throughout an enterprise for trends, opportunities. **Navigating the info sphere**

It involves two elated activities:

- Information search, discovery and retrieval.
- Presentation of retrieved Information.

Search, Discovery and Retrieval:

This view is changing in three ways.

1. Characterization of accessible information
2. Search concepts from this information.
3. Development of information filter

Presentation or visualization:

It is used for easy understanding of information.

Organization must predefine rules for visualization.

This process will highlight the trouble spots and area of opportunities.

Presentation increases the fallowing tasks of information :

1. Accessing ability of information.
2. Collecting of information.
3. Queue of information.
4. Organizing of information.

Digital Library Layer

Many organizations manage their information through corporate library, if it provide the architecture to model, map, integrate & information in digital documents is called digital library.

It provides information structures by this organizations &workers access vast amount of data encoded in multimedia formats.

Digital libraries are of two types:

1. Electronic document-based digital libraries.
2. Data-base oriented warehouses.

Document digital library:

The term document is used to denote all non data records I.e. books, reports, e-files, videos and audios.

Digital library is simply a distributed network of interlinked information.

Data warehouses:

It is a central repository for combining and storing vast amount of data from diff sources.
Sources are main frame database, lint-server database, text reportsetc.

Making A Business Case For Document Library

This section highlights the role that documents play in today's organization and how business can better meet their customers' needs by improving document management support.

Digital Document Management Issues and Concerns

Ad hoc documents: Letters, finance reports, manuals are called ad hoc documents, which are prepared by managers &professionals.

Process-specific documents: invoices and purchase orders which are created, constructed and distributed by support personnel. these are form based.

Knowledge-oriented documents: these are technical documents, catalogs of product information, and design documents. **Types of Digital Documents** Four types of digital documents are:

Structuring applications around a document interface Structuring interlinked textual & multimedia Documents.

Structuring and encoding information using document-encoding standards

Scanning documents for storage and faxing. **Document Imaging**

♦ Document imaging emulates microfiche and microfilm.

- An imaging system passes appear document through a scanner that renders it digital and then stores the digital data as a bit-mapped image of document.
- The problem with the imaging approach is that the output contains only images not text.
- The following imaging standards are prominently used:
- **TIFF** (tag image file format): format for interchange of bit-mapped images.
- **ITU-TSS** (international telecommunication union-telecommunication standardization sector) Group IV T.6 facsimile: this standard is used for compression and exchange of bit-mapped files.

Structured Documents

A structured document provides clear description of document content.
Structured documents apply data-base structuring capabilities to individual documents and document collections.
Standard for structured documents are:
SGML (Standard Generalization Markup Language):
It is an ISO standard for interchange & multi formatting description of text document in terms of logical structure.
ODA (Office Document Architecture):
It is an ANSI & ISO standard for interchange of compound office documents.ODA specifies both content & format.
CDA (Compound Document Architecture):
It defines set of rules for content and format .It defines services for compound documents.
RTF (Rich –Text Format):
It is developed by Microsoft for interchanging of desk top documents.

Hyper Text Documents

1. Hyper text is a way of making document-based information more mobile.
2. Reasons for mobility of information are:

   Information in enterprises is seldom located on server but is distributed throughout the organization.

   Accessing & retrieving large monolithic document is time consuming.

   Reuse of document for composing new documents is difficult task.

   In this relationships between documents can be represented through hypermedia links i.e. hyperlinks.

Standards of Hypermedia:

HyTime: it adds time based relationships like synchronization, it is extension of SGML.

HTML: developed by WWW to support distributed hypermedia. MHEG(multimedia /hypermedia encoding/exporting Group):standard for presenting objects in multimedia

Active documents

Active document represents what is known as document oriented computing.

Active document provide an interactive interface between documents.

Active documents are especially powerful because they combine composition of information with the distributed nature of information. Ex: spreadsheet, word-processing..etc **Document Constituencies:**

The emerging document processing & management strategies must address these constituencies.

They need system to access distributed repositories& to manipulate them in a number of ways.

Document-oriented processes

Components of Document-oriented processes are:

- Document creation
- Document media conversation(it accept multiple forms of input)
- Document production and distribution
- Document storage and retrieval **Document-based framework flows:**

The following Four activities make up the document-based framework flow:

Document modeling: it defines the structure and processes the document.

Transformation: creates modules for capturing and validating.

Synthesizing: create value-added information from the combination of two or more documents.

Business modeling: defines the structure and processes of the business environment.

Architecture of the data warehouse is as follows:

Data warehouse is used store information of the organization.

Data warehouse is needed as enterprise wide to increase data in volume and complexity.

Characteristics of data warehouse are:

i. An information-based approach to decision making.

ii. Involvement in highly competitive & rapidly changing markets. iii. Data stored in many systems and represented differently.

Functions performed by data warehouse are:

Allow existing transactions and legacy systems to continue in operation.

Consolidates data from various transaction systems into a coherent set.

Allows analysis of virtual information about current operations of decision support.

Types of data warehouses

There are four types of data warehouses:

Physical data warehouse: It gathers corporate data along with the schemas and the processing logics.

Logical data warehouse: It contains all the Meta data and business rules.

Data library: This is sub set of the enterprise wide data warehouse.

Decision support system (DSS): These are the applications but make use of data warehouse

Managing data

To manage data fallowing steps are needed:

Translation

Summarizing

Packaging

Distributing

Garbage collection

Advantages of data warehouse:

Timely and accurate information become an integral part of the decision-making process.

User can manage and access large volumes of in one cohesive framework.

Data warehousing has wide spread applicability.

It provides point-of-sales reports instead of end-of –day reports.

Advertising and Marketing on the Internet The new age of information-based marketing.

Advertising on the internet.

Marketing research.

The New Age of Information-Based Marketing

The new age of information-based marketing differentiate interactive marketing into four areas:

a. Retailers vs manufacturers
b. Target and micromarketing
c. Small business vs large business

d. Regulatory and legal implications of cyberspace marketing. **Retailer's vs Manufacturers:**

The role of Retailers and manufacturers are fast reversing in electronic commerce.

Retailer's vs Manufacturers have the fallowing methods:

Market research and customer prospecting.

Market presence method

Product or services building method

Information-based products pricing and priority method.

Target and Micromarketing:

Electronic commerce, technology has put target and micromarketing within the research of small business.

It gives information to the micro marketers not only about its own business but also consumer's information.

Consumer target is two-way flow of communication between seller and buyer.

Direct mail and telemarketing are two fast growing ways to micro market.

Technology is an essential tool in micromarketing.

There are two main types of micromarketing:

Direct-relationship micromarketing: is aimed at stimulating sales at retail establishments through direct contacts with consumers.

Direct-order micromarketing: is focused on selling products directly to consumers in their homes or businesses.

Small vs large: Thread avoid vs goliath syndrome

The key distinction between small and large business remains access to national and international marketing for advertising purposes.

Today, exorbitant advertising cost represents the barrier to reaching the customer effectively. Internet and other networks plays good role in advertising.

The major difference between the internet and other I-way advertising media are ownership and membership fees.

Due to the empowering effect of internet-facilitated advertising however, the balance of power between large and small companies may change in future.

Advertising on the Internet

The notion of advertising and marketing became inevitable after 1991 when the internet was opened for commercial traffic.

There are very good reasons for embracing the inevitability of growing of commercial advertising on the internet: - Advertising conveys much needed information

- Advertising generates significant revenue

Key components for making internet advertising effectively are:

Advertising process

Core content

Supporting content

Market and consumer research

Repeat customers

On-line advertising paradigms:

Two different advertising paradigms are emerging in the on-line world, they are:

1. Active or push-based advertising 2. Passive or pull-based advertising

Active or push-based advertising:

Active or push-based advertising is of two types they are :

The broadcast model:

Broadcasting message provides a means for reaching a great number of people in short period of time.

It mimics the traditional model, in which customer id exposed to the advertisement during TV programming.

It basically uses direct mail, spot television, cable television.

Text-based broadcast messages also used in advertising in Usenet news groups.

The junk mail model:

♣ Disadvantage of the direct mail include relatively high cost per contact.

♣ Junk mail is the just poorly targeted direct mail.

♣ It is most intrusive of all forms of internet advertising, because it is easily implemented using electronic mail.

♣ Junk mail creates unwanted expense as well as an annoyance.

Passive or pull-based advertising

Pull-based advertising provide a feedback loop, company and customers.

On-line pull-based advertising includes the following:

Billboards

Catalogs or yellow pages directories:

Endorsements

Based on the above three we have the fallowing models:

The billboards or www model:

Billboard advertising is often used to remind the customer of the advertising messages communicated through other media.

The advantage of this model is no customer charges.

In this message must be simple, direct.

Catalog and yellow pages directory model:

Traditionally, the most visible directory service of advertising is the yellow pages.

Catalog model is the least intrusive model but requires active search on the part of customer.

Yellow pages are low in cost in terms of production and placement.

Disadvantage of yellow page include lack of timeliness and little creative flexibility.

Customer endorsement model:

i. In endorsements people tell their experiences with products and services.

ii. These are in question and answer format.

Marketing Research

Market research is extremely important for companies in terms of how they allocate their advertising dollars in sales promotions, how they introduce new products, how they target new markets. Broadly marketing research is divided into three faces:

Data collection

Data organization

Data analysis and sense making

Data collection:

Markets mainly relied on source database for understanding consumer behavior.

Source data base mainly comprise of numeric information.

Delivery of source database services fallows two main patterns.

Data collect and collate data, making it available by data base producers.

Data collect and collate data, making it available by central hosts like CompuServe, American online..etc.

Data organization:

Everyone is collecting data from electronic commerce, but very few are organizing it effectively for developing a marketing strategy.

The key abilities in their environment are:

Leverage its established database into customized offerings by audience and markets.

Leverage its established database in terms of horizontal growth.

Data analysis and sense making:

The ability to link database to analytic tools like econometricprograms and forecasting models is called data analysis.

Market research is undergoing major changes; the next generation of source database will definitely include multimedia information.

UNIT - V

UNIT - V On-Demand Education and Software Agents Computer based Education and Training – Technological Components – Digital Copyrights and E-Commerce – History of software agents – Characteristics and Properties of Agents – Technology behind the Agents – Tele script Agent Language – Safe-Tcl – Software Agents in action –SGML.

CBE (Computer based Education):

A self-learning technique, usually offline/online, involving interaction of the student with programmed instructional materials. Computer Based Education (CBE) is an interactive instructional technique whereby a computer is used to present the instructional material and monitor the learning that takes place. CBE uses a combination of text, graphics, sound and video in enhancing the learning process. CBE refers to the use of the computer as a tool to facilitate and improve instruction. CAI programs use tutorials, drill and practice, simulation, and problem solving approaches to present topics and they test the student's understanding.

Origin of CBE :

Origin of CBE After the development of a small commercial computer in U.S.A to process census data – around 1960 Development of PLATO (Programmed Logic for Automatic Teaching Operations) - around 1964 Development of computerized tutorials in arithmetic and reading for elementary school children by Patrick Suppes of Stanford University in 1966 and in fact he is considered to be the father of CAI .

Basic assumptions of CBE :

Basic assumptions of CBE CBE is suitable for all type of teaching and learning activities. As the learners performance is going to be recorded automatically in the computer memory, immediate feedback can be provided to the learners by the teachers and also the teachers can use the data in making the best teaching strategy for the learner in future. CBE can be provided simultaneously even for thousands of students and thereby it facilitates individualized instruction.

Typical CBE provides :

Typical CBE provides Text or multimedia content Multiple-choice questions Problems Immediate feedback Notes on incorrect responses Summarizes students performance Exercises for practice Worksheets and tests.

Advantages of CBE:

Advantages of CBE one-to-one interaction great motivator freedom to experiment with different options Instantaneous response/immediate feedback to the answers elicited

Computer-based training:

Computer-based training According to the University of Massachusetts at Amherst : " The training that occurs solely on the computer with individuals interacting with a computer program to learn a given concept or training course." Computer-Based training (CBT) is, training that can be delivered by a computer , with or without additional aid from trainers . (Also called as computer based learning or web based training) CBT can be considered a sub-set of distance learning where students can learn on their own using materials provided by a school or commercial company as opposed to being in a classroom. Examples – ISDN Module.

Computer-based training:

CBT started almost as computers became common in large organisations. The initial applications tended to be training on the computer itselfjust like a modern tutorial in the help files of a PC-based application. A number of companies developed specialist hardware and software which could mix video and graphics to deliver realistic training simulations . IT allows the students interests, needs, strengthsand weaknesses to drive the learning processwith the instructor facilitating rather than dictating. The effectiveness of using IT in the classroom depends on the implementation , curriculum and the pedagogical approach used.

Basic Components for Creating and Delivering CBT:

Basic Components for Creating and Delivering CBT Learning Management System Authoring & Design Tools Delivery Systems Internet or intranet CD or DVD distribution LAN or local computer Knowledge Base (provided by content experts)

Digital Copyright:

Protecting Intellectual Property on the Internet is a 2000 book by Jessica Litman detailing the legislative struggles over the passage of the Digital

Millennium Copyright Act. It was widely reviewed and is generally cited as the definitive history of the DMCA's passageas well as an exemplar of the lobbying and jockeying around passage of contemporary copyright legislation. Karen Coyle noted thatthis is not a law book although it is about law. Digital Copyright is instead a social history of copyright law. It is not about the law but about how the technology developments of the 20th century changed how copyright law is crafted in the United States and who reaps the benefits.

By engaging in a scorched-earth campaign, the recording industry squandered some truly awesome assets it was unwilling to commit itself to an insecure digital standard that might become entrenched. Instead, it fought about whose patented security algorithm would become the new standard and it focused on herding all audio music off the Internet

Software Agents:

Although the theory of agents stated that agent is given a very famous with the growth of internet.

Software agents are a piece of software which works for the user. However software agent is not just a program.

An agent is a system situated within and a part of an environment that senses that environment and acts on it.

Over time in pursuit of its own agenda and so as to effect what it senses in the future Important use of agent concept is the tool for analysis not as dosage. As the system changes on can understand it.

History of software agents

The concept of an agent can be traced back to Hewitt's Actor Model (Hewitt, 1977)-"A self-contained, interactive and concurrently-executing object, possessing internal state and communication capability."

To be more academic, software agent systems are a direct evolution of Multi-Agent Systems (MAS). MAS evolved from Distributed Artificial Intelligence (DAI), Distributed Problem Solving (DPS) and Parallel AI (PAI) thus inheriting all characteristics (good and bad) from DAI and AI.

John Sculley’s 1987 “Knowledge Navigator” video portrayed an image of a relationship between end-users and agents. Being an ideal first, this field experienced a series of unsuccessful top-down implementations, instead of a piece-by-piece, bottom-up approach. The range of agent types is now (from 1990) broad: WWW, search engines, etc.

Characteristics of Software agents:

Software agents are like guards and locomotives of most E-Commerce.

The following are very few characteristics:

Software agents can do their task without any outsource intervention.

Social interaction with other software agents and human.

Software agents are specific in their goals.

Good software agent is the one which has the attitude to receive and adopt changes . The agent must be programmed in a powerful language so as to express the rules.

Safety of the information must be promised by the agent.

Effective usage of the existing resources.

Agent must be a good sailor

Agents must be very careful in handling unauthorized users. The same information must be accessed by the user to which they have right.

Properties of Software Agents:

- Autonomy: the ability to act autonomously to some degree on behalf of users for example by monitoring events and changes within their environment.
- Pro-activity: the ability to pursue their own individual set goals, including by making decisions.
- Re-activity: the ability to react to and evaluate external events and consequently adapt their behaviour and make appropriate decisions to carry out the tasks to help them achieve their goals.
- Communication and Co-operation: the ability to behave socially, to interact and communicate with other agents (in multiple agent systems (MAS)) i.e. exchange information, receive instructions and give responses and co-operate when it helps them fulfil their own goals.
- Negotiation: the ability to conduct organized conversations to achieve a degree of co-operation with other agents
- Learning: the ability to improve performance over time when interacting with the environment in which they are embedded

Types of Software agents:

Agents are classified into different types based on the characteristics they posses. In order to possess the above properties agents must have distinct features such as locomotion, integration, co-operation, information, stimulation, etc. For the same sake software agents are classified into 8 agents.

A) Collaborative agents: A collaborative agent is a software program that helps users solve problem, especially in complex or unfamiliar domains by correcting errors, suggesting what to do next, and taking care of low level details. Collaborative agents are also refereed as collagen. In spite of their behavior of autonomy, cooperation and learning, collagen punctuate the first two behaviors. In order to perform these they have to agree on acceptable protocols.

B) Interface agents: Interface agents are computer programs that employ machine learning techniques in order to provide assistance to a user dealing with a particular application . These agents take sufficient amount of time to understand and learn human behavior before they are onto work. In spite of their artificial learning thoughts they are limited co-operative with other agents .

C) Mobile agents: A mobile agent is an executing program that can migrate during execution from one machine to another in a heterogeneous network . Mobile agents are used to solve many problem of network computing with minimum bandwidth and connectivity . The theme behind these agents isgive program the ability to move. The main advantage of mobile agent over stationery agent are:

(a) This is not bound to the system where it begins execution.
(b) Can move from one system to another within the network.
(c) Both the state and code is transported.

D) Information/Internet agents: The intelligent part of software which can automatically search for information on the website is termed as information agents. Information system can be considered as knowledge base system. These agents are defined by what they do unlike collaborative agents or interface agents

E) Reactive agents: These agents are responsible for stimulating the response to the present state of the environment in which they are embedded. These agents interact with other agents in a very simple and basic way. The important things which support reactive agents.

(a) There is no prior specification of the behavior of these agents set since the dynamic interaction leads to the emergent complexity.
(b) Reactive agents are responsible for collection of modules which operate autonomously.
(c) Reactive agents tend to operate on representations which are close to raw sensor data .

(d) Intelligent behavior is the interaction of these agents with their environment.

(a) **Hybrid agents:** Combining two or more of the previous mentioned agent philosophies will yield a better functioning agent. E.g: Synergy of reactive and collaborative model. The expectation is that this hypothesis will come true.

(b) **Heterogeneous agents:** These agent systems unlike hybrid, refers to an integrated set up of at least two or more agents which belong to two or more different agent classes. These may also contain two or more hybrid agents .

(c) **Smarts agents:** The smart agents are the new form of software agents that interface with other agents forming an artificial intelligence. SMART stands for System for Managing Agents for Real Time. The key concept lies here is not the entire individual agent need be intelligent. But by working together in a smart way the agents form a type of emergent intelligence that may appears to exhibit intelligence.

Technology behind Software Agents:

The idea here is enabling the intelligent agent as an instantly connected computing service on the network . The use of WWW provides robustness and scalability of web servers; access of firewalls will alsobecome easier. Since Intelligent Software Agents (ISAs) include problem domains that require human-like intelligenceprocessing automated they need to have artificial human like intelligence.

In order to process this they need the knowledge of the techniques like Artificial Intelligence, Pattern recognition, neural networks, embedded systems, and similarly such high end knowledge. Software agents offer great promise to build loosely-coupled, dynamically adaptive systems on increasingly pervasive message-based middleware, P2P and component technology, Java, XML, SOAP, HTML, HTTP and CGI etc. It can be seen that the knowledge of software engineering and enterprise modeling is also required for software agents.

Tele script Agent Language

Tele script is generally oriented toward creating a common language for wireless.

To reduce the time needed for interactivity between client and server, telescript bundles into an intelligent program that travels to a distance computer retrievers answers to all the queries and then return with the answers. Thus results in two trips across the network a big saving in time, bandwidth and money.

In telescript agent is a program the user creates and send across a network a big saving in time, bandwidth and money. In telescript agent is a programme the user creates and send across a network. An agent carries out transactions on a telescript aware network in places. Places are the locations on the network.An electronic shopping center or a directory of services that correspond to telescript engine. Agent can travel from local places to remote place.

Working

Telescript is a interpreted language. The idea is using an interpreted language to transfer data. Telescript aims to bring the same interoperability to the networked would. Like postscript, it is an interpreted language.

Telescript comes in two types.
i) High telescript
ii)Low telescript

1. High telescriptfor users and programmershigh telescript has a computer language syntax and is compiled to low telescript just like normal computer languages.

2. Low telescript is used for computer processing.Is like assembly language used in normal computers and is harder for humans read but much easier for computers to work .

When generated, high telescript is sent to the local telescript engine which consists of a converter and the telescript interpreter. The converter translate high telescript to low telescript to the micro level language, which is the understandable format for the computer hardware.

Safe-Tcl

Safe-Tcl is a mechanism for controlling the execution of programs written in the Tcl scripting language. It allows untrusted scripts (applets) to be executed while preventing damage to the environment or leakage of private information. Safe-Tcl uses a padded cell approach: each applet is isolated in a safe interpreter where it cannot interact directly with the rest of the application. The execution environment of an applet is controlled by a trusted script running in a master interpreter. SafeTcl supports applets using multiple security policies within an application. These policies determine what an applet can do, based on the degree to which the applet is trusted. Safe-Tcl separates security management into well-defined

phases that are geared towards the party responsible for each aspect of security.

The Safe-Tcl security model has three particular strengths:

- Safe-Tcl separates untrusted code from trusted code, with clear and simple boundaries between environments having different security properties.
- Safe-Tcl does not prescribe any particular security policy and supports varying levels of trust. Instead, it provides a mechanism for implementing a variety of security policies and levels of trust. Organizations can implement different policies based on their needsand a single application can use different security policies for different applets.
- Safe-Tcl gains power and flexibility by using Tcl throughout as the scripting language. All configuration information is expressed as Tcl scripts, and the mechanisms for verifying trust, checking permissions and implementing policies are also expressed in Tcl.

Software Agents in action

The knowledge of an agent consists of information and protocols. Information is to be understood datasuch as user preferencesor data. A protocol consists of simple if then relationships or represents also complex neural networks. For the use of knowledge the agent needs the ability to think which is called agent machinery.

The agent machinery requires two things. The agent must assume events in its environment over sensors and it must combine the assumed events with its knowledge in a thought process . From this linkage the agent can draw conclusions. The agent can initiate autonomouslywithout intervention of the instructor and act through the actors.

The extension of the knowledge base results from learning processes. Learning is a behavior modification which is the result of an experience. A software agent learns using its learning machinery .

The agents execute their task by replicating themselves within a network from one computer to another computer.Agent-based e-business in E-Commerce can be defined as a business enabled and operated by software agent technology.

The primary roles in the agent-involved E-Commerce environment are played by users, agent-based e-business, existing e-business and other agents.

SGML (Standard Generalized Markup Language)

SGML (Standard Generalized Markup Language) is a standard for how to specify a document markup language or tag set. Such a specification is itself a document type definition (DTD). SGML is not in itself a document language, but a description of how to specify one. It is metadata.

SGML is based on the idea that documents have structural and other semantic elements that can be described without reference to how such elements should be displayed. The actual display of such a document may vary, depending on the output medium and style preferences. Some advantages of documents based on SGML are:

- They can be created by thinking in terms of document structure rather than appearance characteristics (which may change over time).
- They will be more portable because an SGML compiler can interpret any document by reference to its document type definition (DTD).
- Documents originally intended for the print medium can easily be re-adapted for other media, such as the computer display screen.

The language thatWeb browser uses, Hypertext Markup Language (HTML), is an example of an SGML-based language. There is a document type definition for HTML (reading the HTML specification is effectively reading an expanded version of the document type definition). In today's distributed networking environment, many documents are being described with the Extensible Markup Language (XML) which is a data description language (and a document can be viewed as a collection of data) that uses SGML principles.

SGML is based somewhat on earlier generalized markup languages developed at IBM, including General Markup Language (GML) and ISIL.

Standard Versions

SGML is an ISO standard: "ISO 8879:1986 Information processing – Text and office systems – Standard Generalized Markup Language (SGML)", of which there are three versions:

- Original SGML, which was accepted in October 1986, followed by a minor Technical Corrigendum.
- SGML (ENR), in 1996, resulted from a Technical Corrigendum to add extended naming rules allowing arbitrary-language and -script markup.
- SGML (ENR+WWW or WebSGML), in 1998, resulted from a Technical Corrigendum to better support XML and WWW requirements.

SGML is part of a trio of enabling ISO standards for electronic documents developed by ISO/IEC JTC1/SC34(ISO/IEC Joint Technical Committee 1, Subcommittee 34 – Document description and processing languages) :

- SGML (ISO 8879)—Generalized markup language ○ SGML was reworked in 1998 into XML, a successful profile of SGML. Full SGML is rarely found or used in new projects.
- DSSSL (ISO/IEC 10179)—Document processing and styling language based on Scheme.
  ○ DSSSLwasreworkedinto W3C XSLT and XSL-FO which use an XML syntax. Nowadays, DSSSL is rarely used in new projects apart from Linux documentation.
- HyTime—Generalized hypertext and scheduling. ○ HyTime was partially reworked into W3C XLink. HyTime is rarely used in new projects.

SGML is supported by various technical reports in particular

- ISO/IEC TR 9573 – Information processing – SGML support facilities – Techniques for using SGML
- In 2007, the W3C MathML working group agreed to assume the maintenance of these entity sets.