BALAJI INSTITUTE OF I.T AND MANAGEMENT KADAPA

4TH SEM

E-BUSINESS
(1-2.5 Units)

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SEMESTER-4

(17E00402) E-BUSINESS

Objective: The course imparts undertaking of the concepts and various application issues of e-business like Internet infrastructure, security over internet, payment systems and various online strategies for e-business.

1. **Introduction to e-business** : Electronic business, Electronic commerce, difference between e-business & e-commerce, electronic commerce models, types of electronic commerce, value chains in electronic commerce, E-commerce in India, internet, web based tools for electronic commerce. Electronic data, Interchange, components of electronic data interchange, electronic data interchange process.
2. **Security threats to e- business**: Security overview, Electronic commerce threats, Encryption, Cryptography, public key and private key Cryptography digital signatures, digital certificates, security protocols over public networks : HTTP, SSL, Firewall as security control, public key infrastructure (PKI) For Security.
3. **Electronic payment system**: Concept of money, electronic payment systems, types of electronic payment systems, smart cards and electronic payment systems, infrastructure issues in EPS, Electronic fund transfer.
4. **E-business applications and strategies**: Business models & revenue models over internet, emerging trends in e- business- governance, digital commerce, mobile commerce, strategies for business over web, internet based business models.
5. **E –business infrastructure and e- marketing**: Hard works system software infrastructure, ISP's, managing e-business applications infrastructure, what is e-marketing, e-marketing planning, tactics, strategies.

Text books:

- Dave Chaffey: e-business & e-commerce management- Pearson.
- e- commerce- e-business: Dr.C.S.Rayudu, Himalaya.

References:

- Whitley, David (2000) ,e-commerce strategy ,Technologies and applications.TMH.
- Schneider Gary P. and Perry, James T(1ST edition 2000) Electronic commerce, Thomson Learning.
- Bajaj, Kamlesh K and Nag, Debjani (1st edition 1999) ,e- commerce, The cutting edge of business, TMH Publishing company

UNIT-1

INTRODUCTION TO E-BUSINESS

1. E-BUSINESS

1.1 Introduction:

Commerce means the activity of buying and selling especially on a large scale.

- Commerce, the exchange of valuable goods or services, has been conducted for thousands of years.
- Traditionally, commerce involved bringing **Trader's, buyers and sellers** together in a physical market place to exchange information, products, services and payments.
- Today, many business transactions occur across a **telecommunications network (internet)** where buyers, sellers and others involved in the business transactions rarely see or know each other and may be anywhere in the world.

E-COMMERCE: E-Commerce is the process of buying and selling of products and services over internet or online services.

1.2 E-BUSINESS

E-Business is a broad concept, it includes buying and selling of products, finance, product development, HRM, Delivery of information, the providing of customer services before and after a sale, the collaboration with business partners and the effort to enhance productivity within organizations.

OR

E-business is the broader spectrum of business activities that can be conducted over internet.

- ICT (Information &Communication Technology): In E-Business ICT is used to enhance one's business. A business processes using technology to improve the way in business processes work.

Electronic Business

One of the first companies to use the term e-business was IBM in Oct 1997,which launched an e-business marketing campaign directed at selling services to companies that needed to connect their current electronic systems to the web.

The initial development of e-business transactions began more than thirty years ago when banks began transferring money to each other by using **Electronic Funds Transfer (EFT),** and when large companies began sharing transaction information with their suppliers and customers via **Electronic Data Interchange (EDI).** Using EDI, companies electronically exchange information that used to be traditionally submitted on paper forms, such as invoices, purchase orders, quotes and bills. This exchange occurs both with suppliers and customers. These transactions generally occur over private telecommunications networks called **valued-added networks** or **VANs**. Because of the expense of setting up and maintaining these private networks and the costs associated with creating a standard interface between companies, implementing EDI has usually been beyond the financial reach of small and medium sized companies. Today, companies of all sizes use a less expensive network alternative to VANs for the exchange of information, products, services and payments- the Internet. Global access to the internet and the web has changed the way people and businesses around the world communicate.

Almost a billion people worldwide use the internet to shop for products and services, listen to music, view artwork, conduct research, get stock quotes, keep up-to- date with current events, chat with each other, upload and download electronic files, send e-mail ,and much more.

1.3 E-Business and the Global Economy:

The widespread electronic linking of individuals and businesses around the world has created an economic environment in which time and space are no longer limiting factors; the business value of information is more important than before and information itself is more accessible; traditional business intermediaries are being replaced by new business intermediaries; and buyers are growing more powerful. In the past some large companies were able to conduct their business transactions electronically using EDI and private networks, but the high costs associated with EDI prevented most businesses

from using the technology. The internet has leveled the playing field by making it easier and cheaper for companies of all sizes to transact business and exchange information electronically.

As many of the business limitations of space and time disappear with the emergence of the internet, businesses that once had geographically limited customer and competitor bases are finding that the whole world is now both customer and competitor. In addition, one millions of companies that previously engaged in business transactions only during traditional hours now conduct those transactions online 24 hours a day, 7 days a week.

> According to a study by J.D. POWER and Associates, 64% of new vehicle buyers use online automotive information when making a purchase

E-business → The practice of servicing businesses or employees over the internet.

E-Commerce→The practice of running a business over the internet.

1.4 E-Business Advantages and Disadvantages:

Like buyers, sellers also benefit tremendously from the global e-business based economy. Sellers can increase sales and operations from local to worldwide markets, improve internal efficiency and productivity, enhance customer service, and increase communication with both suppliers and customers.

E-business advantages to buyers and sellers:

FOR SELLERS	FOR BUYERS
Increased sales opportunities	Wider product availability
Decreased costs	Customized and personalized information and buying options
24 hours a day, 7 days a week sales	24 hours a day 7 days a week shopping.
Access to narrow market segments	Easy comparison shopping
Access to global markets	Access to global markets
Increased speed and accuracy of information delivery	Quick delivery of digital products and information.
Data collection and customer preferences tracking.	Access to rich media describing products and services.

E-business disadvantages **to buyers and sellers:**

FOR SELLERS	FOR BUYERS
Growing competition from other e-businesses	Difficulty differentiating among so many online sellers.
Rapidly changing technologies	Unpredictable transaction security and privacy
Greater telecommunications capacity or bandwidth demands	Dealing with unfamiliar, possibly untrust -worthy, sellers.
Difficulty of integrating existing business systems with e-business transactions	Inability to touch and feel products before buying them
Problems inherent in maintaining e-business systems	Unfamiliar buying processes and concerns about vendor reliability
Global market issues: diverse languages, unknown political environments and currency conversions	Issues with state sales tax charges and logistical difficulties of product returns.

2. ELECTRONIC COMMERCE (E-COMMERCE):

2.1 Definition: E-Commerce is the process of buying and selling of products and services over internet or online services.

- E-commerce draws on technologies such as mobile commerce (m-commerce), Electronic Fund Transfer, Supply Chain Management, Internet marketing, online transaction processing, Electronic Data Interchange (EDI) and automated Data collection systems.
- Modern e-commerce typically uses the World Wide Web (WWW), e-mail etc.,
- Typically e-commerce transactions include the
  - ✓ Purchase of online books (Amazon)
  - ✓ Music purchases (music download)

2.2 Business Applications:

Some Common Applications Related To E-Commerce Are:

1. Conversational commerce (e-commerce via chat)
2. Digital wallet
3. Electronic tickets
4. Group buying
5. Instant messaging
6. Online banking
7. Online shopping
8. Order tracking
9. Social networking
10. Artificial intelligence

2.3 Government Regulation of E-Commerce

In India the information technology act 2000 governs the basic applicability of e-commerce.

2.4 The Process of E-Commerce

2.5 Advantages of E-Commerce:

- Fast buying/selling procedures ,as well as easy to find products
- Buying/selling 24/7

- No need of physical company setups
- Easy to start and manage a business
- Low operational costs and better quality of services
- Customers can easily select products from different providers without moving around physical.

2.6 Disadvantages of E-Commerce:

- Unable to examine products personally
- Not everyone is connected to internet
- There is a possibility of credit card theft
- Mechanical failures can cause unpredictable effects on the total process.

3. DIFFERENCE BETWEEN E-BUSINESS AND E-COMMERCE

E-COMMERCE	E-BUSINESS
The process of buying and selling of goods and services with electronic devices over the internet	E-business is the boarder spectrum of business activities that can be conducted over internet.
It is more appropriate in B2C context	It is used in the context of B2B
E-commerce is narrower concept and restricted to buying and selling.	It is a broader concept that involves market surveying supply chain and using data mining.
Network used – internet	Network used – internet, intranet & extranet.
They carry out commercial transactions	They carry out business transactions.
It is limited to monetary transactions	It includes monetary as well as allied activities
e-commerce usually requires the use of just a website	E-business involves the use of CRM's ERP's that connect different business processes.
Example: buying of pen drive from amazon.com is considered e-commerce	Example: Using of internet by Dell, Amazon for maintaining business processes like online customer support, e-mail marketing, and supply chain management.

4. ELECTRONIC COMMERCE MODELS

- A company business model is the way in which the company conducts business in order to generate revenue.
- Widespread access to the internet and the web is driving companies to adapt old business models and create new ones.
- E-business models are broadly categorized as,
  - Business to Consumer (B2C)
  - Business to Business (B2B)
  - Business to Government (B2G)
  - Consumer to Consumer (C2C)
  - Consumer to Business (C2B)

Business Models and Examples

MODEL	DESCRIPTION	EXAMPLES
B2C	Business to consumer: business sells products or services directly to consumers	Amazon.com Tattered cover book store eDiets.com
B2B	Business to business: Business sells products or services to other business or brings multiple buyers and sellers together in a central market place.	Airparts.com Jayde.com Rack space managed hosting
B2G	Business to government: Business sells to local, state, and federal agencies or creates a marketplace to bring government agency buyers and sellers together.	B2G market Scanplanet.com Supply core
C2G	Consumer to consumer: consumers sell or trade	eBay swapvillage.com

	directly with other consumers	
C2B	Consumer to business: consumers submit bills for products or service that competing business accept or decline.	Priceline.com

Explanation:

1. **Business to consumer (B2C):** consumers are increasingly going online to stop for and purchase products, arrange financing, prepare shipment and delivery of digital products such as software and get service after the sale.

A. **E-Retail:** B2C, e-business includes retail sales, often called **E-retail** of goods and services as well as online purchases of items such as online tickets, entertainment venue tickets, hotel rooms and shares of stock.

B. **Subscription model**: Some B2C e-businesses provide high-value content for a subscription fee. Example of e-businesses following a **subscription model** such as this include the wall street journal online (for financial news and articles), **consumer reports**(for product reviews and evaluations) and **eDiets**.com for nutritional counseling

C. **Virtual malls**: The B2C e-business category also includes virtual malls, which are e-business web sites that host a number of online merchants.

Example: MSN shopping and Yahoo! Shopping

D**. Pure-play e-retailers**: merchants that offer traditional or web specific products or services only over the internet, are sometimes called "virtual merchants" and they provide another variation on the B2C model

Example: amazon.com, a company that sells books, electronics, toys, music and more is one of the most successful original pure-play e-retailers.

2. **BUSINESS TO BUSINESS (B2B):**

- B2B e-businesses offer internet and web products such as website hosting and web page design, networking hardware and software, or e-business consulting services.

- Internet and web products
- Online trading community
- Forward and reveres auctions

- Another B2B model is an **online trading community** that acts as a central source of information for a vertical market.
- A "vertical market" is a specific industry in which similar products or services are developed and sold using similar methods.
- Examples of vertical markets include insurance, real estate, banking, heavy manufacturing and transportation.

- The information available at **online trading community** websites includes buyer's guide's, suppliers and product directories, industry news and articles, schedules for industry trade shows and events, and classified ads.
- Another subcategory within the B2B models is **a B2B auction**, where products and services are exchanged through **online bidding**.
- B2B auctions include both online forward auctions, where many buyers bid on products or services offered by a single seller, and online reverse auctions, in which a single buyer offers to purchase products and services from multiple competing sellers.
- One B2B auction site that offers both forward and reverse auction services for the retail, construction, travel and manufacturing industries is **hedgehog.**

3. BUSINESS TO GOVERNMENT (B2G):

- The e-businesses create a marketplace for sellers wanting do business with government agencies.
- B2G e-businesses provide information on govt contracting and bring suppliers and government agencies together.
- E-businesses such as Bid main and B2G markets follow the B2G E-business model.

4. CONSUMER TO CONSUMER (C2C):

In the consumer-to-consumers or **C2C** e-business model, consumers sell products, personal services and expertise directly to other consumers

through a number of methods: by placing online classified ads, by participating in forward & reverse auctions, or by making trades.

Examples, of e-business that involve consumers selling directly to consumers are American boat listing, an online boat listing service ;eBay, which offers both fixed price items and auctions:;Traderonline.com, which hosts classified ads; and AllExpoerts.com, an expert information exchange.

5. **CONSUMER TO BUSINESS (C2B):**
   - C2B, e-business model uses reverse auctions to enable consumers to name their own price for a specific good or service; once the bid is offered and accepted, it is often binding.
   - An e-business following the C2B model, collects an individual consumer's bid for a product or service, such as an air-line ticket, rental car, or hotel room, and then offers the bid to multiple competing sellers who either accept or decline the consumers bid.
   - The most well-known e-business following the C2B e-business model is priceline.com

5. TYPES OF ELECTRONIC COMMERCE

The term e-commerce however, can mean different things to different people, depending on how it is defined. For our purpose, however, e-commerce consists of the following three types.

1. Online promotion
2. Online ordering
3. Electronic shopping

Explanation:

1. **ONLINE PROMOTION**

Here the site can take the user through the purchasing decisions by allowing them to choose a colour and size of the product and then find out how much the total purchase with cost.

However, the actual purchase to be made offline. For instance, car company sites. In this case the website automatically informs the nearest

dealer of the enquiry including the purchasing decision date recovered from the web site interaction.

2. **ONLINE ORDERING:**

The client registers on the site and is given a secure user name and password. A website can now be used to initiate product delivery which is unique to that user. The most common use of this special information delivery is in giving price information over the internet. Depending upon the address of the registered website user, a different price currency appears on site.

3. **ELECTRONIC SHOPPING:**

For some categories of retail products, Internet shopping is now very easy. It allows customers to browse a website, choose the product they would like to and enter a credit card to order the product information of minute. Customers choose the delivery service they would like and the deal is done.

The latest shopping cart technology means the store can be opened for business 24 hours a day 365 days a year. Naturally, payment security is of paramount importance for both the vendor and the customer. It is possible to arrange secure payment systems that allow the use of credit cards across the net. The system also provides to integrate the internet sales date with traditional accounts stock and management systems, so that internet sales data and distribution are handled seamlessly.

6. VALUE CHAINS IN ELECTRONIC COMMERCE

E-BUSINESS VALUE CHAINS: Value chains are used to represent the value activities of any transaction starting with a product or service and ending with a customer.

A value chain for a product is the chain of actions that are performed by the business to add value in creating and delivering the product.

For Example, when you buy a product in a store or from the web, the value chain includes the business selecting products to be sold, purchasing the components or tools necessary to build them from a wholesaler or manufacturer, arranging the display, marketing and advertising the product and delivery the product to the client.

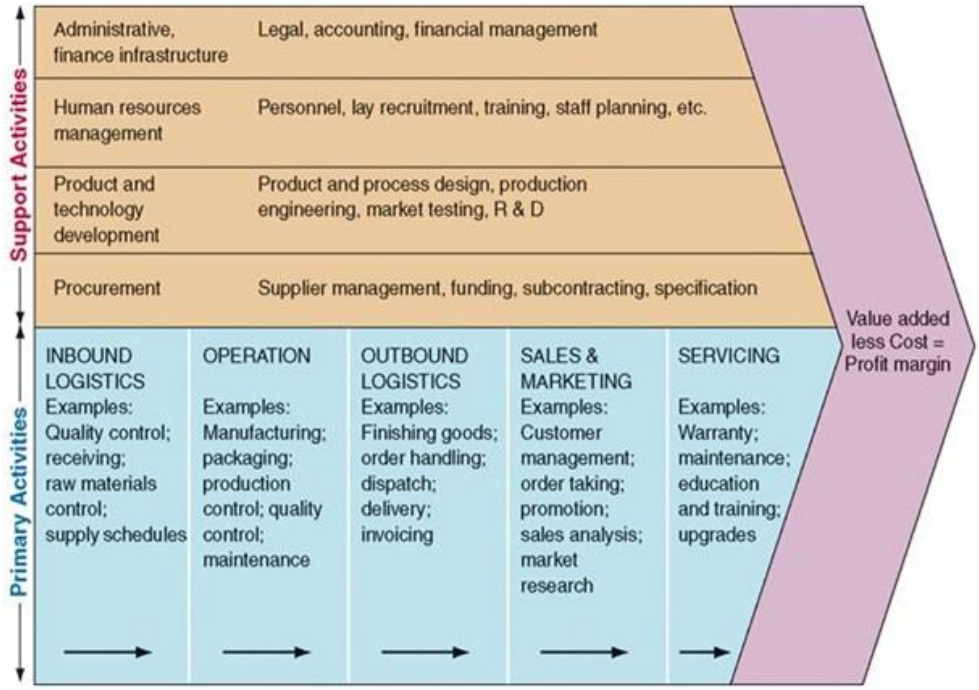


Figure: **PORTER VALUE CHAIN TEMPLATE**

The value chain model, as originally demonstrated by porter (1985), identifies **nine strategically relevant activities** that create value and reduce cost in a specific business.

- These nine value-creating activities consist of **five primary activities** and **four support activities.**
- The primary activities represent the sequences of, bringing **materials into the business** (inbound logistics), **converting them into final products** (operations), **and shipping out final products** (outbound logistics), **marketing** and **service.**
- The support activities **include procurement technology development Human Resource Management and firm infrastructure**.

- This model is very helpful for identifying specific activities in business where competitive strategies can be applied and where information systems are most likely to have a strategic impact.
- Successful implement of e-commerce in an organization should be based on a thorough understanding of the areas in the value chain where e-commerce can add value most.
- Among a host of critical areas/factors in the value chain that major organizations have taken into consideration for establishing a sound e-commerce strategy include

1. Role of intermediaries
2. Value pricing and
3. Brand

1. ROLE OF INTERMEDIARIES:

- Intermediaries may be more important now than even before because most of the rapidly growing internet businesses are essentially middle men.
- For example, companies such as Amazon, CD-Now, egghed.com, Cisco and e* trade can all be thought of as middlemen-resellers products providers by some other source.
- Intermediaries will continue to be important because they provide consumers with selection specialized distribution and expertise.

2. VALUE PRICING:

- In addition to employing e-commerce technology to enhance distribution channels, this technology is also used to redefine pricing strategies.
- Most companies pursuing a premium pricing strategy for example, can use the internet to better understand their customers.
- Value pricing involved several approaches.
- One approach to pricing involves businesses offering heavily discounted prices in attempt to attract customers to their websites.
- An attractive alternative approach is to utilize the internet to track customers buying habits and adjust prices accordingly, thereby uncovering new market segments.

3. BRAND DIFFERENTIATION/LOYALTY:

- Pricing is just one of several ways for a company to differentiate itself from the competition.

- Another way in which a company can differentiate itself is by promoting brand loyalty.
- Brand loyalty encourages repeat customers and help to create long term profitability.
- A major benefit of customer loyalty is that loyal customers often refer new customers to a supplier.

7. E-COMMERCE IN INDIA

1. **HIGHER COMMMERCE POTENTIALS**

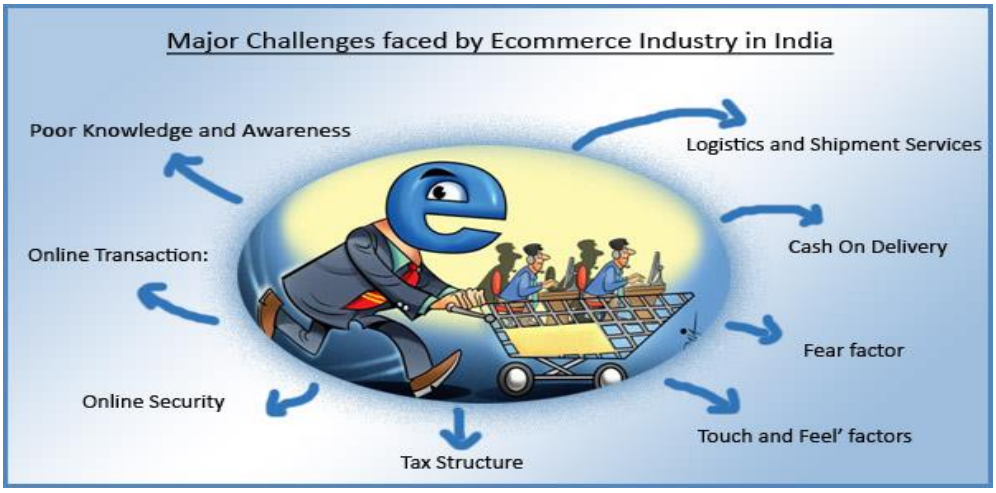
- Computer hardware
- Computer components
- Computer software
- Auto parts
- Apparel with brand authority

2. **MEDIUM E-COMERCE POTENTIAL**

- Sports goods
- Toys
- Specialty stores
- High ticket furniture(high cost item i.e.,house,car ,land etc.,)
- Jewelry
- White goods(large electrical goods-refrigerators, washing machines etc.,)
- Auctions(A public sale in which goods or property are sold to the highest bidder(person/organization making a formal offer)

3. **LIMITED E-COMMERCE POTENTIAL**

- Department stores
- Low ticket furniture
- Discount apparels
- Perishable goods (It is any product in which quality deteriorates due to environmental conditions through time..example: meat ,sea food, fish, fruits, vegetables, flowers, chemicals etc.,)
- Perfumes
- Low ticket immediate needs.



8. INTERNET:

8.1 Internet -A Brief History

- The internet has its origin in military operations for defence purposes whereby virtue of its operations, the military personnel are scattered geographically in different distant places.
- To facilitate reliable, accurate and timely communication network, the internet was designed for military use so that it is protected from disruption in case of destruction from a nuclear attack.

8.2 Internet -A Brief Indian History

- Strangely in India, the internet is the product of educational and research understandings i.e., ERNET (Education Research Network)
- Internet in India was establishes in the late 1980's
- The Videsh Sanchar Nigam Limited (VSNL), a Government of India enterprise, is India's international telecom carrier, has also contributed its might giving to the expansion of internet technology in India.
- This backbone network in India is known as VSNL's Gateway Internet Access network (GIAS)
- The present position of internet in India, the greatly published information super highway is accessible to anyone with time interest and curiosity.
- The last fifteen years have witnessed an explosion of the internet activity.

- The use of the internet is moving away from pure educational research to a network connecting millions of computers, many of which belong to companies using the Net for commercial purpose

8.3 Concept and Meaning:

- Internet is a conglomeration of a number of smaller networks and other inter connected machines distributed over the entire globe.
- Internet is a window to the global superhighway and to the cyber space.
- So it is a global system of connected independent groups of computers.
- It is the world's greatest democracy in terms of getting the information you as a net user require which is available at your discretion.
- Internet is a network of networks and a mother of all networks.
- It is a global network created by connecting these smaller networks with telephone lines.
- The internet helps to get in touch with anybody around the world at the cost of a telephone call, proving to be economically viable.
- Internet is the world's biggest software library, having opened doors to the vast amount of information available on the space information platform just by the click of a mouse.
- The internet is a two way communication method. (sender and the receiver)
- The main objective of the internet is to facilitate the participating users to have mutual exchanging of data- between the computers.

8.4 SOME OF THE E-COMMERCE WEBSITES

www.amazon.com

www.askmebazar.com

www.bookselleronline.com

www.ebay.in

8.5 Who owns and manages the internet

- The world is getting networked in a big way. Today there are millions of internet users the world over to whom it has become a means of cross

border transfer of information, it facilitates direct contact between the individuals, groups and institutions from different countries.

- Voluminous information available on the internet becomes available instantaneously, which can be accessible to millions of individuals.
- It may be mentioned that the net is not owned by any single individual or organization.
- The management and control of the internet is completely decentralized and it is entirely managed by individual and organizational volunteers.
- Every user pays for his part.
- Each network meets the expenditure for the installation and operating costs as well as those connecting up with the other networks.
- The internet is a cooperative environment and as a social as well as technical in essence catering to all segments of the society.
- It is the responsibility of the users to ensure the trust and loyalty of the community.

8.6 Information available on the internet:

1. Agriculture
2. Business and finance
3. Computer-literature
4. Education
5. Environment
6. Games
7. Geography
8. Health
9. History
10. Language
11. Libraries
12. News
13. Physics
14. Space
15. Technology
16. Travel
17. Weather

8.7 What to do on the internet?

1. Online news services
2. Shopping
3. Banking
4. Advertisements
5. Photography
6. Libraries
7. Medical health
8. Educational research
9. Listen to music
10. Daily news
11. Cultural information
12. Cyber payments
13. Histories
14. Medical health
15. Teaching
16. Payments

8.8 Applications

- E-mail
- Real time chatting
- telnet
- Archie
- Mosaic

8.9 Advantages of Internet

1. **FOR OPERATIONS**
   - It is cost effective
   - Saves time
   - Flexibility
   - Automation of operations
2. **FOR PLEASURE**

   The internet can be used at home,
   - To exchange electronic mail instantly with college friends and family members.

- To find educational tools
- To participate in group discussions on topics
- To entertainment purpose
- For shopping
- To read about interesting sports and leisure events and choice topics

3. **FOR BUSINESS**

- Communication on various projects
- Distribute software
- Market and sell product online.

9. WEB BASED TOOLS FOR E-COMMERCE

Learning Objectives: In this topic you will learn about

- Computers that support web servers
- Hardware requirements of typical web server software packages.
- Fundamental duties of a web server
- Specific web server software, including Apache, Microsoft internet information server, and Netscape enterprise server
- Advanced web server tools

Types of Web Sites

- Development sites
- Intranets
- B2B and B2C commerce sites
- Content delivery sites

Web Server Considerations

- The company must decide whether to run servers in-house or through third party web and e-commerce provides
- Scalability of e-commerce
- Contact web Host Guild (WHG) for help.

- Bandwidth of the web site.
- Consider a local third-party ISP.

Web platform choices

- A fast server is better than a slower one.
- Internal and external traffic to occur on the server
- Scalability of the server hardware.
- Hardware decisions go hand in hand with operating system and application server software choices.

Building a Scalable E-Commerce System

- Three layers in e-commerce systems

1. Web server layer
2. Middle-tier layer
3. Backend layer

- An application server is a middle-tier software and hardware combination that lies between the internet and a corporate backend server.

Web Server Performance

- Benchmarking is testing used to compare the performance of hardware and software
- Hardware and operating systems are key areas for benchmarking
- The speed of its connection can affect a web server's performance.
- Throughput and response time can measure a server's web page delivery capability.

Web Server Benchmarking Software

Web server benchmarking software types are listed below,

- Net bench

- Server bench
- SPEC SFS97
- SPEC web99
- WCAT
- Web bench
- Web stone

Web Server Cache

- A web server cache is a high-speed memory area set aside to store web pages.
- The cache can save time by filling client web page requests from high-speed memory whenever possible.

Web Server Software Features

- Web servers are located on the internet or intranets usually behind firewalls.
- The duties and features of web servers differ depending on whether they are publicly accessible.

Web server software program feature depends on the software package being used

Essential Capabilities of Web Server Program

- Security
- FTP
- Searching
- Data analysis

Web Site Management

- FrontPage has some site management capabilities.

- Home sites is a site management tool that validates graphics computes page download times for modem connection, validates links, and validates HTML codes.

Web Application Construction

- Application construction uses web editors and extensions to produce web pages.
- Some web development systems provide simple tools to create web pages.
- Some tools can be used to create dynamic features without the need to know CGI or use API coding.

Web Site Development

- Site development tools comprise features such as,

1. An HTML/visual web page editor
2. Software development kits
3. Web page upload support

- The best known of these tools are the HTML editors and visual web page editors.
- Examples include FrontPage, Dreamweaver, cold fusion, page mill, Hot Metal Pro, and Netscape composer.

Electronic Commerce

- An electronic commerce server deals with buying and selling of goods and services.
- A web server should support electronic commerce software.
- The best electronic commerce software will generate sales reports on demand allowing store managers to see updated sales information.

Web Server Software

- Two distinct web servers in the market: intranet servers and public web servers.
- Three of the most popular web server programs are,

1. Apache HTTP server
2. Microsoft internet information server
3. Netscape enterprise server

1. APACHE HTTP SERVER

- Apache HTTP server is free and performs very efficiently.
- Apache runs on many operating systems and the hardware that supports them.
- Apache has a built-in search engine and HTML authoring tools and supports FTP.
- Apache can be managed either from server console or a web server.

2. MICROSOFT INTERNET INFORMAITON SERVER (MIIS)

- IIS comes bundled with Microsoft's Windows NT server and 2000 server operating systems.
- IIS includes an integrated search engine.
- IIS supports FTP, permits administration from a remote browser.
- IIS combines HTML pages, Active X components, and script to produce dynamic pages.

3. NETSCAPE ENTERPRISE SERVER (NES)

- Netscape will migrate NES to planet to create the 64-bit server.
- The Netscape server runs on operating systems such as AIX, digital UNIX, HP-UX, Irix, Solaris, and windows NT.
- NES has a verity search engine in it.

- NES has Netscape directory server to provide basic security for discretionary access control.

Determining Web Server Information

- You can determine the type of hardware and software most web sites are running by visiting net craft.
- Net craft software examines the designated web site and returns both web server hardware and software information.

Other Web Server Tools

There are other tools that are part of web servers.

1. Portals
2. Search engines
3. Intelligent agents

Web Portals

- A web portal is a cyber door on the web.
- A portal serves as a customizable home base from which users do their searching navigating, and other activity.
- The portal loads automatically when it launches the web browser.

Customer Portals

- Examples of successful portals include about.com, amazon.com, excite, Netscape net center, and Yahoo!
- Most portals include: e-mail, links to search engines, links to membership services; news, sports, and business headlines and articles; personalized space, links to chat rooms, links to virtual shopping malls, and web directories.

Business Portals

- Most business portals can be accessed only by member enterprises.

- Business portals specialize in business commodities and materials such as steel, gasoline, or chemicals.
- Example of business portals are work.com, e-STEEL, foodUSA, TurboStaff.com, etc.

Search Engines

- A search engine is special kind of web page software that finds other web pages that match a word or phrase you entered.
- A web directory is a listing of hyperlinks to web pages that is organized into hierarchical categories.
- Search engines contain three major parts: spider, index and utility.

Intelligent Agents

- An intelligent agent is a program that performs functions such as information gathering, information filtering or mediation running in the background on behalf of a person or entirety.
- Examples of agent systems include auctionBot, Bargain Finder, Firefly, and Kasbah.

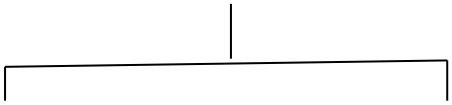
10. ELECTRONIC DATA, INTERCHANGE, COMPONENTS OF ELECTRONIC DATA INTERCHANGE, ELECTRONIC DATA INTERCHANGE PROCESS

10.1 Introduction

- Getting and sending orders, bills collections, payables, receivables, orders, invoices, freight bills, shipment instructions, trading reports, enquires, payment instructions, status reports and other information vital to various business operations are the routine business transactions.
- There are only two popular conventional systems which have been prevailing for a long period to perform these activities.
- They are postal services by postal authorities and telephone telegrams by the department of telecommunications.

- These two communications services are available for business transactions are traditional methods known for their cost, ineffectiveness and slack levels of performance.
- In order to solve the above problems, a new development has emerged in this area called **Electronic Business Data Communication**.

10.2 TYPES OF BUSINESS DATA TRANSFER SYSTEMS



Traditionally, the transfer of business data by the trading partner has been by paper document. There are two systems for business data interchange between trading partners. They are paper based system and electronic based system.

1. Paper-Based System

Traditionally data transfer from one business house to another has been carried out through paper documents. The documents have to be manually forwarded by postal services and entered into the destination computer. Hence it is called paper-based systems.

In the early days, transaction data has been interchanged through processor file transfer which is associated with problems like unwieldy, erroneous, error prone and inefficient transactions etc.

Disadvantages of Paper-Based System

1. TIME DELAYS
   - Transportation delay (mail system)
   - Manual processing delay (type re-type, re-enter the information)
   - Ordering delay (delay in transporting, payment delay, billing delays, poor customer services)
2. Labor cost
3. Errors
4. Inventory
5. Paper bond process
6. Time consuming process
7. Untimely analysis
8. Losing customers

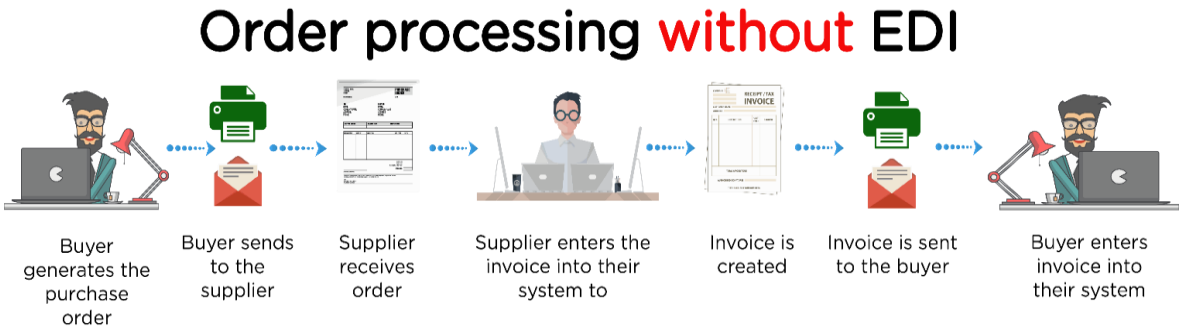
10.3 ELECTRONIC DATA INTERCHANGE (EDI)

In order to solve problems associated with the paper based business data in interchange system the alternate mechanism came in the form of electronic data interchange (EDI). The term in non technical usage simply means electronic interchange of data between computer systems of the various participants.

Definition: EDI is defined as the transfer of structured data of processing from computer to computer using agreed formats and protocol.

EDI is the interchange of standard formatted data between computer application systems of trading partners with minimal manual intervention.

- Electronic Data Interchange (EDI) is the computer-to-computer exchange of business documents in a standard electronic format between business partners.
- Companies use EDI systems to exchange business information automatically by computer as paperless transactions.
- EDI (Electronic Data Interchange) is a process for transferring information between systems using standardized electronic formats to enable computers to process the information while minimizing or completely eliminating the need for human intervention.
- Many business documents can be exchanges using EDI like:- purchase order, Invoices, advance ship notice, customer documents, inventory documents, payment documents, etc.
- EDI is used for B2B transactions that occur on a regular basis to a pre-determined format.



Order processing without EDI:

In a traditional B2B transaction, for example the purchaser:-

1) generates the purchase order,

2) Prints it, and

3) Mails or faxes the printed purchase order to the vendor.

- The vendor then :-

1) Prepares the invoice,

2) Prints it, and

3) Mails or faxes the invoice to the purchaser. Upon receipt of the invoice, the purchaser then has to input the invoice into his system to process and finalize the procurement.

Order processing With EDI:

- Paper documents are eliminated and human intervention is minimized. In the same transaction, the purchaser simply inputs the procurement details into his computer system, which sends it straight to the vendor's own systems. The invoice is automatically created in the vendor's computer

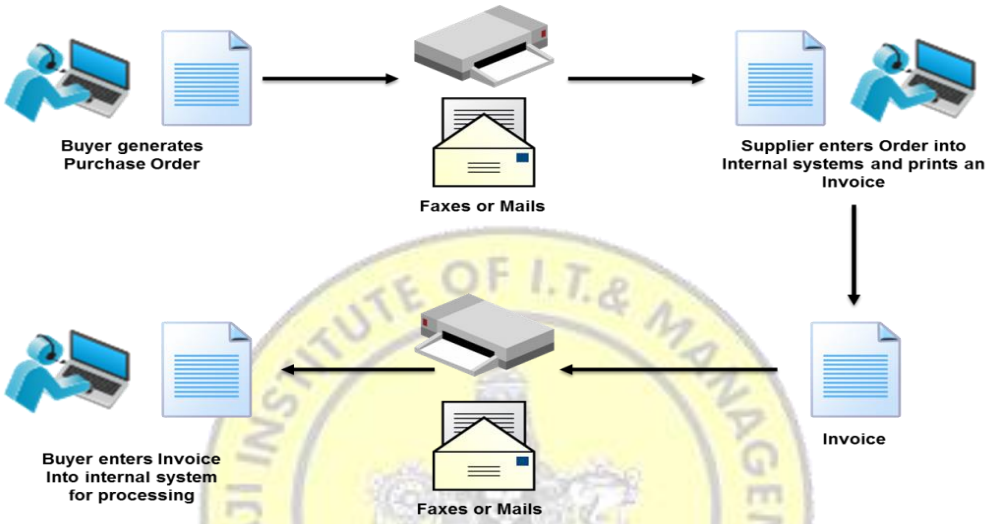
system and sends it straight back to the purchaser's system for processing.

A Traditional Document Exchange of a Purchase Order	An EDI Document Exchange of a Purchase Order
• This process normally takes between three and five days.	This process normally occurs overnight and can take less than an hour.
• Buyer makes a buying decision, creates the purchase order and prints it	Buyer makes a buying decision, creates the purchase order but does not print it.
• Buyer mails the purchase order to the supplier.	EDI software creates an electronic version of the purchase order and transmits it automatically to the supplier.
• Supplier receives the purchase order and enters it into the order entry system.	Supplier's order entry system receives the purchase order and updates the system immediately on receipt.
• Buyer calls supplier to determine if purchase order has been received, or supplier mails buyer an acknowledgment of the order.	Supplier's order entry system creates an acknowledgment an transmits it back to confirm receipt.

1. Computer-to-computer: EDI replaces postal mail, fax and email. While email is also an electronic approach, the documents exchanged via email must still be handled by people rather than computers.

Having people involved slows down the processing of the documents and also introduces errors. Instead, EDI documents can flow straight through to the appropriate application on the receiver's computer (e.g., the Order Management System) and processing can begin immediately.

A typical manual process looks like this, with lots of paper and people involvement:



The EDI process looks like this — no paper, no people involved:

2. Business partners

The exchange of EDI documents is typically between two different companies, referred to as business partners or trading partners.

For example, Company A may buy goods from Company B. Company A sends orders to Company B. Company A and Company B are business partners.

3. Business documents

These are any of the documents that are typically exchanged between businesses. The most common documents exchanged via EDI are purchase orders, invoices and advance ship notices. But there are many others documents

such as bill of lading, customs documents, inventory documents, shipping status documents and payment documents.

4. Standard format

- Because EDI documents must be processed by computers rather than humans, a standard format must be used so that the computer will be able to read and understand the documents.
- A standard format describes what each piece of information is and in what format (e.g., integer, decimal, mmddyy).
- Without a standard format, each company would send documents using its company-specific format and, much as an English-speaking person probably doesn't understand Japanese, the receiver's computer system doesn't understand the company-specific format of the sender's format.
- There are several EDI standards in use today, including ANSI, EDIFACT, TRADACOMS and ebXML. And, for each standard there are many different versions, e.g., ANSI 5010 or EDIFACT version D12, Release A. When two businesses decide to exchange EDI documents, they must agree on the specific EDI standard and version.
- Businesses typically use an EDI translator – either as in-house software or via an EDI service provider – to translate the EDI format so the data can be used by their internal applications and thus enable straight through processing of documents.

(17E00402) E-BUSINESS
Semester-4

Objective: The course imparts undertaking of the concepts and various application issues of e-business like Internet infrastructure, security over internet, payment systems and various online strategies for e-business.

1. **Introduction to e-business** : Electronic business, Electronic commerce, difference between e-business & e-commerce, electronic commerce models, types of electronic commerce, value chains in electronic commerce, E-commerce in India, internet, web based tools for electronic commerce. Electronic data, Interchange, components of electronic data interchange, electronic data interchange process.
2. **Security threats to e- business**: Security overview, Electronic commerce threats, Encryption, Cryptography, public key and private key Cryptography digital signatures, digital certificates, security protocols over public networks : HTTP, SSL, Firewall as security control, public key infrastructure (PKI) For Security.
3. **Electronic payment system**: Concept of money, electronic payment systems, types of electronic payment systems, smart cards and electronic payment systems, infrastructure issues in EPS, Electronic fund transfer.
4. **E-business applications and strategies** : Business models & revenue models over internet, emerging trends in e- business- governance, digital commerce, mobile commerce, strategies for business over web, internet based business models.
5. **E –business infrastructure and e-marketing**: Hard works system software infrastructure, ISP's, managing e-business applications infrastructure, what is e-marketing, e-marketing planning, tactics, strategies.

Text books:

- Dave chaffey :e-business & e-commerce management- Pearson.
- e- commerce- e-business :Dr.C.S.Rayudu, Himalaya.

References :

- Whitley, David (2000) ,e-commerce strategy,Technologies and applications.TMH.
- Schneider Gary P.and Perry, James T(1ST edition 2000) Electronic commerce, Thomson Learning.
- Bajaj, Kamlesh K and Nag, Debjani (1st edition 1999) ,e- commerce, The cutting edge of business,TMH Publishing company

UNIT-2
SECURITY THREATS TO E-BUSINESS

1. SECURITY OVER VIEW

1.1 Introduction: E-Commerce is still a young industry that is growing fast and has not experienced security as a high priority area.

- The Industry in turn is a sophisticated way of doing business.
- The internet where e-commerce is operated, is very much an environment where networks and computers participate by playing by rules.
- But some unethical hackers are breaking the rules to cause privacy & Security problems.
- The industry requires an instantaneous solution to these problems caused by hackers.

1.2 Security Concepts:

- Internet business requires privacy and security
- Today, there seems to be boom on e-commerce requiring a secured defense.
- The rise in e-commerce has led to the need of privacy, security and a strong crypto (secret)
- Public crypto is important for online application
- An authentication through a digital signature is an essential feature pertaining to online security
- E-Commerce is establishing itself in India including a presence in the international business scenario and trade globally – this call for strategies assuring online security.

❖ **To protect :**

- National Security,
- Public Safety,
- Personal Privacy,
- To support online commerce

without interruption

- At the heart of the problem, in every business, there is the fear of loss of privacy, lack of security for monitoring electronic transactions from snooping (action of trying to find out something, especially information about someone's private affairs), spying (the activity of trying to obtain

secret information from organizations) and capturing virtually any data transmission online and through cellular phones.

- **Security becomes challenge to:** ***Designers, Researchers, System Managers, Govt., Software Developers, users.***
- A businessman needs data available online to be securely stored yet readily accessible by him, his customers and business partners.
- ***Privacy, Identity, Non-refutability*** are the three essential requirements for successful e-commerce.
- Thus, in the current scenario of e-commerce, online security and privacy has become a much talked about issue. Since internet is easy to access and cheap to use, the confidence in security of messages and data online is of serious concern.

1.3 Security:

- The term security with reference to the message or information put on transmission through the net is protection from danger of data being phone to accidental or intentional.
- Destruction, disclosure, modification or alternation in the original message before it reaches the receiver.
- If involves measures taken to prevent spying and attacks, which proves detrimental to the original message.
- In recent years, the use of the Net is rapidly growing, for reasons of efficiency, more and more corporate and financial institutions have started networking with both LAN and WAN to improve their efficiency.
- Sound and Vital decisions are taken based on the information available to the decision maker through these networks.
- So, it is more important that an appropriate level of secrecy, security and privacy is maintained with reference to this information.
- **Security means –** providing assurance of privacy, identity and non-refutability for e-commerce data information exchange as well as managing the security itself.
- To build up an effective digital commerce the growing problems of security, privacy, retaining the identity of customers and non-refutability (prove to be true) must be solved in order to build up an effective digital commerce.

1.4 Survey finding on security:

- 56 percent of the surveyed respondents said that information security was high priority.
- Only 19 percent has complete security policy
- 49 percent admitted that they do not know whether inadequate online security caused monetary lose.
- The biggest threat remains internal
- The authorized respondents were believed to be responsible 58 percent of the time
- Unauthorized employees -24 percent.
- Former employees - 13 percent.
- Hackers or terrorists expressed 13 percent.
- Competitors accounted for 3 per cent.

In a survey of 1600 IT executive from 50 nations, 13 percent reported some security breach or corporate espionage.

2. ELECTRONIC COMMERCE THREATS

- The world today is coming closer from communicating to one person sitting at the other end of the world to finalizing business deals; everything has become fast and quick.
- The **reason** for this is the massive internet boom which has made life easier for the average person by providing a plethora (a large or excessive amount) of options.
- What's more it has also made your shopping experience a more interesting and enjoyable one.
- You can now get practically everything from online shopping.

E-Commerce Security: E-Commerce Security is protection of the various e-commerce assets from unauthorized access, its use or modification.

E-Commerce Threat: In simple words, you can say that using the internet for unfair means with an intention of stealing, fraud and security breach.

Types of e-commerce threats:

- There are various types of e-commerce threats. Some are accidental, some are purposeful, and some of them are due to human error.
- The most common security threats are phishing attacks, money thefts, data misuse, hacking, credit card frauds and unprotected services.

1. **Inaccurate Management**
2. **Price Manipulation**
3. **snowshoe Spam**
4. **Malicious Code threats**
    a. **Viruses**
    b. **Worms**
    c. **Trojan horses**
5. **Hacktivism**
6. **Wi-Fi Eavesdropping**
7. **Other threats**

Explanation:

1. **Inaccurate Management/Poor Management**: When security is not up to the mark it poses a very dangerous threat to the networks and systems. Also security threats occur when there are no proper budgets are allocated for purchase of anti-virus software licenses.
2. **Price Manipulation:** Modern e-commerce systems often face price manipulation problems. It allows an intruder to slide or install a lower price into the URL and get away with all the data.
3. **Snowshoe spam:**

- Almost each one of us deals with spam mails in our mail box.
- A spam is something which is sent by one person, but unfortunately a new development is taking place in the cyber world. It is called as **snowshoe spam.**
- Unlike a regular spam it is not sent from one computer but is sent from many users.
- In such a case it becomes difficult for the anti-spam software to protect the spam messages.

4. **Malicious code threats**: These code threats typically involve viruses, Worms, Trojon horses.
    a. **Viruses:** Viruses are normally external threats and can corrupt the files on the website if they find their way in the internal network. They can be very dangerous as they destroy the computer systems completely and can damage the normal working of the computer.
    b. **WORMS:**

- These are serious than viruses.
- If places itself directly through the internet

- If can infect millions of computers in a matter of just few hours.

c. Trojan Horse: It is a programming code which can perform destructive functions. They normally attack you computer when you download something.

- So always check the source of the downloaded file.

5. Hacktivism: (Hacking Activism)

- At first it may seem like you should hardly be aware of this cyber threat
- It is typically using social medical platforms to bring to light social issues.
- It can also include flooding an email address with so much traffic that it temporarily shuts down.

6. Wi-Fi Eave dropping:

- It is also one of the easiest ways in e-commerce to steal personal data.
- It is like a "Virtual listening" of information which is shared over a wi-fi network which is not encrypted.
- It can happen on public as well as on personal computers.

7. Other threats: Some of the other threats which include are

a) Data Packet sniffing (sniffers)
b) IP spoofing
c) Port scanning

a) Data Packet sniffing: An intruder can use a sniffer to attack a data packet flow and scan individual data packs.

b) IP spoofing: with IP spoofing it is very difficult to attack to track the attackers. The purpose here is to change the source address and give it such a look that it should look as though it originated from another computer.

c) Port scanning: Port scanning refers to the surveillance of computer ports, most often by hackers for malicious purposes. Hackers conduct port-scanning techniques in order to locate holes within specific computer ports. For an intruder, these weaknesses represent opportunities to gain access for an attack. There are 65,535 ports in each IP address, and hackers may scan each and every one to find any that are not secure.

SECURITY FEATURES

Ways to combat e-commerce threats: Developing a through implementation plan is the first step to minimize a cyber threat.

3. ENCRYPTION

It is the process of converting a normal text into an encoded text which cannot be read by anyone except by the one who sends or receives the message.

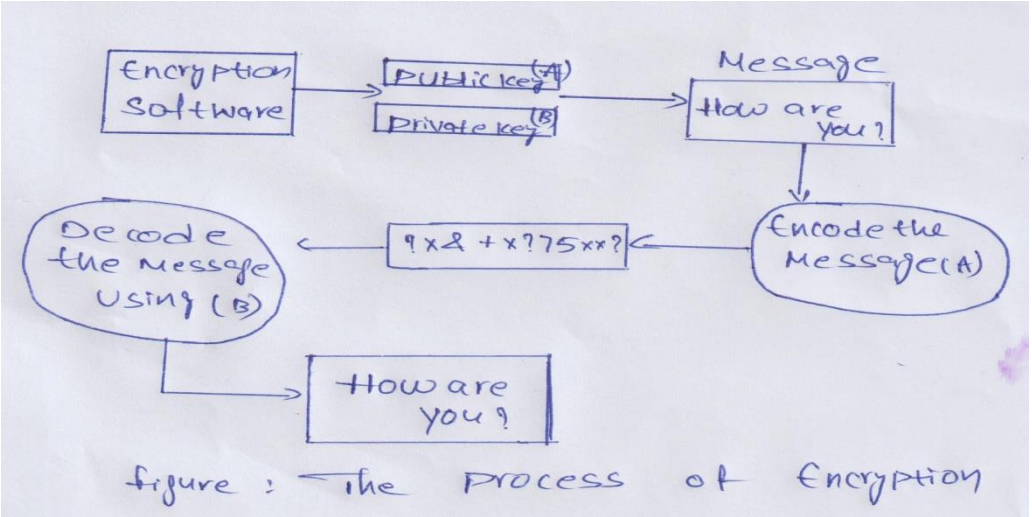


figure : The process of Encryption

3.1 Origin: The encryption concept, as we are taking today in the context of e-commerce on the internet was initially used for defense purpose for LANS

- With the advancement in sophisticated technology, it rapidly developed into a delicate science called **cryptography.**
- Nearly more than 2000 years ago, Julius Caesar used a simple cipher system for the purpose of concealing military information.
- This type of encryption can be broken and can easily be defected by trying all possible displacement till the message becomes plain and meaningful.
- For instance, consider replacing the letters of alphabets in the original text by letters that are a predetermined number of places away.
- Thus, the plain and cipher letters may look as follows.

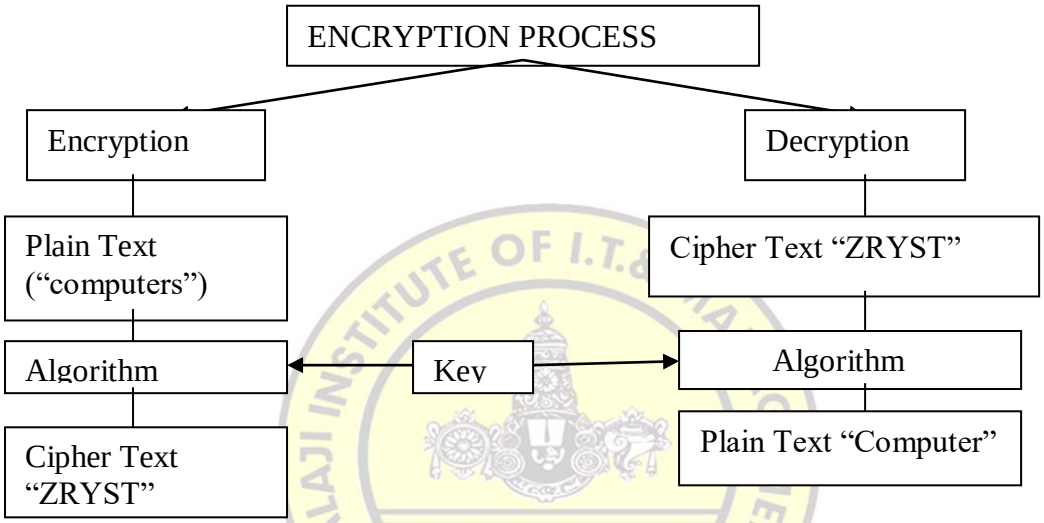
Plain - ABCDEFGHIJKLMNOPQRSTUVWXYZ
Cypher - FGHIJKLMNOPQSTUVWXYZABCDE

In addition to this, there are a number of other systems developed from time to time. **For instance.**

- Messages may be written backwards
- Secret messages may be written horizontally or vertically
- Adopting special symbols for the normal letters of the alphabet.
- Dots may be used for vowels
- Greek, Roman, Italics and alphabets of other countries may be used.

3.2 Meaning: A simple way to protect from electronic snoopers is through encryption.

- It is a process which involves scrambling the date or message in a complex manner.
- It is a process of mathematical representation wherein an algorithm is used to transform plain text into coded equivalents for transaction or storage.
- The encryption process may appear as follows:



- The process of transformation of the plain text into cryptogram is called **encryption, enciphering or encoding**
- Only authorized persons who know the key will be able to get the original information.
- The process of reconverting the cryptogram back into the original information is called **decryption, deciphering or decoding**
- In this age of communication, transmission of data does not take place only through the passage of text alone, but it includes text, audio, video, graphics, animation etc.,

4. CRYPTOGRAPHY

CRYPTOGRAM: It means writing a message which appears to be meaningless to those who have no means or the key to extract the original text from the cipher text.

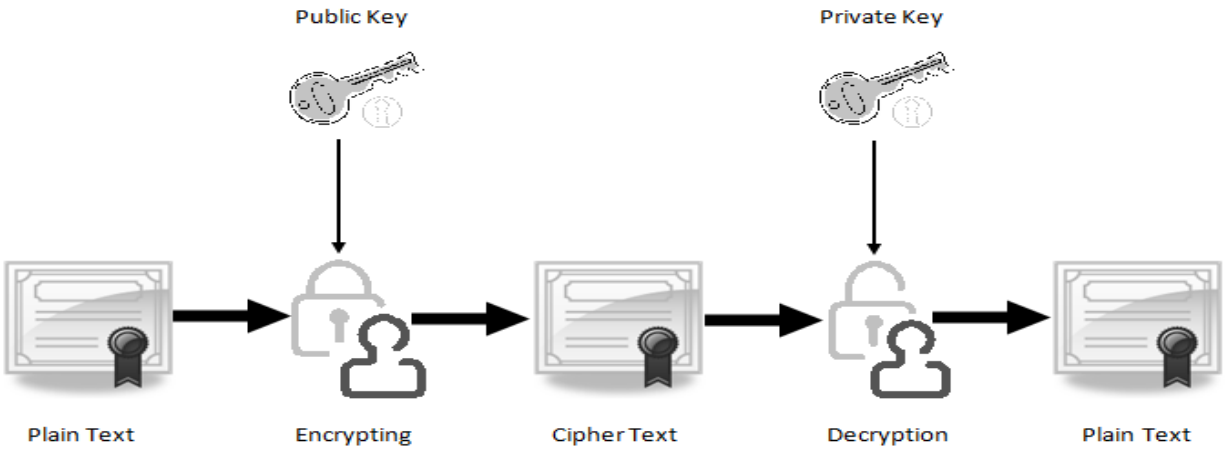
- A Message written in code is called cryptogram.

Cryptanalyst:

- A person who examines all the messages in the cryptosystem under study

- Studies all possible relationships existing with other cryptosystems.
- Gathering all relevant information and their past present activities.

Cryptography: It is the science and art of transforming messages to make them secure and immune to attack.



- The word cryptography is derived from the Greek word **"Kryptos"** which means **hidden**.
- It is an art and methodology involved in creating cryptograms.
- Cryptography can be used to combat the problems of computer privacy and security
- It involves a process of converting plain text or original message into the cipher text.
- Cryptography may be explained as a method of scrambling confidential information sending information, and then unscrambling it so that it can be read in its original form by the recipient party.

Eg: Paul wants to sent an important message to his friend that contains secret information.

- With the help of cryptography, if somebody in the middle can't understand the message what paul send so he encrypt his plain text.

5. PUBLIC KEY AND PRIVATE KEY CRYPTOGRAPHY

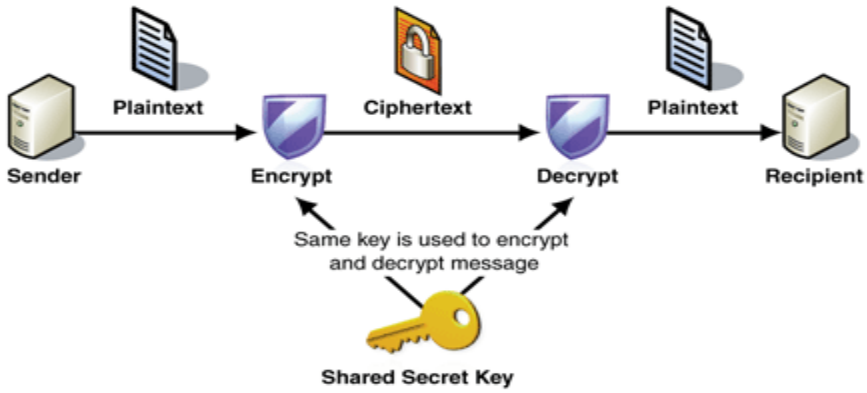
- Private Key and public key are a part of encryption that encodes the information.
- Both keys work in two encryption systems called **symmetric and asymmetric.**

Categories of Cryptography:

I. **Symmetric Key Cryptography**
II. **Asymmetric Key Cryptography**

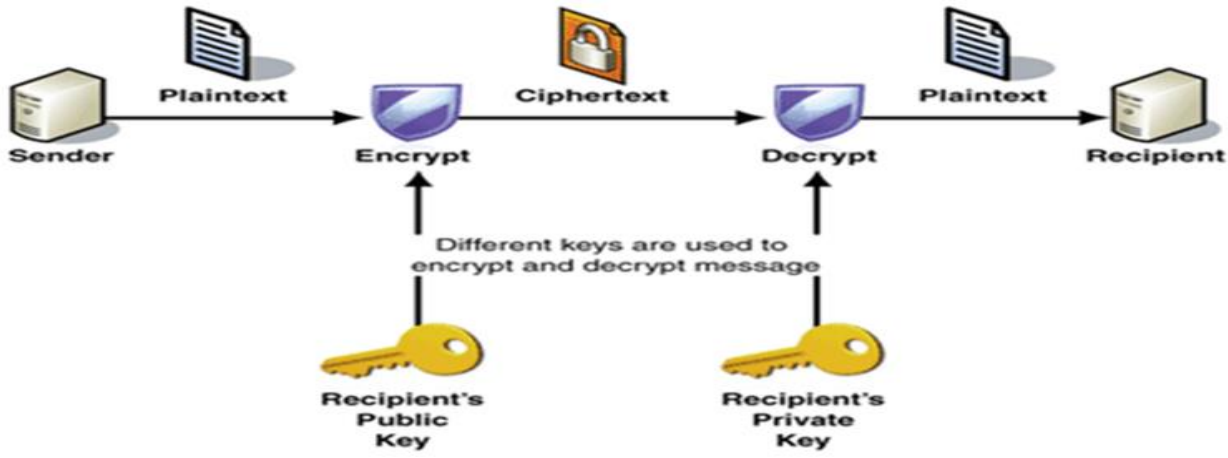
Explanation:

1. **Symmetric Key Cryptography (Private-key encryption or secret key encryption)**
   Sender and Receiver uses the same key and an encryption/decryption algorithm to encrypt/decrypt data i.e., the key is shared.



2. **Asymmetric Key Cryptography**
   Sender and Receiver uses the different keys for encryption and decryption namely Public key and Private Key respectively
   utilities a pair of keys like public and private key for better security where a message sender encrypts the message with the public key and receiver decrypts it with his/her private key.

- Public and private key pair helps to encrypt information that ensures data is protected dating transmission.



Public Key:

- Public key uses asymmetric algorithms that convert messages into an unreadable format.
- A person who has a public key can encrypt the message intended for a specific receiver.
- The receiver with the private key can only decode the message, which is encrypted by the pubic key. The key is available via the public accessible directory.

Private Key: The private key is a secret key that is used to decrypt the message and the party knows it that exchange message.

- In the traditional method, a secret key is shared within communicators to enable encryption and decryption the message, but if the key is lost, the system becomes void.
- To avoid this weakness, PKI (Public key infrastructure) come into force where a public key is used along with the private key.
- PK1 enables internet users to exchange information in a secure way with the use of a public & Private Key.

Symmetric V/S Asymmetric

CHARACTERISTICS	SYMMETRIC KEY CRYPTOGRAPHY	ASYMMETRIC KEY CRYPTOGRAPY
Key used for encryption/decryption	Same key is used for encryption and decryption	One key used for encryption and another different key is used for decryption.
Speed of encryption/decryption	Very fast	Slower
Size of resulting encrypted text	Usually same as or less than the original clear text size	More than the original clear text size
Key agreement/exchange	A big problem	No problem at all
Number of keys required as compared to the number of	Equals about the square of the number of participants so scalability	Same as the number of participants so scales up quite well.

participants in the massage exchange	is an issue.	
Usage	Mainly for encryption and decryption (confidentiality) cannot be used for digital signatures (integrity and non-repudiation checks)	Can be for encryption and decryption (confidentiality) as well as for digital signatures (integrity and non reputation checks)

Applications:

1. Defence services
2. Secure data manipulation
3. E-Commerce
4. Business Transactions
5. Internet payment Systems
6. User identification Systems
7. Access Control
8. Data Security

Conclusion: By using encryption techniques a fair unit of Confidentiality, authentication, integrity, access control and availability of data is maintained.

6. DIGITAL SIGNATURES

- Signature denotes a persons name written by himself. Where the law or the procedure requires a signature of a person, it is to be written.
- It is a method used to identify a person and to indicate that person's approval of the information mentioned in the document.

Verification of Digital Signature: To verify digital signature means to determine accurately whether:

- ❖ The digital signature is created using the private key in relation to the public key.
- ❖ The record is not altered since the creation of a digital signature.

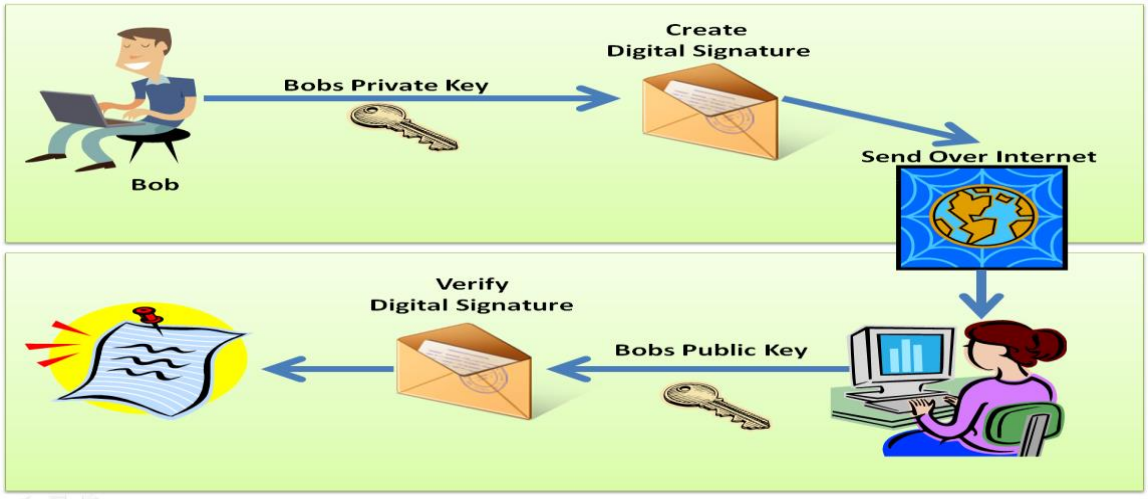
A signature can be considered as a secure electronic signature when it is:

- Unique to the person using it.
- Capable of identifying such a person.
- Created in a manner under the sole control of the person using it and

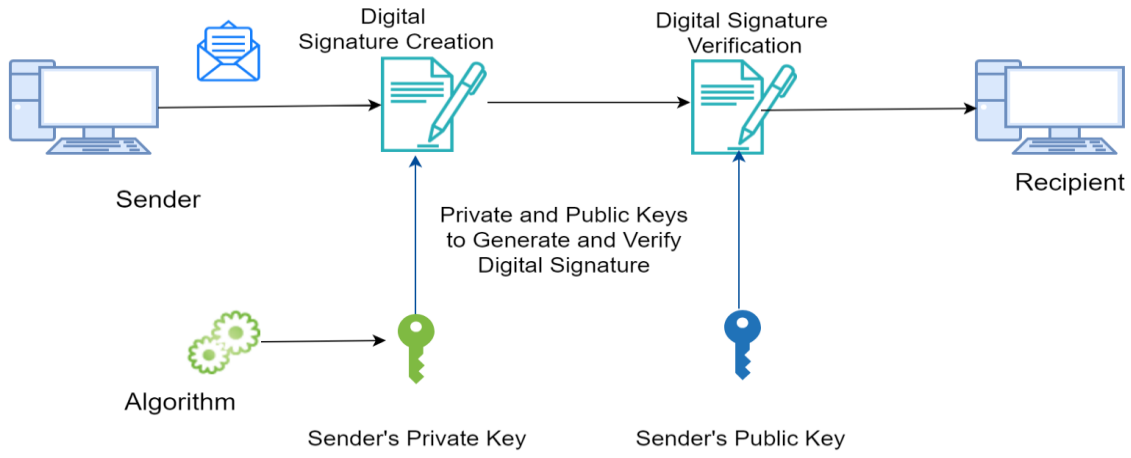
- Is linked to the electronic record to which it relates. It means there is a change in the record, and then the electronic signature will become invalid.

Message Digest: A Message digest is a fixed length digital with signature of a variable length data stream. It is highly secure version of the venerable check sum unique value. The authentication through a digital signature is possible by putting the message through a computation which produces a unique value called a message digest. This unique value of the message digest is encrypted with a private key and then appended to the message.

- When the message is received at the destination, the receiving person at the end performs the same computation on the message to obtain the digest. So, the process of decrypting the digital signature using the public key makes it possible to compare the two and ascertain the origin of the message and that it has not been altered.



Digital Signatures



7. DIGITAL CERTIFICATES

Definition: A **Digital Certificate** is simply a computer file which helps in establishing your identity. It officially approves the relation between the holder of the certificate (the user) and a particular public key. Thus, a digital certificate should include the user name and the user's public key. This will prove that the certain public key owned by a particular user.

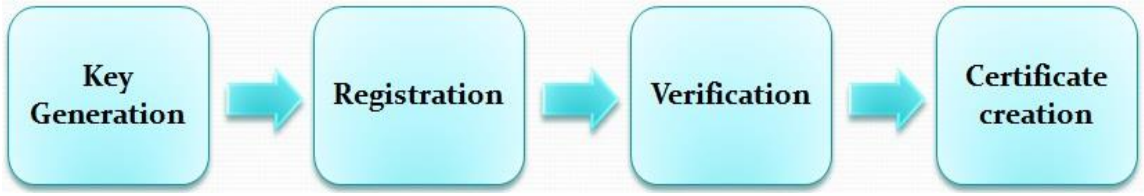
A digital certificate is an electronic certificate. The basic requirement for successful e-commerce is to ensure integrity of online transactions to the customers. It means that the security solutions must assure the following:

- To verify authenticity of the information on the website.
- To secure the submission of confidential customer information and
- To prevent from denying any transaction by either of the party.

Digital certificate plays a major role in securing online customer's financial transactions. X.509 is the popular digital certificate. The purpose of a digital certificate is to serve as an electronic substitute for a sealed envelope or signature when sending messages across the net. Its features include:

- The digital ID decides in browsers only or e-mail software
- Permits to sign digitally and encrypt e-mail and
- Client certificate ensures integrity of shopper's information.
- The certificate is used for two purposes encryption and verifying
- A private key is used to decrypt sensitive financial information of the shopper, which is usually sent by e-mail.
- The credit card is secured by it. Thus, client certificate is used for the encrypting purpose.
- Similarly, the client certificate is also used for enabling the shoppers to verify the authenticity of a supplier.
- The certificate authorities may be subsidiaries of banks and credit-card companies or independent one.
- There are a many companies that sell digital certificates, for example, American Express certificate Authority, Digital Signature trust co., VeriSign inc., Global sign NV etc.,

Digital Certificate Creation Steps:



1. **Key generation** – It starts with the creation of the subject's public and private keys using some software. This software works as a part of web browser and web server. The subject must not share the private key. The subject then sends the public key along with the other information like evidence about himself/herself to the RA (**Registration Authority**). Although, either if the user has no knowledge about technicalities included in the creation of the key or if there are particular demands that the key must be centrally created then these keys can be created by RA also on the subject's (user's) behalf.
2. **Registration**: Suppose the user has created the key pair, the user now sends the public key and the related registration information (e.g. subject name, as it is needed to show in the digital certificate) and all the evidence of himself and herself to the RA.
   For this, the software offers a **wizard** in which the user inserts the data and submits it when all the data is validated. Then the data moves over the network/internet to the RA. The format for the certificate requests has been standardized and is called **certificate signing request** (CSR). This is one of the **public key cryptography standards** (PKCS).
3. **Verification**: When the registration process is completed, the RA has to check the user's credentials such as the provided information is correct and acceptable or not.
   The second check is to ensure the user who is requesting for the certificate does indeed possess the private key correlating to the public key that is sent as the part of the certificate request to the RA. This inspection is called as checking the **Proof Of Possession** (POP) of the private key.
4. **Certificate creation**: Suppose that all steps until now have been successfully executed, the RA accepts all the details of the user to the CA. The CA does its own verification (if required) and creates a digital certificate for the user.
   There are programs for creating certificates in the **X.509** standard format.

The CA delivers the certificate to the user and also keeps a copy of the certificate for its own record. The CA's copy of the certificate is maintained in a **certificate directory**.

DIGITAL SIGNATURE Vs DIGITAL CERTIFICATE

BASIS FOR COMPARISON	DIGITAL SIGNATURE	DIGITAL CERTIFICATE
Basic	It verifies the authenticity and source of a particular document.	It creates an identity of a website and also increases its trustworthiness.
Process	The document is encrypted at the sending end and decrypted at the receiving end using asymmetric keys.	A certificate is issued by a trusted agency known as CA which follow particular steps to do so that are - key generation, registration, verification and creation.
Security	It provides authentication, non-repudiation and integrity.	It provides authentication and security.

Conclusion: Digital Signature and Digital Certificate both are used for ensuring the authenticity of the digital document although these are absolutely different things. A document is digitally signed to protect it from tampering while Digital Certificate increases the trustworthiness of the website.

8. SECURITY PROTOCOLS OVER PUBLIC NETWORKS

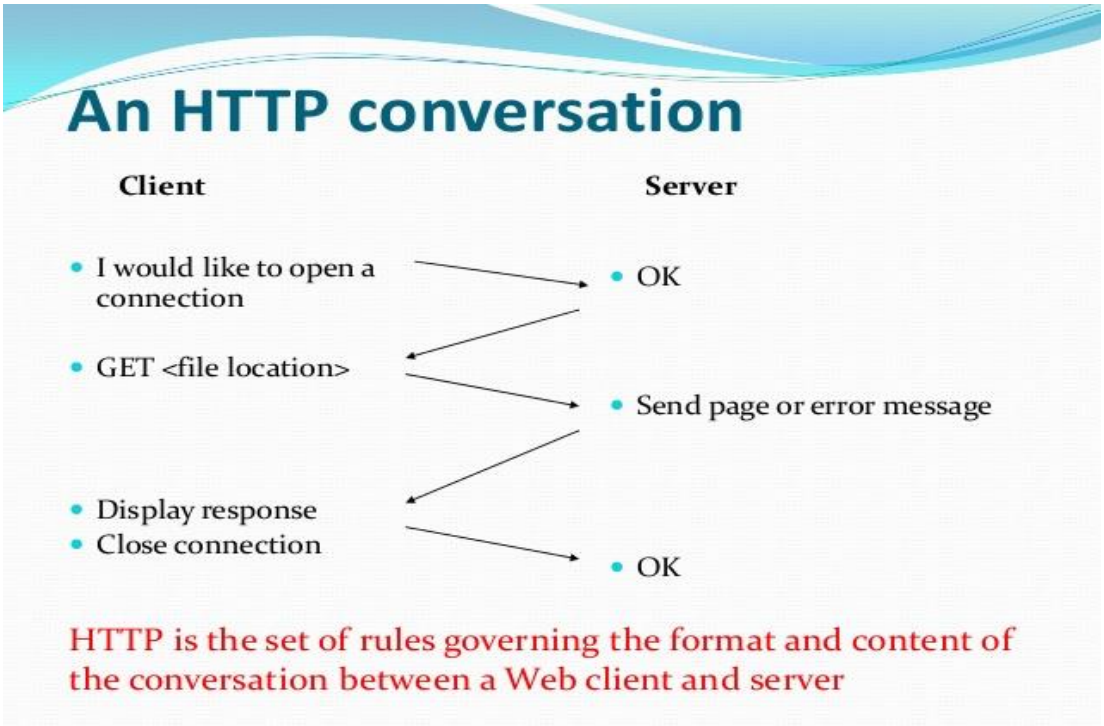
- Network security protocols are a type network protocol that ensures the security and integrity of data in transit over a network connection.
- Network security protocols define the processes and methodology to secure network data from any illegitimate attempt to review or extract the contents of data.

- Network security protocols are primarily designed to prevent any un-authorized user, application, service, or device from accessing network data.
- This applies to virtually all data types regardless of the network medium used.
- Network security protocols generally implement cryptography and encryption techniques to secure the data so that it can only be decrypted with a special algorithm, logical key, mathematical formula and / or a combination of all of them.
- Some of the popular network security protocols include
    - HTTP
    - SSL
    - Firewall as security control
    - Public key infrastructure (PKI) for securing

8.1 HTTP (Hyper Text Transfer Protocol)

Introduction:

- HTTP was coined by **Ted Nelson** in 1991
- HTTP is the set of rules for transferring files(text, graphic images, sound, video and other multimedia files) on the World Wide Web (www).
- As soon as a web user opens their web browser, the user is indirectly making use of HTTP
- HTTP is an application protocol that runs on top of the TCP/IP suite of protocols.
- For example, the URL for computer hope is https://www.computerhope.com
- Today's browsers no longer require HTTP in front of the URL since it is the default method of communication.
- However, it is kept in browsers because of the need to separate protocols such as FTP(File Transfer Protocol).
- It is used to access data on the WWW(world wide Web)
- It is a protocol which governs the Communication between the client and server.



Features of HTTP:

- Connectionless
- Media Independent
- Stateless

1. HTTP is connectionless

- After a request is made, the client disconnects from the server and waits for a response.
- The server must re-establish the connection after it processes the request.

2. HTTP is media independent:

Any type of data can be sent by HTTP as long as both the client and server know how to handle the data content.

3. HTTP is Stateless:

This is a direct result of HTTP being connectionless.

- The server and client are aware of each other only during a request
- Afterwards, each forgets the other
- For this reason neither the client now the browser can retain information between different requests across the web pages.

Working:

1. A browser contacts a server to establish a TCP(Transmission Control Protocol) connection with it
2. The HTTP software on the client sends a request to the server. The HTTP software on the server interprets this request and sends the response to the client.
3. **HTTP Commands**:
    a. **GET:** Request by a client to obtain a webpage from the server.
    b. **PUT:** Request by a client to store a webpage on the server.
    c. **POST:** Request by a client to update contents of a webpage on the server.
    d. **DELETE:** Request by a client to remove a web page from the server.

- **HTTP** was coined by Ted Nelson in 1991.

8.2 SSL (Secure Socket Layer)

Secure sockets layer (SSL) is a networking protocol designed for securing connections between web clients and web servers over an insecure network, such as the internet. After being formally introduced in 1995, SSL made it possible for a web server to securely enable online transactions between consumers and businesses. Due to numerous protocol and implementation flaws and vulnerabilities SSL was deprecated for use on the internet by the internet engineering task force in 2015 and has been replaced by the transport layer security TLS protocol.

- The most commonly used security technique is the SSL.
- In order to exchange information over the internet in a secured manner, Netscape designed Netscape navigator and server products.

The SSL was developed by the Netscape considering the following three important points:

- The **ability to secure** (encrypt, authenticate and provide data integrity) TCP/IP connection using TCP/IP application level protection. Such protocols include HTTP, Cipher, FTP, Telnet, S-HTTP and others.
- **Simplicity** with reference to the fact that it can be easily used and verified.
- **Suitability**

- The SSL will be the most popular way of encrypting information to be transmitted along with the Net

- SSL uses TCP (Transport control protocol) for communication.
- In SSL, the word socket refers to the mechanism of transferring data between a client and server over a network.

WHAT IS SSL used for?

The internet has spawned new global business opportunities for enterprises conducting online commerce. However that growth has also attracted fraudsters and cyber criminals who are ready to exploit any opportunity to steal consumer bank account numbers and card details. Any moderately skilled hacker can easily intercept and read the traffic unless the connection between a client (e.g. internet browser) and a web server is encrypted.

HOW DOES SSL WORK?

The following graphic explains how SSL certificate works on a website. The process of how an SSL handshake takes place is explained below.

- An end user asks their browser to make a secure connection to a website (e.g. https://www.example.com)
- The browser obtains the IP address of the site from a DNS server requests a secure connection to the website.
- To initiate this secure connection the browser requests that the server identifies itself by sending a copy of its SSL certificate to the browser.
- The browser checks the certificate to ensure
  - That it is signed by a trusted CA
  - That it is valid that it has not expired or been revoked
  - That it confirms to required security standards on key lengths and other items.
  - That the domain listed on the certificate matches the domain that was requested by the user.
- When the browser confirms that the website can be trusted it creates symmetric session key which it encrypts with the public key in websites certificate. The session key is then seen to the web server.
- The web server uses its private key to decrypt the symmetric session key.
- The server sends back an acknowledgement that is encrypted with the session key.
- From now on all data transmitted between the server and the browser is encrypted and secure.

Why do I need SSL certificate?

The internet has spawned new global business opportunities for enterprises conducting online commerce. However, that growth has also attracted fraudsters and cyber criminals who are ready to exploit any opportunity to steal consumer bank account numbers and card details. Any moderately skilled hacker can easily intercept and read the traffic unless the connection between a client (eg.internet browser) and a web server is encrypted.

Objectives of SSL:

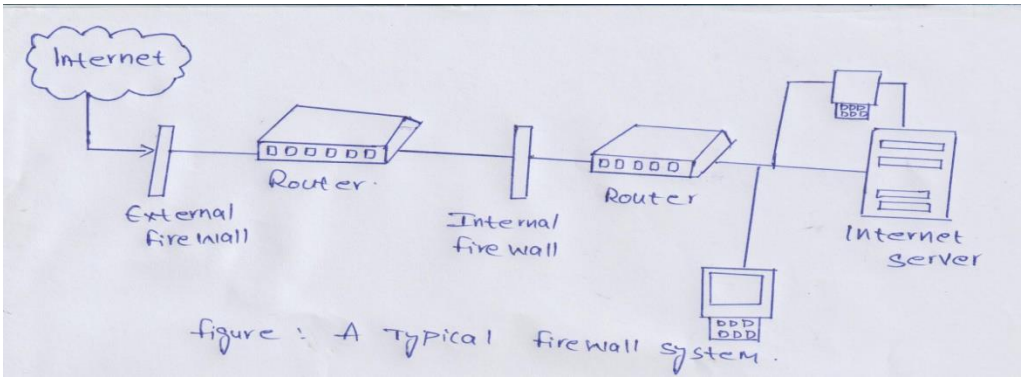
1. Data Integrity
2. Data Privacy
3. Client-Server authentication

1. **Data Integrity:** Data is protected from tampering
2. **Data Privacy:** Data Privacy is ensured through a series of protocols, including the SSL Record protocol, SSL Handshake Protocol, SSL Change cipher spec protocol & SSL Alert protocol.
3. **Client – Server Authentication:** The SSL Protocol uses standard cryptographic techniques to authenticate the client & server.
   SSL is the predecessor of transport layer security (TLS), which is a cryptographic protocol for secure internet data transmission.

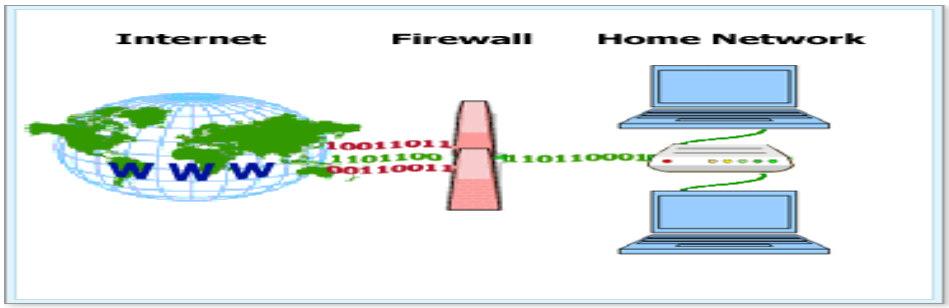
8.3 FIREWALL AS SECURITY CONTROL

Fire Wall

- A firewall is a system designed to prevent unauthorized access to or from a private network.
- Firewall can be implemented either hardware, or software or both that acts as gatekeeper and protects IS.
- Firewalls prevent unauthorized internet users from accessing private networks connected to the internet.
- Acts like watchman, will not allow any unauthorized user to access the server of an organization.
- Firewalls are an electronic device that blocks all traffic, and then selectively allows only a few well selected items.
- A fence around the network is simply a firewall.
- The function of a firewall is to restrict access to the destinated points by growing non registered users.



Firewalls



- Firewalls are an electronic device that blocks all traffic, then selectively allows only a few well selected items.
- A fence around the network is simply a firewall. There may be some well selected gates. The function of a firewall is to restrict access to the destinated points by growing non registered users.
- Sometimes, security holes are left open accidentally. In these cases, firewalls need to be administered carefully. It is a preventive measure
- . It gives rules that allow specific types of traffic to go through the firewalls.
- These are like doors in a house which restricts the entry of intruders.
- Any private network connected to an external link like the internet needs a firewall which will allow friendly access and repel unfriendly ones.
- A new firewall product tailored for personal computer users has just been released. 'Norton Internet Security' provides protection from hackers for networks and comes bundled with the 'Norton Antivirus'.
- A variant and expensive alternative known as **"hybrid firewalls"** are available in the market.

- The sender and the recipient of the message will need to have the key for scrambling and unscrambling of the message.
- The levels which have gone into making encryption are very much a fortress to the eavesdropper.

Drawbacks: It has no capability of detecting anyone trying to break in. for instance, digging a hole underneath it.

- It does not know if the person coming through the gate is allowed in.
- It is not a dynamic defence mechanism of security.
- Firewalls are incapable to recognize any attack against the network.
- It restricts access only to the web server. When the web server itself is hacked, it cannot protect the server.
- Firewalls can only watch on the boundary of a network and not beyond it. Most of the problems related to insecurity arise from inside the network.
- Firewalls of the network see nothing going on inside.
- It watches only the traffic which passes between the internal link and the Net.
- Firewalls cannot sense the network traffic and cannot process the events of the internet.
- There is no protection from firewalls at several sensitive areas and net connection points.

8.4: PUBLIC KEY INFRASTRUCTURE (PKI) FOR SECURITY

It will change the face of online security; as such understanding of PKI is necessary. It addresses the role of strong authentication in securing the electronic business environment and building a foundation necessary to establish trusted secure electronic communication over the Net. E-security is essential for e-business and e-commerce.

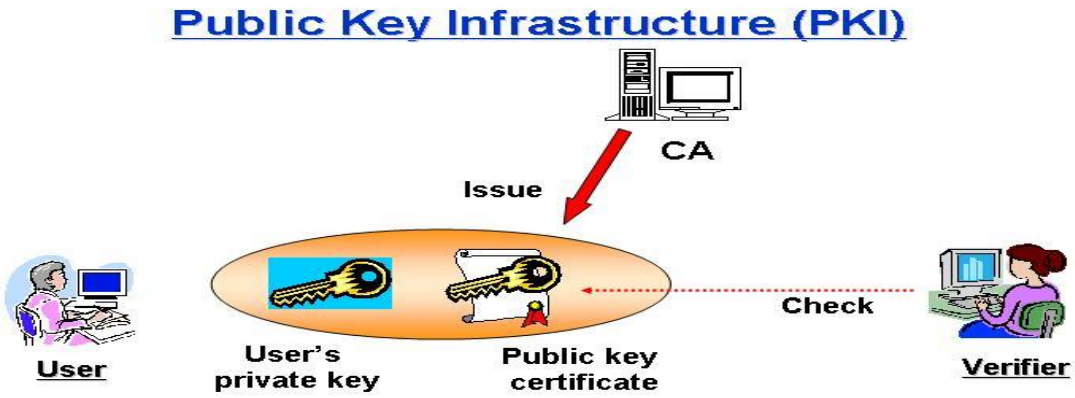
The application of IT world wide has become more and more complex, placing increasing demand on resources. Encryption and authentication technologies are installed and are in use on a global basis.

- PKI is the principal tool to establish a trusted path for electronic transactions.
- It **protects against** a variety of possible assaults like **un-authorized disclosure** of sensitive information, **spoofing /data alternation etc.**

What is Public Key Infrastructure?

- Need for consistent means to manage digital certificates
- PKI: framework for all entities involved in digital certificates
- Certificate management actions facilitated by PKI
  - Create
  - Store
  - Distribute
  - Revoke

- The classic protection technique involves the use of public key and private key cryptography.
- A key pair is generated for each business.**(Public Key ,Private Key)**
- The private key is installed on the server of a particulars business and no one can access it.
- The matching public key of business is freely distributed as its server ID.
- Customers will use the server 1D to encrypt communications sent to that particular site and the owner of that site only holds that **matching private key.**
- **Private Key:** In this kind of security, the encryption and decryption keys are similar. To make it difficult to encode the key, and even using a powerful computer, it should be of a very high order. Implementation of these keys is possible by Application of Specific Integrated Circuits (ASIC) chips, wherein field programmable gate arrays are added on the chords.
- **Public Key:** By Nature, public key has essentially two keys. One key is used for encipherment and the other for decipherment. The key used for encipherment should be confidential the code cannot be cracked by the decipherer unless he knows the key used by the encipherer. In such a case, in this system, the encipherment key may even be published like a telephone directory. The fact is that even with the algorithm for description, it is impossible to find the deciphering key.
- Therefore only the user who has his own secret decipherment key will be able to decipher the cryptogram addressed to him.



Working of Keys: In electronic transactions, the asymmetric cryptosystem is followed. The system is capable of generating a secure key pair. The pair consists of two keys: public key and private key.

- **A Private Key** is used for creating a digital signature and public key is used to verify this signature.
- Public key cryptosystems are designed around the possession of both the private and public keys.
- They are built by each entity, wishing in secure electronic transactions and communication.

Consider these points below:

- A public key is known to every one
- A private "is" only to the owner /creditor
- Algorithm is used to generate these keys either of the key is used to encrypt a message
- The other corresponding key in the key pair will be able to decrypt it.

Public key cryptosystems are used to provide both the services of confidentiality and authentication.

- For instance, X is sending a confidential message to Y
- X encrypts the message using Y's widely known public key.
- Y receives message from X as encrypted, Y decrypts using X's private key.
- A Private key should be carefully protected
- The public keys are made known to whoever wants it.

- When a public key cryptosystem is in operation, the secret private key is not shared with anyone.
- A public key is not kept secret, as no purpose is served.
- The public key as a matter of fact should be made available to anyone who wants to engage in secure electronic transactions and communication with the owner of the corresponding private key.

SEMESTER-4
(17E00402) E-BUSINESS

Objective: The course imparts undertaking of the concepts and various application issues of e-business like Internet infrastructure, security over internet, payment systems and various online strategies for e-business.

1. **Introduction to e-business** : Electronic business, Electronic commerce, difference between e-business & e-commerce, electronic commerce models, types of electronic commerce, value chains in electronic commerce, E-commerce in India, internet, web based tools for electronic commerce. Electronic data, Interchange, components of electronic data interchange, electronic data interchange process.
2. **Security threats to e- business**: Security overview, Electronic commerce threats, Encryption, Cryptography, public key and private key Cryptography digital signatures, digital certificates, security protocols over public networks : HTTP, SSL, Firewall as security control, public key infrastructure (PKI) For Security.
3. **Electronic payment system**: Concept of money, electronic payment systems, types of electronic payment systems, smart cards and electronic payment systems, infrastructure issues in EPS, Electronic fund transfer.
4. **E-business applications and strategies**: Business models & revenue models over internet, emerging trends in e- business- governance, digital commerce, mobile commerce, strategies for business over web, internet based business models.
5. **E –business infrastructure and e- marketing**: Hard works system software infrastructure, ISP's, managing e-business applications infrastructure, what is e-marketing, e-marketing planning, tactics, strategies.

Text books:

- Dave Chaffey: e-business & e-commerce management- Pearson.
- e- commerce- e-business: Dr.C.S.Rayudu, Himalaya.

References:

- Whitley, David (2000) ,e-commerce strategy ,Technologies and applications.TMH.
- Schneider Gary P. and Perry, James T(1ST edition 2000) Electronic commerce, Thomson Learning.
- Bajaj, Kamlesh K and Nag, Debjani (1st edition 1999) ,e- commerce, The cutting edge of business, TMH Publishing company

UNIT-3
ELECTRONIC PAYMENT SYSTEM

1. CONCEPT OF MONEY

1.1 Introduction:

- The payment mechanism which constitutes the core of e-commerce process has become an important business strategy.
- It is simply because the payment mechanism has the potential to change the very essence of commercial transactions, business and industry models throughout the world.
- Payment processing systems plays a critical role in e-business and any company considering launching its business must have chalked out pans well in advance.

Originally, the trade began in form of a barter system wherein people exchanged goods that they possessed with the goods belonging to other people.

- Things soon became complicated with the availability of goods, belonging to both parties in the later system, not coinciding.
- As a result, a medium of exchange, in the form of tokens, evolved.

Money: Money can be anything that people accept as a standard for payment.

- Coins
- Currency
- Checks
- Credit/debit

1.2 Meaning of Money:

- **Serves as a medium of exchange** --for buying and selling
- **Serves as a common measure of value** – Value of a good or service can be expressed in terms of money.
- **Serves as a store of value** – money saved in present can be used future.

General Acceptability by the people backed by the govt.

1.3 Functions of money:

In a static sense – (Stationary)

1) It acts as a medium of exchange
2) As a unit of account – **Express value of goods (eg mobile – 400 to 49000; rice bag- 40/-)**
3) Fiat money – **Paper currency- backing of Indian govt – legal tender**
4) As store of value – Surplus income (in banks etc) use in future

In Dynamic sense – New functions recently

1) Direct economic trends – Savings--investments (a. output b. employment) (Economic development country)
2) As encouragement to division of labour
3) Smoothens transformation of savings(Household) into investment(producers)

2. ELECTRONIC PAYMENT SYSTEMS

Types of Payment systems

1. Offline Payment Options
2. Online Payment Options
3. Payment Process Software

1.Offline Payment Options	2.Online Payment Options
• **A Phone** • **Drop a cheque into the Postal head box** • **Earn and use discounts** • **Bills** • **Drafts** • **Cheques** • **Money order** • **Cash On Delivery(COD)**	• **Doing business online is an innovative strategy and the payback or payment through the e-shop is one of the most critical and challenging issues for any such business.** • **How to make payments for online buying is a frequently asked question.** • **E-cash, e-wallets, smart cards and credit / debit cards**

*** Electronic payment via a web is catching up gradually. Even today, many customers prefer using the traditional payment methods such as cash on delivery.**

3. Payment process software: The payment process Software is used to facilitate payback for purchase. This software is usually sold as a service rather than as a product. It means there is no need on our part to install it on the web server and run it yourself. It is just sufficient to pass the credit card data to the software company's server and they take it from there. Most companies allow buying the software and leasing it for a monthly fee.

There are hundreds of companies making payment processing software. The best known and popular payment processing packages are Authorize Net, Cyber cash, IC verify and PC Authorize.

2.1 Electronic Payment System: (EPS) / Online Payment System:

EPS is a way of making transactions or paying for goods and services through an electronic medium, without the use of cheques or cash.

- The EPS has grown increasingly over the last decades due to the growing spread of internet – based baking & shopping.
- As the world advances more with technology development, we can see the rise of electronic payment system and payment processing devices.
- As these increases, improve, and provide ever more secure online payment transactions the percentage of cheque & cash transactions will decrease.

2.2 Requirement for E-payments:

1. Acceptability
2. Convertibility
3. Efficiency
4. Integration
5. Scalability
6. Usability

2.3 What is EPS: It is a system which helps the customer or user "to make online payment for their shopping"

- To transfer money over the internet.

Examples of EPS:

- Online Reservation (IRCTC, Air, Bus)
- Online bill payment (mobile bill, Electricity, gas, credit cards… etc.,)
- Online order placing (Buying & selling)
- Online ticket booking (movie)
- Net Banking

2.4 EPS Storage methods:

1. **Online**
2. **Offline**

1. Online: Trusted third party holds customers money like online bank, holds customers cash accounts.

2. Offline: Customer holds cash on smart card or software wallet.

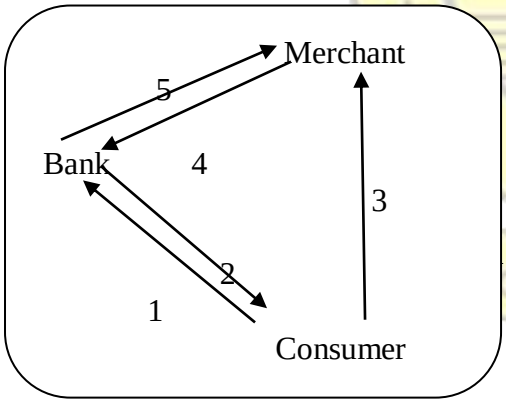
3. TYPES OF ELECTRONIC PAYMENT SYSTEM (EPS)

1. **E-Cash**
2. **E-Wallet**
3. **Credit Cards**
4. **Debit Cards**
5. **Net Banking**
6. **Mobile Payment**
7. **Amazon Pay**

1. E-Cash: A system that allows a person to pay for goods or services by transmitting a number from one computer to another.

* This is issued by a bank and represents a specified sum of real money.

E-Cash Processing:



1) Consumer buys e-cash from bank
2) Bank sends e-cash bits to consumer (after charging that amount plus fee)
3) Consumer sends e-cash to merchant
4) Merchant checks with bank that e-cash is valid.
(check for forgery or fraud)
5) Bank verifies that e-cash is valid
6) Parties complete transactions

2. E-Wallet: (faster payments)

* The E-wallet is another payment scheme that operates like a **carrier of e-cash** and other information.
* The aim is give shoppers a single, simple and secure way of carrying currency electronically.
* Trust is the basis of the e-wallet as a form of electronic payment.

Eg: Paytm, IRCTC, Amazon, SBI to Maintain E-wallet

By using e-wallet we can access/book the ticket overcome all kinds of the complications.

* It is a prepaid account that allows the customer to store multiple credit cards, debit card and bank account numbers in a secure environment.
* It is very simple and secure

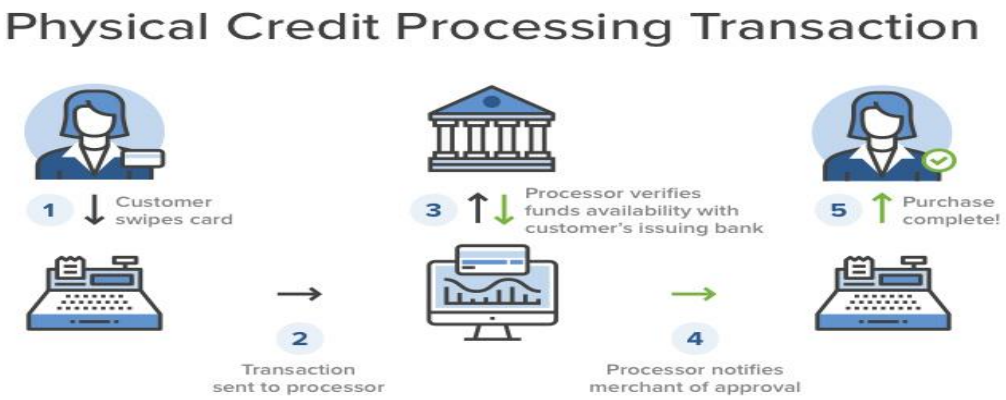
Procedure for using an e-wallet

1. Decide on an online site where you would like to shop (Paytm, Amazon, … etc.,)
2. Maintain an e-wallet on website (Paytm etc.,)
3. Fill out personal information such as your credit card number, name, address and phone number and where merchandise should be shipped.
4. When you are ready to buy, it automatically deduct amount from e-wallet, if you have.

3. Credit Cards:

Example: VISA, Master card, American Express, Discover network

* It is a plastic card having a magnetic number and code on it.
* It has some fixed amount to spend
* Customer has to repay the spend amount after sometime.



Risk in using credit cards:

- Operational Risk
- Credit Risk
- Legal Risk

Credit Card: It is simple to use, the customer has to just enter their credit card number and date of expiry in the appropriate area on the seller's webpage.

Security: To improve the security system, increased security measures, such as the use of a Card Verification Number (CVN) have been introduced to on-line credit card payments.

4. Debit card:

***** Debit card is one of the largest e-commerce payments medium in India.

* Customers who want to spend online within their financial limits prefer to pay with their debit cards.

* With the debit card, the customer can only pay for purchased goods with the money that is already there in his/her bank account.

5. Net Banking:

* It is a simple way of paying for online purchases directly from the customer's bank.

* It uses a similar method to the debit cad of paying money that is already there in the customer's bank.

* Net banking does not require the user to have a card for payment purposes but the user needs to register with his/her bank for the net banking facility.

* While completing the purchase the customer just needs to put in their net banking ID and pin.

6. Mobile Payment:

* Instead of using a credit card or cash, all the customer has to do is send a payment request to his/her service provider via text message; the customer's mobile account or credit card is charged for the purchase.

* To set up the mobile payment system, the customer just has to download software from his/ her service provider's website and then link the credit card or mobile billing information to the software.

7. Amazon pay:

* Another convenient, secure and quick way to pay for online purchases is through Amazon pay.
* Use your information which is already stored in your Amazon account credentials to log in and pay at leading merchant websites and apps.
* Your payment information is safely stored with Amazon and accessible on thousands f websites and apps where you love to shop.
* If you are planning to sell your products online, Amazon would be happy to help you in setting up payment gateways for your products and services.