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E-COMMERCE

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Author :
Dr. K. Sivakumar,
Associate Professor & Head,
Department of Computer Applications,
Park's College (Autonomous),
Tirupur – 641 605.

E-COMMERCE

SYLLABI

Working of WAP; Wireless Technologies; Generations in Wireless Communications; Security Issues related to Wireless Communications; Mobile Computing in Four Dimensions; Wireless Millennium.

 Knowledge Management: Knowledge Management and its Goals; Collaborative Computing and Knowledge Management; Knowledge Management Tools; Features of Knowledge Management Tools; Knowledge Creating Process; Knowledge Management Strategies for Different Organizations; Knowledge Management in Research and Development Organizations

Implementation of E-Commerce: WWW.EBAY.COM - B2C Website – Registration, Time factor, Bidding process, Growth of eBay; PayPal – New Trend in Making Payments Online; National Electronic Funds Transfer.

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BLOCK III: - E-PAYMENT SYSTEMS AND CRM, SCM
UNIT IX – E-PAYMENT SYSTEMS

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UNIT I – E-COMMERCE

Structure

1.1. INTRODUCTION

As an end in itself, understanding the e-commerce concepts and terms is important to enable you learn more about components, types, process and functions of e-commerce after the course is over. Without understanding these concepts and terms, you will have difficulty discussing e-commerce ideas with others, and will have difficulty in reading the technical literature. Since computer science is rapidly evolving new e-commerce and since the issues are important in many areas of computer science the ability to learn more quickly is important to maintaining your technical edge.

1.2. OBJECTIVES

After going through this lesson you would be in a positions to
➢ Use ideas from the various paradigms of e-commerce that is not explicitly suited to that paradigm.
➢ Implement important run-time e-commerce and its applications, components, types, process and its functions, goals and business models of the e-commerce that use such implementations.

1.3. E-COMMERCE

Electronic commerce is doing business online. It is about using the power of digital information to understand the needs and preferences of each customer and each partner to customize products and services for them, and then to deliver the products and services as quickly as possible. Personalized, automated services offer businesses the potential to increase revenues, lower costs, and establish and strengthen customer and partner relationships. To achieve these benefits, many companies today engage in electronic commerce for direct marketing, selling, and customer service; online banking and billing; secure distribution of information; value chain trading; and corporate purchasing. Although the benefits of electronic commerce systems are enticing, developing, deploying, and managing these systems is not always easy. In addition to adopting new technology, many companies will need to reengineer their business processes to maximize the benefits of electronic commerce.

An electronic commerce strategy should help deliver a technology platform, a portal for online services, and a professional expertise that companies can leverage to adopt new ways of doing business. Platforms are the foundation of any computer system. An ecommerce platform should be the foundation of technologies and products that enable and support electronic commerce. With it, businesses can develop low-cost, high-value commerce systems that are easy to grow as business grows. An e-commerce platform's breadth should also be unmatched, ranging from operating systems to application servers, to an application infrastructure and development tools, and to a development system.

1.3.1. Defining E-Commerce

Ecommerce, also known as electronic commerce or internet commerce, refers to the buying and selling of goods or services using the internet, and the transfer of money and data to execute these transactions. Ecommerce is often used to refer to the sale of physical products online, but it can also describe any kind of commercial transaction that is facilitated through the internet.

Whereas e-business refers to all aspects of operating an online business, ecommerce refers specifically to the transaction of goods and services.

Here are a few examples of e-commerce:
• accepting credit cards for commercial online sales

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- generating online advertising revenue
- trading stock in an online brokerage account
- driving information through a company via its intranet
- driving manufacturing and distribution through a value chain with partners on an extranet
- selling to consumers on a pay-per-download basis, through a Web site

1.3.2. Main Activities of Electronic Commerce

Any activity via the internet, which requires a paid transaction, is e-commerce activity. It can be products, services, and consultancy-anything that you can buy or sell. It is not mandatory to be paid online for an activity to be termed e-commerce activity. flipkart, for example is an e-commerce major even though majority of its revenue comes from accepting cash after delivering products.

Types of E-commerce Activities:

➢ **Online Shopping:** A prevalent example of e-commerce is shopping via the internet. Virtual stores are created online, often boasting more variety of choices that are available at physical stores. There are also stores that exist only online and benefit from the lack of investment into physical infrastructure.

➢ **Electronic Payments:** Payment systems for utility bills, phone, cable and internet bills, as well as online shopping, are an important aspect of e-commerce. Here, security needs to be ensured regarding credit card and personal information.

➢ **Virtual Auctions:** One version of e-commerce is the online auction popularized by eBay. These websites offer customers the benefit of selling to others at the best possible price.

➢ **Internet Banking:** E-commerce has allowed many people to forego frequent visits to the bank and instead perform their regular banking activities online via secure banking service.

➢ **Online Ticketing:** Ticketing for almost all types of activities is now done online. This includes travel ticketings such as air travel, bus and trains, as well as tickets for entertainment and sports events. This allows people to avoid queues and just go on the day of the event.

1.3.3. Benefits of E-Commerce

E-Commerce Benefits can be broadly classified in three major categories −

➢ Benefits to Organizations
➢ Benefits to Consumers
➢ Benefits to Society

Benefits to Organizations

➢ Using e-commerce, organizations can expand their market to national and international markets with minimum capital investment. An organization can easily locate more customers, best suppliers, and suitable business partners across the globe.

➢ E-commerce helps organizations to reduce the cost to create process, distribute, retrieve and manage the paper based information by digitizing the information.

➢ E-commerce improves the brand image of the company.

➢ E-commerce helps organization to provide better customer services.

➢ E-commerce helps to simplify the business processes and makes them faster and efficient.

➢ E-commerce reduces the paper work.

➢ E-commerce increases the productivity of organizations. It supports "pull" type supply management. In "pull" type supply management, a business process starts when a request comes from a customer and it uses just-in-time manufacturing way.

Benefits to Customers

➢ It provides 24x7 supports. Customers can enquire about a product or service and place orders anytime, anywhere from any location.

➢ E-commerce application provides users with more options and quicker delivery of products.

➢ E-commerce application provides users with more options to compare and select the cheaper and better options.

➢ A customer can put review comments about a product and can see what others are buying, or see the review comments of other customers before making a final purchase.

➢ E-commerce provides options of virtual auctions.

➢ It provides readily available information. A customer can see the relevant detailed information within seconds, rather than waiting for days or weeks.

➢ E-Commerce increases the competition among organizations and as a result, organizations provide substantial discounts to customers.

Benefits to Society

➢ Customers need not travel to shop a product, thus less traffic on road and low air pollution.

➢ E-commerce helps in reducing the cost of products, so less affluent people can also afford the products.

➢ E-commerce has enabled rural areas to access services and products, which are otherwise not available to them.

➢ E-commerce helps the government to deliver public services such as healthcare, education, social services at a reduced cost and in an improved manner.

1.3.4. Broad Goals of Electronic Commerce

Main goals of E-Commerce are:

▪ **Wider reach:** E-Commerce provides a platform for business to operate freely and reach a wider audience.

▪ **Not bound by limitations**: E-Commerce should allow users operate without "this site" the limitations of space, time and locations. Customers should be able to interact and transact with lease hassles.

▪ **Customer Experience**: It should provide users a faster and convenient mode of shopping. Some people consider shopping as a social experience and might not like online shopping though it has its comforts. E-

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Commerce experience should be improved with intuitive and good interface so that users enjoy online shopping.

- **New revenue collecting techniques:** We already know about the traditional techniques of revenue collection, for example, payment upon receipt, advance payment, and so on. At present, electronic commerce supports more improved methods of revenue collection. For example, an information product service provider will allocate the product broadly and then charge on a usage basis - which means charging the customer only when the information is used.
- **Ease of moving from Legacy systems**: The legacy systems that are prevailing in electronic commerce field include mainframe-based agreement, paper cheques, and payment systems, and so on. An electronic commerce infrastructure gains success only when it allows the user to easily shift from traditional systems to innovative, electronic systems, and applications and processes.
- **Transaction devices:** It is necessary that e-commerce adapts the technologies and devices required for reaching and maintaining the mass market.
- **Security:** e-Commerce sites, services, and payment accesses should be secure so that customer feels secure with transactions.

1.3.5. Main Components of E-Commerce

The technology and infrastructure used to develop the E-commerce application is the key to its success. The hardware and software must be selected in such a way that they can fulfill the needs of the E-commerce application.

The following figure shows the components involved in E-commerce infrastructure.
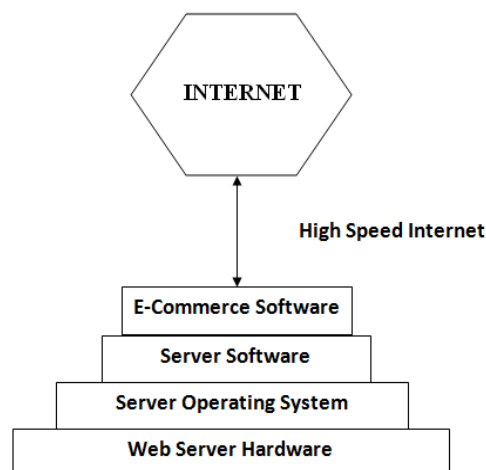
Figure 1: - Components of E-Commerce

1. Hardware:

A Web server hardware platform is one of the major components of the Ecommerce infrastructure on which the performance of the whole E-commerce application depends. While selecting Web server hardware, the software that will run on the server of the E-commerce transactions to be processed must be considered.

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The amount of the storage capacity and the computing power required depend on the volume of the E-commerce transaction to be processed. If the exact requirements are not known in advance, then the hardware configuration should be highly scalable so that they can be upgraded to meet the requirements.

2. E - Commerce Software's

Software is the main component that implements the E-commerce services and functionality. Software for E-commerce can be categorized in the following two types

➢ **Web server software:**

Web server software is required in addition to the Web server operating system software.

It is used to implement some extra functionality such as security and identification and retrieval and sending of Web pages.

Web server software creates a Web log file that identifies things such as the URL of the visitor, the length of the visit and the search engine and the key words used to find the site.

Web server software includes website development tools such as HTML editor and Web page upload support.

➢ **E-commerce software's:**

With the growth of E-commerce, many applications have emerged— for example, the electronic shopping cart that tracks the items selected for purchase and their costs.

Typical E-commerce software must support the following processes:

➢ **Catalog management:**

It is required to deliver the customized content to the screen or the GUI used by the customer.

The software used for catalog management combines the different product data formats into a standard format for viewing, aggregating and interacting catalog data into a central store.

➢ **Product configuration:**

The Web-based product configuration software allows the user to build the product to their specifications without the intervention of the salespeople.

For example, Dell Computers and CISCO systems use configuration software to sell build-to-order and network processes to their customers over the Internet.

➢ **Shopping cart**

A model known as shopping cart is used by Ecommerce sites to track the items that are selected for purchase; the shopping cart allows customers to view all the items selected by them. The customers can add new items and remove the previously selected items from the shopping cart.

➢ **Transaction processing:**

E-commerce transaction processing is used to process the data received from the. Shopping cart and to calculate the total cost of the purchase.

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- **Web traffic data analysis:**

    It is required to analyze all the data captured in the Web log file. The analysis is essential to improve the Website performance.

1.3.6. Functions of Electronic Commerce

- **Marketing**:-

    One of the areas it impacts particularly is direct marketing. In the past this was mainly door-to-door, home parties (like the Tupperware parties) and mail orders using catalogues or leaflets. This moved to telemarketing and TV selling with the advance in television technology and finally developed into e-marketing.

- **Human Resource Management**:-

    Issues of on-line recruiting, home working and 'entrepreneurs' work on a project by project basis replacing permanent employees.

- **Business law and ethics**:-

    The different legal and ethical issues that have arisen as a result of a global 'virtual' market. Issues such as copyright laws, privacy of customer information etc.

- **Management Information System**:-

    Analysis, design and implementation of e-business systems within an organization; issues of integration of front-end and back-end systems.

- **Product Operations and Management**:-

    The impact of on-line processing has led to reduced cycle time. It takes seconds to deliver digitized products and services electronically; similarly the time for processing orders can be reduced by more than 90 percent from days to minutes.

- **Finance and Accounting**:-

    On-line banking ; issues of transaction costs ; accounting and auditing implications where 'intangible' assets and human capital must be tangibly valued in an increasing knowledge based economy.

- **Economy**:-

    The impact of E-commerce on local and global economies; understanding the concepts of a digital and knowledge based economy and how this fits into economic theory.

    The four functions of e-commerce are:

    1) Communication.
    2) Process Management.
    3) Service Management.
    4) Transaction capabilities process effective and cheap for suppliers and customers.

Communication: -

    It is related with exchange of information or documents for carrying out business transactions. e.g. E-mail.

Process Management Function: -

    It includes computerization and improvement of business processes. e.g. Connecting two computers in networking to share and transfer data instead of manually copying information from one computer to another.

Service Management Function: -

This is related with applying technology to improve the quality of service .E.g. Federal Express website. It allows customers to follow shipment and schedule picks up 24 hours a day with a worldwide network automatically without taking the help of service representative. Customer service is improved because of sites.

Transaction Capabilities: -

It allows buying and selling on the internet or allows carrying out any online service E.g. Retail website of Amazon.com and REI.

1.3.7. Process of E-Commerce

Under the e-commerce umbrella there exist a variety of activities. These include:

➢ **Online Shopping:** A prevalent example of e-commerce is shopping via the internet. Virtual stores are created online, often boasting more variety of choices than are available at physical stores. There are also stores that exist only online, and benefit from the lack of investment into physical infrastructure.

➢ **Electronic Payments:** Payment systems for utility bills, phone, cable and internet bills, as well as online shopping are an important aspect of e-commerce. Here, security needs to be ensured regarding credit card and personal information.

➢ **Virtual Auctions:** One version of e-commerce is the online auction popularized by eBay. These websites offer customers the benefit of selling to others at the best possible price.

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➢ **Online Ticketing:** Ticketing for almost all types of activities is now done online. This includes travel ticketing such as air travel, bus and trains, as well as tickets for entertainment and sports events. This allows people to avoid queues and just go on the day of the event.

1.3.8. Types of E-Commerce

There are a number of different types of E-Commerce

1. B2B - Business to Business
2. B2C - Business to Consumer
3. C2B - Consumer to Business
4. B2E - Business to Employee
5. C2C - Consumer to Consumer

B2B - Business to Business

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

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

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- Procurement;
- order fulfillment;
- Managing trading-partner relationships.

B2C - Business to Consumer

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

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

C2B - Consumer to Business

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

B2E - Business to Employee

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

C2C - Consumer to Consumer

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

1.3.9. Role of Internet and Web in E-Commerce

Internet provides a worldwide collection of networks, linked with each other to share information by using a common set of protocols. The Internet opens up the opportunity for people all over the world to get linked inexpensively and consistently. Since it is a large network of people and information around the world, the Internet is an enabler for e-commerce as because it allows businesses to showcase and sell their products and services online. It gives potential customers, prospects and business partners access to information about these business houses and their products and services which might lead to purchase.

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The Internet is a worldwide, publicly accessible series of interconnected computer networks that transmit data by packet switching using the standard Internet Protocol (IP). It is a "network of networks" that consists of millions of smaller domestic, academic, business, and government networks, which together carry various information and services, such as electronic mail, online chat, file transfer, and the interlinked web pages and other resources of the World Wide Web (WWW).

The Internet and the World Wide Web are not synonymous. The Internet is a collection of interconnected *computer networks*, linked by copper wires, fiber-optic cables, wireless connections, etc. In contrast, the Web is a collection of interconnected documents and other *resources*, linked by hyperlinks and URLs.

World Wide Web is an example of an information protocol/service that can be used to send and receive information over the Internet. It supports:

➢ Multimedia Information (text, movies, pictures, sound, programs . . .).
➢ Hypertext Information (information that contains links to other information resources)
➢ Graphic User Interface (so users can point and click to request information instead of typing in text commands).

The server software for the World Wide Web is called an HTTP server (or informally a Web server). Examples are Apache and IIS. The client software for World Wide Web is called a Web browser.

The Internet and the Web made e-commerce possible because they brought about an extraordinary expansion of digital services to millions of amateur computer users. The Web makes nearly all of the elements of rich human expression including color, text, images, photos, animations, sound, and video available, creating a unique environment in which to establish a commercial marketplace. Many of the Web's services and features support e-commerce, including.

Table 1: - Services support e-commerce

E-mail	Search Engine	Intelligent Agents (bots)
Instant Messaging (IM)	Online Forum & Chat	Streaming Media
Cookies		

It is interesting as you read along to compare these services to other traditional media such as television, radio, telephone or print media (newspapers , magazine's , letters etc). If you do, you will quickly realize how rich the Internet Environment is.

1. E-mail or Electronic Mail:

Since its earliest days, **electronic mail**, or **email**, has been the most used application of the Internet. **E-mail** uses a series of protocols to enable messages containing **text**, **images**, **sound**, and **video** clips to be transferred from one Internet user to another. Because of its flexibility and speed, it is now the most popular form of **business communication** – more popular than the **phone**, **fax** or any **postal services**.

E-mail, for example, can be used as a very **effective marketing**

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tool. E-commerce **sites** can buy e-mail lists from various sources and collate(bring together) them with lists of their current customers to create a targeted advertising message that can be quickly and economically delivered and will produce a **creditable response**. Email messages include **commercial**, **personal**, **spam** and **junk** etc.

➢ **Spam** -- usually refers to **advertising e-mails** sent out **randomly** to **generated** e-mail addresses.

➢ **Junk e-mails --** are usually sent from sites which have a **record** of your e-mail address either because you have signed onto(sites) them using your e-mail as your **userid**, or because you have **ticked** the appropriate box(check box) on the web-site allowing them to use your e-mail address in this way.

➢ **Inbox**-- contains new incoming emails.

➢ **Sent**-- A copy of messages you send are put into the **Sent** folder, if the **Save to sent** box is checked when you compose a message.

➢ **Drafts**-- A place for storing messages that you haven't finished writing. If you're in the middle of writing a message and need to stop for some reason, click the **Save** button to put it into the Drafts folder.

➢ **Trash**-- stores email that you have chosen to delete. When you delete email from a folder, it is put into the **Trash** folder. The messages are not truly deleted until you empty the folder.

➢ **Attachment** – a file (documents, images, sounds or video clip) inserted within an email message.

2. Search Engine

Identifies web pages that appears to match keywords, also called queries, typed by the user and provides a list of the best matches.

No one knows for sure how many web pages there really are. But obviously with so many web pages, finding web specific pages than can help you or your business, nearly instantly, is an important problem. The question is: how can you find the one or two web pages you really want and need out of the 50 billion (google) indexed web pages? or Bing 20 billion indexed WebPages.

Search engines (Google, Yahoo, bing, baidu) solve the problem of finding useful information on the web nearly instantly. There are hundreds of different search engines in the world, but the vast majority of the search results are supplied by the top fine providers.

Search Engine Marketing:

Initially, few understood how to make money out of search engines that changed in 2000 when GOto.com (Later overtrue.com) allowed advertisers to bid for placement on their search engine results and Google followed suit in 2003 with its **Ad Words** program which allowed advertisers to bid for placement of short text ads on Google search results. The spectacular increase in Internet advertising revenues has helped search engines transform them selves into major shopping tools and created an entire new industry called "search engine marketing." Search engine marketing has been the fastest – growing form of advertising in the US.

When users enter a search term at Google, MSN Search, Yahoo, or any of the other web sites serviced by these search engines, they receive two types of listing: sponsored links, for which advertises have paid to be listed (usually at the top of the search results page) and

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unsponsored "organic" search results. In addition, advertisers can purchase small text ads on the right side of the search results page.

In addition, search engines are extending their services to include maps, satellite images, computer images, email, calendars and group meeting tools. Outside of email, search engines are the most common onlIne daily activity and produce the largest online audiences.

Search engines (Site Own Search) have also become a crucial tool on e-commerce sites, providing a method for customers to quickly locate the product category or a specific product they are looking for.

1.3.9.1. Technologies Used

E-commerce must be supported by corresponding technologies. To study e-commerce, one must masters the e-commerce supporting technologies. General speaking, e-commerce supporting technologies can be divided into three categories:

➤ Information display technologies which include Web, HTML, XML and Java technologies.

➤ Information transmission technologies which consist of EDI, TCP/IP, WAP, WLAN and Bluetooth technologies.

➤ Information processing technologies which comprise some common used technology such as GPS, GIS, DSS, GDSS, IDSS.

Electronic Data Interchange (EDI)

➤ EDI is the computer-to-computer exchange of structured business information in a standard electronic format. Information stored on one computer is translated by software programs into standard EDI format for transmission to one or more trading partners. The trading partners' computers, in turn, translate the information using software programs into a form they can understand.

Bar Codes

➤ Bar codes are used for automatic product identification by a computer. They are a rectangular pattern of lines of varying widths and spaces. Specific characters (e.g. numbers 0-9) are assigned unique patterns, thus creating a "font" which computers can recognize based on light reflected from a laser.

➤ The most obvious example of bar codes is on consumer products such as packaged foods. These codes allow the products to be scanned at the check out counter. As the product is identified the price is entered in the cash register, while internal systems such as inventory and accounting are automatically updated.

➤ The special value of a bar code is that objects can be identified at any point where a stationary or hand held laser scanner could be employed. Thus the technology carries tremendous potential to improve any process requiring tight control of material flow. Good examples would be shipping, inventory management, and work flow in discrete parts manufacturing.

Electronic Mail

➤ Messages composed by an individual and sent in digital form to other recipients via the Internet.

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Internet

➢ The Internet is a decentralized global network of millions of diverse computers and computer networks. These networks can all "talk" to each other because they have agreed to use a common communications protocol called TCP/IP. The Internet is a tool for communications between people and businesses. The network is growing very, very fast and as more and more people are gaining access to the Internet, it is becoming more and more useful.

World Wide Web

➢ The World Wide Web is a collection of documents written and encoded with the Hypertext Markup Language (HTML). With the aid of a relatively small piece of software (called a "browser"), a user can ask for these documents and display them on the user's local computer, although the document can be on a computer on a totally different network elsewhere in the world. HTML documents (or "pages," as they are called) can contain many different kinds of information such as text, pictures, video, sound, and pointers, which take users immediately to other web pages. Because Web pages are continually available through the Internet, these pointers may call up pages from anywhere in the world. It is this ability to jump from site to site that gave rise to the term "World Wide Web." Browsing the Web (or "surfing the Net") can be a fascinating activity, especially to people new to the Internet. The World Wide Web is by far the most heavily used application on the Internet.

Product Data Exchange

➢ Product data refers to any data that is needed to describe a product. Sometimes that data is in graphical form, as in the case of pictures, drawings and CAD files. In other cases the data may be character based (numbers and letters), as in the case of specifications, bills of material, manufacturing instructions, engineering change notices and test results.

➢ Product data exchange differs from other types of business communications in two important ways. First, because graphics are involved users must contend with large computer files and with problems of compatibility between software applications. (The difficulty of exchanging CAD files from one system to another is legendary.) Second, version control very quickly gets very complicated. Product designs, even late in the development cycle, are subject to a great deal of change, and because manufacturing processes are involved, even small product changes can have major consequences for getting a product into production.

Electronic Forms

➢ Electronic forms are a technology that combines the familiarity of paper forms with the power of storing information in digital form. Imagine an ordinary paper form, a piece of paper with lines, boxes, check-off lists, and places for signatures. To the user an electronic form is simply a digital analogue of such a paper form, an image, which looks like a form but which appears on a computer screen and is filled out via mouse, and keyboard. Behind the screen, however, lie numerous functions that paper and pencil cannot provide. Those extra functions come about because the data from electronic forms are captured in digital form, thus allowing

storage in data bases, automatic information routing, and integration into other applications.

1.3.10. E-Commerce Systems

It is important to identify the key drivers of e-commerce to allow a comparison between different countries. It is often claimed that e-commerce is more advanced in the USA than in Europe. These key drivers can be measured by a number of criteria that can highlight the stages of advancement of e-commerce in each of the respective countries. The criteria that can determine the level of advancement of e-commerce are summarized and can be categorized as:

1. Technological factors – The degree of advancement of the telecommunications infrastructure which provides access to the new technology for business and consumers.
2. Political factors – including the role of government in creating government legislation, initiatives and funding to support the use and development of e-commerce and information technology.
3. Social factors – incorporating the level and advancement in IT education and training which will enable both potential buyers and the workforce to understand and use the new technology.
4. Economic factors – including the general wealth and commercial health of the nation and the elements that contribute to it.

Since a distinction has been made in this book between e-commerce and e-business for consistency, the key drivers of e-business are also identified. These are mainly at the level of the firm and are influenced by the macro-environment and e-commerce, which include:

➤ Organizational culture – attitudes to research and development (R&D); its willingness to innovate and use technology to achieve objectives.
➤ Commercial benefits – in terms of cost savings and improved efficiency that impact on the financial performance of the firm.
➤ Skilled and committed workforce – that understands, is willing and able to implement new technologies and processes.
➤ Requirements of customers and suppliers – in terms of product and service demand and supply.
➤ Competition – ensuring the organisation stays ahead of or at least keeps up with competitors and industry leaders.

These key drivers for the implementation of e-business can be put into the context of the classic economic equation of supply and demand

System Development Tools The tools chosen for developing this system are: HTML5, PHP, MYSQL, jQuery and XAMPP. They are chosen based on their popularity and ease of use.

I. HTML5: Is a reversion of the Hypertext Markup Language (HTML), the standard programming for describing the contents and appearance of web pages. HTML is the most common language used in creating web pages.A markup language is a set of markup tags and the tags describe document content.

II. PHP: is an acronym for "PHP Hypertext Preprocessor"; originally called "Personal Home Page Tools. PHP is a server-side scripting language, and is a powerful tool for making dynamic and interactive Web pages quickly. PHP is a widely-used, platform independent, open source

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(Anyone may view, modify and redistribute source code and supported freely by community), free, and efficient alternative to competitors such as Microsoft's ASP. PHP scripts are executed on the server.

III. jQuery: jQuery is used to create an amazing effects and animations for interactive web applications. jQuery is a lightweight JavaScript library that emphasizes interaction between JavaScript and HTML. An advantage over just JavaScript ismuch easier to use and Eliminates cross-browser problems.

IV. MYSQL: MySQL is a Leading open source RDBMS, Ease of use -No frills, Fast, Robust, Security, Multiple OS support, Free (much cheaper than Oracle!), Technical support, Easy to use Shell for creating tables, querying tables, Support large database– up to 50 million rows, file size limit up to 8 Million TB etc.

1.3.11. Pre-requisites of E-Commerce

This section gives a very brief overview of the requirements for e-commerce. However, it is important to understand that all of these are not necessarily required for all levels of e-commerce. Requirements widely vary with different kinds of e-commerce activities.

Telecommunication Infrastructure Requirements

This mostly entails bandwidth and security. The requirement for bandwidth varies widely from one e-commerce activity to another making it hard to generalize. Bandwidth usually becomes crucial for service-based B2B e-commerce as opposed to product-based one and high-traffic B2C e-commerce as opposed to low-traffic one. Two main components of security requirements for e-commerce are type of firewall and encryption/algorithm mechanism. This also varies widely from one e-commerce activity to the other. Ranging from protection against unwanted disclosure of client information to guarantee of reliable electronic payment. Security requirements are a crucial part of e-commerce.

Hardware Requirements for E-commerce

Hardware requirements for high-traffic sites may be dependent on the following issues: number of transactions per second; number of hits per second; number of queries per second; number of queries done by RDBMS per second; number of pages served per second involving all of the above parameters. Some other factors that need to be considered when setting up a high traffic e-commerce site include clustering i.e. use of backup servers which automatically takes over operations in case of failure of primary ones. Low-traffic sites can be easily served from a single machine depending on the needs of the business. Pentium II/III based Intel server running Linux can serve hundreds of unique customers each day.

Software Requirements for E-commerce

several software are available free on the Internet that can be used to build e-commerce exchanges. Some examples are Apache Web Server, Apache-Jserv Servlet Engine, Linux Operating System, mySQL database, postgresql etc. Many of these open source software may not be adequate for high-traffic sites.

Technical Skill Requirements

A systems administrator must have a good knowledge of computer hardware, must be able to maintain and upgrade hardware including hard drive, processor and motherboard. He/she must also have the skill to install and compile Apache, mySQL and Java servlet engine. A developer needs to be a high level programmer with a few years of experience in the industry and must possess a clear understanding of how an e-commerce system works. Understanding how information flows from one end of the system to another and what modifications take place in between is essential. Specific required skills include programming skills in C, PHP and Java and knowledge on SQL programming and data architecture.

Financial Infrastructure

Payment procedures are the ways in which a seller can receive payment in return for the goods or services sold. Access to these services depends on the banking infrastructure in location of selling and customers' locations.

Legal and Policy Framework

In general, policies that ensure legal certainty, security and consumer protection for online transactions and interactions should be enacted. These include the resolution of issues such as transactional security, electronic contract enforceability and the authentication of individuals and documentation. The development of such an enabling environment has involved a joint focus of government and private sectors on: an efficient and sound financial system (including online payments, the use of electronic currency and foreign exchange liberalization), an efficient, inexpensive and reliable telecommunication system (including to long-distance market, competitive local exchange carriers, and high speed lines),legal mechanisms for the enforcement of contract law, consumer protection and defense of intellectual property rights, an efficient tax administration, and swift, transparent, and reliable customs operations.

1.3.12. Scope of E-Commerce

Electronic Commerce (e-Commerce) is a term popularized by the advent of commercial services on the Internet. Internet e-Commerce is however, only one part of the overall sphere of e-Commerce. The commercial use of the Internet is perhaps typified by once-off sales to consumers. Other types of transactions use other technologies. Electronic Markets (EMs) are in use in a number of trade segments with an emphasis on search facilities and Electronic Data Interchange (EDI) is used for regular and standardized transactions between organizations. The mainstream of e-Commerce consists of these three areas; these are represented as a diagram and outlined in a little more detail below.

➢ **Electronic Markets:** An electronic market is the use of information and communications technology to present a range of offerings available in a market segment so that the purchase can compare the prices (and other attributes) of the offerings and make a purchase decision. The usual example of an electronic market is an airline booking system.

➢ **Electronic Data Interchange (EDI):** EDI provides a standardized system for coding trade transactions so that they can be communicated directly

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from one computer system to another without the need for printed orders and invoices and the delays and errors implicit in paper handling. EDI is used by organizations that make a large number of regular transactions. One sector where EDI is extensively used is the large supermarket chains which use EDI for transactions with their suppliers.

➢ **Internet Commerce:** Information and communications technologies can also be used to advertise and make once-off sales of a wide range of goods and services. This type of e-Commerce is typified by the commercial use of the Internet. The Internet can, for example, be used for the purchase of books that are then delivered by post or the booking of tickets that can be picked up by the clients when they arrive at the event. It is to be noted that the Internet is not the only technology used for this type of service and this is not the only use of the Internet in e-Commerce.

1.3.13. E-Business Models

A business model is the method of doing business by which a company can sustain itself (generate revenue). The business model spells-out how a company makes money by specifying where it is positioned in the value chain. • There are many benefits of bringing a business to the Internet. An e-business can offer personalization, high quality customer service and improved supply-chain management. Examples of the models include:

➢ Storefront Model.
➢ Auction Model.
➢ Portal Model.

Storefront Model.

➢ This model is a basic form of e-commerce in which the buyer and the seller interact directly. It combines transaction processing, security, online payment and information storage to enable merchants to sell their products online. To conduct storefront e-commerce, merchants need to organize online catalogs of products, take orders through their Web sites, accept payments securely, send merchandize to customers and manage customer data. The storefront should be marketed to potential customers. Many of the leading storefront model companies are B2C (Business to consumer).

➢ Examples: – www.more.com (health and beauty e-commerce) – www. moviefone.com (movie tickets, reviews, movie clips and trailers).

Shopping-Cart Technology

➢ One of the most commonly used e-commerce enablers is the shopping cart. This order-processing technology allows customers to accumulate items they wish to buy as they continue to shop. Supporting the shopping cart is a product catalog, which is hosted on the merchant server in the form of database. The merchant server is the data storage and management system employed by the merchant. It is often a system of computers that conduct all of the functions necessary for running a Web site. A database is a part of the merchant server designed to store and report on large amounts of information.

➢ For example, a database for an online clothing retailer would typically include such product specifications as item description, size, availability,

shipping information, stock level, and on-order information. Amazon.com is a good example of an e-business that uses shopping-cart technology.
Online Shopping Malls

➢ Online shopping malls present consumers with a wide selection of product and services.

➢ Consumers can find products from a wide variety of vendors, and rather than making several separate purchases, they can use the mall's shopping-cart technology to purchase items from many stores in a single transaction.

➢ Often these online shopping-mall sites act as shopping portals, directing traffic to the leading retailers for a specific product.

Auction Model

➢ The Web offers many kinds of auction sites that search other auction sites to pinpoint the lowest prices on an available item. • Auction sites act as forums through which Internet users can assume the role of either seller or bidder. As a seller, you post an item you wish to sell, the minimum price your require to sell your item and, deadline to close the auction, and many other features depending on the site.

➢ eBay is one of the most profitable online auction models. On eBay, people can buy and sell just about anything. The company collects a submission fee, plus a percentage of the sale amount. eBay uses a database to manage the millions of auctions it offers. This database evolves dynamically as sellers and buyers enter personal identification and product information.

Portal Model

o Portal models give the visitors the chance to find almost everything they are looking for in one place. They often offer news, sports, and weather information, as well as the ability to search the web.

o Examples include

        www.hotbot.com;

        www.about.com;

        www.altavista.com;

o These portals provide users with a shopping page that links them to thousands of sites carrying a variety of products. Portals link consumers to online merchants, online shopping malls, and auction sites. They help users collect information on an item for which they are looking and allow users to browse independently owned storefronts.

1.4. LET US SUM UP

In this unit, you have learnt about the basics of e-commerce, components of e-commerce and functions of e-commerce. This knowledge would make you understand the various e-commerce aspects and types of e-commerce used to develop the business using various models. Thus, the E-Commerce unit would have brought you to closer to know the basic concept of e-commerce.

1.5. UNIT – END QUESTIONS

1. List out the functions of E-Commerce.
2. Explain about the prerequisites of E-Commerce.
3. Define E-Business Models?

1.6. ANSWER TO CHECK YOUR PROGRESS

1. Functions of Electronic Commerce
➢ Marketing:-
➢ Human Resource Management:-
➢ Business law and ethics:-
➢ Management Information System:-
➢ Product Operations and Management:-
➢ Finance and Accounting:-
➢ Economy:-
   The four functions of e-commerce are:
1) Communication.
2) Process Management.
3) Service Management.
4) Transaction capabilities process effective and cheap for suppliers and customers.

2. This section gives a very brief overview of the requirements for e-commerce. However, it is important to understand that all of these are not necessarily required for all levels of e-commerce. Requirements widely vary with different kinds of e-commerce activities.
➢ Telecommunication Infrastructure Requirements
➢ Hardware Requirements for E-commerce
➢ Software Requirements for E-commerce
➢ Technical Skill Requirements
➢ Financial Infrastructure
➢ Legal and Policy Framework

3. A business model is the method of doing business by which a company can sustain itself (generate revenue). The business model spells-out how a company makes money by specifying where it is positioned in the value chain. • There are many benefits of bringing a business to the Internet. An e-business can offer personalization, high quality customer service and improved supply-chain management. Examples of the models include:
➢ Storefront Model.
➢ Auction Model.
➢ Portal Model.

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1.7. SUGGESTED READINGS

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UNIT II – E-COMMERCE ACTIVITIES

Structure

2.1. Introduction
2.2. Objective
2.3. E-commerce Activities
      2.3.1. Various Activities of E-Commerce
      2.3.2. Various Modes of Operation Associated with E-Commerce
      2.3.3. Matrix of E-Commerce Types
      2.3.4. Elements and Resources impacting E-Commerce and Changes
      2.3.5. Types of E-Commerce Providers and Vendors
      2.3.6. Man Power Associated with E-Commerce Activities
2.4. Opportunity Development for E-Commerce Stages
      2.4.1. Development of E-Commerce Business Case
      2.4.2. Components and Factors for the Development of the Business case
2.5. Steps to Design and Develop an E-Commerce Website
2.6. Let Us Sum Up
2.7. Unit – End Exercises
2.8. Answer to Check Your Progress
2.9. Suggested Readings.

2.1. INTRODUCTION

In this lesson you will be aware with the basic activities of e-commerce and stages and steps to design and develop an e-commerce website. These activities include the various models, e-commerce types, elements and resources and man power associated with e-commerce. These basic activities are used to construct and manage the more comprehensive e-commerce process.

2.2. OBJECTIVES

After going through this lesson you would be in a positions to
➢ Various activities and modes of e-commerce.
➢ Types of E-Commerce Providers and Vendors.
➢ Define E-Commerce stages and components.
➢ Explain the steps and development of e-commerce Website.

2.3. E-COMMERCE ACTIVITIES

2.3.1. Various Activities of E-Commerce
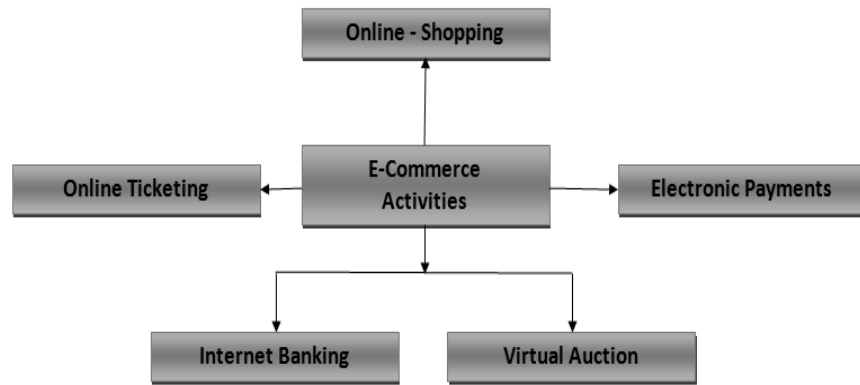
Figure 2: - Activities of E-Commerce

➢ **Online Shopping:** A prevalent example of e-commerce is shopping via the internet. Virtual stores are created online, often boasting more variety of choices that are available at physical stores. There are also stores that exist only online and benefit from the lack of investment into physical infrastructure.

➢ **Electronic Payments:** Payment systems for utility bills, phone, cable and internet bills, as well as online shopping, are an important aspect of e-commerce. Here, security needs to be ensured regarding credit card and personal information.

➢ **Virtual Auctions:** One version of e-commerce is the online auction popularized by eBay. These websites offer customers the benefit of selling to others at the best possible price.

➢ **Internet Banking:** E-commerce has allowed many people to forego frequent visits to the bank and instead perform their regular banking activities online via secure banking service.

➢ **Online Ticketing:** Ticketing for almost all types of activities is now done online. This includes travel ticketing such as air travel, bus and trains, as well as tickets for entertainment and sports events. This allows people to avoid queues and just go on the day of the event.

2.3.2. Various Modes of Operation Associated with E-Commerce

Electronic Commerce, largely through the Internet, provides customers with direct access to services. As a consequence, most of the value added tasks of agents and brokers can be automated. As more and more people accept E-Commerce as an alternative to more traditional labour intensive processes that have for years supported these types of service businesses, there will be less need for human representatives to directly provide the service and greater need for technical personnel to create and maintain the technical systems that support the services. We now turn our attention to how EC supports functional operations in organizations.

➢ **Marketing**
o A market is a network of interactions and relationships where information, products, services and payments are exchanged. The advent

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of EC is changing marketing practice. In particular, the transformation of traditional intermediaries such as retailers occurs as a result of new computer-mediated relationships. One need only examine the setting of an interactive home-shopping supermarket to appreciate the changing role of the retailer in EC. EC systems for business-to-business commerce on the Internet are still in their infancy. Internet electronic markets for business-to-business EC follow the n-suppliers while m-customers scenario is slowly evolving. Comprehensive Internet EC systems should provide sure and easy access, be easy to use, help overcome differences in time of business, location, and language between suppliers and customers, and at the same time support the entire trading process in business-to-business commerce

➢ **Purchasing**

o Automated purchasing and logistics are carried out between trading partners with well established relationships – this is a primary application of EDI. The purchase and delivery of a product can signal the termination of the negotiation stage or occur sometime afterwards. On-line purchasing environments are still very much in their infancy, and over the next few years, one may expect to see a rapid increase in the functionality of these environments that will assist both buyers and sellers. Intelligent purchasing advisors will assist buyers in specifying their product requirements, searching for product information, and selecting the best supplier. This might lead to a shift in the balance of power from sellers to buyers.

➢ **Design**

o High quality design of products has been successfully achieved with the help of quality function deployment (QFD), design for manufacturing and design for quality. Also, various computer-based technologies have helped to improve the quality of product designs. These include computer-aided design (CAD), 3D Modelling and ProEngineer to reduce the time to develop new products.

➢ **Production**

o For organizations to stay in synchronization with the changes taking place in their operational and competitive environments, the use of fast, accurate information systems is crucial. The implementation of e-manufacturing or e-service necessitates business-to-business (B2B) e-commerce. Communication and data collection constraints are reduced with Web-based production of goods and services. Using database management, data warehouse and data mining technologies, the Web can facilitate interaction with customers and suppliers, data collection, and data analysis processes.

➢ **Sales and Distribution**

o EC looks like it is finally coming into the mainstream and retailers are beginning to realize its key role in customer service. A large number of potential web shoppers abort their transactions in frustration over the process and have security fears about web-based transactions. Powerful techniques have been developed in the Internet framework to support the security requirements that are the foundation of EC. Also, EC models for business-to-business and consumer-to-business transactions have been

developed. Moreover, the necessary regulation framework is being settled.

➢ **Warehousing**

o EDI can help to minimize warehousing cost. EDI enables minimal stocks to be held with the resultant saving in the costs of storage, insurance, warehousing and security. Improved audit trails lead to better stock management and accountability. Reduction in manual processing reduces the need for people, thus labour cost savings are possible. Just-in-time manufacturing refers to the ability to produce minimal sized batches of finished goods, only when needed, i.e. responding to market pull; in an extended supply chain, EDI leads to minimal stock holdings by all parties and hence a reduced supply chain system operating costs. EDI also helps to improve cash flow – vast improvements in matching invoices against orders and receipts become possible leading to timely payment. Reduced stock handling saves money.

➢ **Supplier Documents**

o EC's access to information and suppliers can empower buyers by giving them access in turn to a larger number of alternative products, and by allowing them to consider a larger number of vendors. Companies can also establish contact and do business with a wider range of trading partners and customers. Many organizations can do business globally because EC can reduce and even eliminate barriers associated with time and distance. Intelligent agents can assist buyers in finding the best prices on products and the most favorable terms available from suppliers.

2.3.3. Matrix of E-Commerce Types

Ecommerce (e-commerce) or electronic commerce, a subset of e-business, is the purchasing, selling, and exchanging of goods and services over computer networks (such as the Internet) through which transactions or terms of sale are performed electronically. Contrary to popular belief, ecommerce is not just on the Web. In fact, ecommerce was alive and well in business to business transactions before the Web back in the 70s via EDI (Electronic Data Interchange) through VANs (Value-Added Networks). Ecommerce can be broken into four main categories: B2B, B2C, C2B, and C2C.

➢ B2B (Business-to-Business)

Companies doing business with each other such as manufacturers selling to distributors and wholesalers selling to retailers. Pricing is based on quantity of order and is often negotiable.

➢ B2C (Business-to-Consumer)

Businesses selling to the general public typically through catalogs utilizing shopping cart software. By dollar volume, B2B takes the prize, however B2C is really what the average Joe has in mind with regards to ecommerce as a whole.

Having a hard time finding a book? Need to purchase a custom, high-end computer system? How about a first class, all-inclusive trip to a tropical island? With the advent ecommerce, all three things can be purchased literally in minutes without human interaction. Oh how far we've come!

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➢ C2B (Consumer-to-Business)

A consumer posts his project with a set budget online and within hours companies review the consumer's requirements and bid on the project. The consumer reviews the bids and selects the company that will complete the project. Elance empowers consumers around the world by providing the meeting ground and platform for such transactions.

➢ C2C (Consumer-to-Consumer)

There are many sites offering free classifieds, auctions, and forums where individuals can buy and sell thanks to online payment systems like PayPal where people can send and receive money online with ease. eBay's auction service is a great example of where person-to-person transactions take place everyday since 1995.

Companies using internal networks to offer their employees products and services online--not necessarily online on the Web--are engaging in B2E (Business-to-Employee) ecommerce.

G2G (Government-to-Government), G2E (Government-to-Employee), G2B (Government-to-Business), B2G (Business-to-Government), G2C (Government-to-Citizen), C2G (Citizen-to-Government) are other forms of ecommerce that involve transactions with the government--from procurement to filing taxes to business registrations to renewing licenses. There are other categories of ecommerce out there, but they tend to be superfluous.

2.3.4. Elements and Resources impacting E-Commerce and Changes

E-commerce and e-business are not solely the Internet, websites or dot com companies. It is about a new business concept that incorporates all previous business management and economic concepts. As such, e-business and e-commerce impact on many areas of business and disciplines of business management studies. For example:

➢ **Marketing** – issues of on-line advertising, marketing strategies and consumer behaviour and cultures. One of the areas in which it impacts particularly is direct marketing. In the past this was mainly door-todoor, home parties (like the Tupperware parties) and mail order using catalogues or leaflets. This moved to telemarketing and TV selling with the advances in telephone and television technology and finally developed into e-marketing spawning ‗eCRM' (customer relationship management) data mining and the like by creating new channels for direct sales and promotion.

➢ **Computer sciences** – development of different network and computing technologies and languages to support e-commerce and e-business, for example linking front and back office legacy systems with the ‗webbased' technology.

➢ **Finance and accounting** – on-line banking; issues of transaction costs; accounting and auditing implications where ‗intangible'assets and human capital must be tangibly valued in an increasingly knowledge based economy.

➢ **Economics** – the impact of e-commerce on local and global economies; understanding the concepts of a digital and knowledge-based economy and how this fits into economic theory. **Production and operations management** – the impact of on-line processing has led to reduced cycle

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times. It takes seconds to deliver digitized products and services electronically; similarly the time for processing orders can be reduced by more than 90 per cent from days to minutes. Production systems are integrated with finance marketing and other functional systems as well as with business partners and customers.

➢ **Production and operations management (manufacturing)** – moving from mass production to demand-driven, mass customization customer pull rather than the manufacturer push of the past. Web-based Enterprise Resource Planning systems (ERP) can also be used to forward orders directly to designers and/or production floor within seconds, thus cutting production cycle times by up to 50 per cent, especially when manufacturing plants, engineers and designers are located in different countries. In sub-assembler companies, where a product is assembled from a number of different components sourced from a number of manufacturers, communication, collaboration and coordination are critical – so electronic bidding can yield cheaper components and having flexible and adaptable procurement systems allows fast changes at a minimum cost so inventories can be minimized and money saved.

➢ **Management information systems** – analysis, design and implementation of e-business systems within an organisation; issues of integration of front-end and back-end systems.

➢ **Human resource management** – issues of on-line recruiting, home working and 'entrepreneurs'work on a project by project basis replacing permanent employees.

➢ **Business law and ethics** – the different legal and ethical issues that have arisen as a result of a global 'virtual'market. Issues such as copyright laws, privacy of customer information, legality of electronic contracts, etc.

2.3.5. Types of E-Commerce Providers and Vendors

E-commerce vendors are needed to supply the software and services used to start and operate most online stores. However, they are more prominently known for supplying consumable and durable goods to online shop owners so that they can resell the items at a profit. As many people realize their dreams of store ownership by opening their own electronic retail stores, there is an increase in the need for suppliers for this fast paced niche sector within the retail industry. E-commerce store owners must choose suppliers that are agile, flexible and quality oriented, or they risk being driven out of business by competing e-shops that have leaner, more reliable supply chains.

Types of E-Commerce Vendors

One of the most exciting ways that online stores can get up and running very quickly and with plenty of product offerings is by using drop shipping vendors, according to Practical Electronic Commerce. These vendors allow retailers to take orders from customers over their websites, and the vendors deliver the products directly to the purchaser. It sounds very easy, but there are some drawbacks. For instance, the online retailer must rely on the drop shipper to make appropriate deliveries of undamaged products to their customers within specified time periods. Since the vendors have many different customers, there are bound to be

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mistakes. The online retailer must be ready to field customer complaints when this happens. Also, the profit margins on the drop shipped items are low because the e-commerce vendors are doing most of the logistical work and inventory storage. The wholesaler is another type e-commerce vendor. Online store owners can purchase items from wholesalers that are below list prices and resell them to their online customers for a profit. Even though higher shipping costs are involved, the profit margins that online retailers gain by using overseas wholesale suppliers are almost always larger than when they use domestic wholesalers. However, online retailers must watch for quality issues when using overseas supply companies that beat out the competition through the use of cheap labor. Online retail business owners who sell specialty goods often find that the best e-commerce vendors are the manufacturers of the goods. These e-shop owners can establish purchase agreements with manufacturers, and the results are lower prices and potentially higher profits from sales.

Characteristics of Reliable E-Commerce Vendors

Reliable e-commerce vendors have quality control systems in place to ensure that purchased products are delivered without damage. The best way for online retailers to find out about the quality control practices of potential e-commerce vendors is to go through a company that pre-screens vendors. The pre-screening service helps to reduce the chances of retailers falling prey to scam artists, and they often highlight their quality control practices and past performance. Reliable e-commerce vendors also work with retailers to solve unexpected problems instead of leaving the online retailer to handle customer care nightmares on their own. Retailers can get good indicators of the quality of the vendors' services by checking if near competitors or leaders in the market are being supplied by them. If market leaders have been serviced by the vendor for a long period of time, then the vendor probably has a sustainable track record for success.

Ecommerce has transformed how people buy and sell online. The Internet provides a fast and easy way for people to purchase things without having to visit an actual store. An online store can reach customers anywhere in the world. In fact, online shopping has become so popular that many vendors sell only online with no physical location. Ecommerce also facilitates the purchase of digital media such as downloadable music and movies: with no physical product, vendors can boast truly instant delivery. There are many Ecommerce companies, and it's important to understand which of the best Ecommerce sites let your online shop flourish as you sell online.

Today's top Ecommerce site builders take all of these factors into account for your Ecommerce website. Many programs are designed to accommodate the sale of both physical and downloadable products. In addition, online businesses are quickly evolving to face times of economic hardship by offering steeper discounts, flat-rate shipping, loyalty programs, and other perks. Many Ecommerce site builders and the best Ecommerce platform options make it easy to run promotions and keep your customers happy. Finally, although the boom in online sales has also opened a potential avenue for fraud and scams, site-builders have

Notes

managed to stay ahead by offering top-of-the-line site protection and payment security to keep the online marketplace as safe as possible.

The Three S's of Ecommerce
Storage Space:

Some Ecommerce site builders put a cap on your sales, so choose one offers you the inventory space and bandwidth to fit your needs. The best Ecommerce platform will let your online shop sell online without limitations.

Safety Protocols:

Choose a program that offers fraud protection and Secure Socket Layer (SSL) encryption. This is for the protection of you and your customers. SSL technology makes it possible to send online payments securely and is a must-have on all Ecommerce sites.

Site Design:

Your Ecommerce solution should have a user-friendly interface. The best Ecommerce sites and functions of each tool should be clear and it should be easy to select your desired options.

2.3.6. Man Power Associated with E-Commerce Activities

It is an interesting thing about eCommerce, that what starts with a lean, technology led approach, quickly translates into a large team, operationally intensive business.

As e-commerce is still in its growth phase, sourcing and merchandising continue to stay as critical functions. If a company needs more sellers, products on board in less time, they need a large workforce to do the job. Add overtime, once the company starts attracting sellers, the same teams shift to enablement and managing these sellers.

This is typical to a marketplace e-commerce model, and for branded retailers they already have a strong and set merchandising / sourcing function. Their e-commerce can simply plug into their existing teams.

Software Professionals

E-Commerce poses a continued requirement of technology enhancement / optimization / support. With scale, everything changes in technology. Hence for a good number of years of growth, technology grows probably at the same pace, may be faster, than other functions. Eventually, if a branded retailer, the technology shall stabilize, however the battle is endless for marketplace players.

Order/ Customer management

This is really the function which is hungry for people. More orders, more processes, more people to do the job. Right from order verification, address verification, coordination between various parties to deliver the order, and if there is an issue, handling and resolving the customer request.

This team is typically termed as mid and back office of e-commerce, with contact center being mid office and all other operational processes being back office.

Evolution in technology has led to automate some processes like auto verification calls, auto-confirmation calls, interactive voice interfaces for order inquiry, support request submitting, etc. which can save cost of manpower and bring higher efficiency in system.

Accounting

Some companies, who fail to deploy right technology in accounting systems, may need a large team just to ensure AR and AP due to multiparty environment of e-commerce. Account reconciliation, payment support to parties, managing accurate accounting for individual customers are the areas that may need intense manpower.

Web store Management

A Web store or a mobile store is all you have to engage customers buying with you. Hence it demands a continued focus in many small tasks. Like banner changes, images, data information correctness, continued testing, etc.

A lot of these challenges can be solved by right and reliable technology; however a team constantly focused on looking at your store on a min by min basis, is suggested.

Logistics and Warehousing

Manpower requirement in this function is dependent on the business model you have chosen and functions you have in-sourced.

For marketplaces as they try to do most of things themselves right to the last mile delivery, the need of manpower is substantial however for brands, they can safely ride on 3rd parties to meet their delivery, and even warehousing needs.

Warehouse typically needs scaling of manpower for:

➢ Inward of goods, proportional to growth in product assortment, suppliers and variety.
➢ Picking, packaging largely proportional to number of items per order and vary category by category.
➢ Dispatch, proportional to number and size of boxes.

Technology can simplify the process and may reduce some manpower needs.

2.4. OPPORTUNITY DEVELOPMENT FOR E-COMMERCE STAGES

The usage of the stages of e-commerce can help to understand how e-commerce is unfolding and are winning the battle to move online. The time between stages will be reduced as software costs come down and wholesalers selling less than the industry average scramble their efforts.

2.4.1. Development of E-Commerce Business Case

There are four major factors to consider when building the ecommerce business plan. To explore ecommerce business models, selling options, related costs, and how to define each in your ecommerce business plan.

Business Plan

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The first element of your ecommerce business plan is:

1. Deciding which types of product or products to sell in your ecommerce business.
2. Identifying suppliers if you don't produce items yourself. These can be wholesale, drop-ship, or print-on-demand vendors.
3. Budget in upfront and ongoing manufacturing, wholesale, or other production costs where applicable.
4. For digital products, identify software needed to produce digital files for distribution.

Operation

The second element of your ecommerce business plan is:

1. Deciding how to handle physical product stock storage and order fulfillment, and budgeting for those costs.
2. For drop-ship and print-on-demand products, understanding how fulfillment and shipping costs are handled by each vendor.
3. For digital products, make sure your digital files can be stored and delivered securely via your ecommerce platform.

Sales Channels

The third element of your ecommerce business plan is:

1. Deciding which online store platform and/or sales channels to use to sell your products.
2. Budgeting the monthly web hosting fees where applicable.
3. Understanding and budgeting Amazon, Etsy, and eBay seller marketplace fees.
4. Understanding and budgeting credit card processing costs.

Marketing

The fourth element of your ecommerce business plan is:

1. Planning a store launch marketing campaign and including these costs in your budget.
2. Creating a three- to six-month outlook marketing plan and including these costs in your budget.

2.4.2. Components and Factors for the Development of the Business case

A business case captures the reasoning for initiating a project or task. It is often presented in a well-structured written document, but may also come in the form of a short verbal agreement or presentation. The logic of the business case is that, whenever resources such as money or effort are consumed, they should be in support of a specific business need. An example could be that a software upgrade might improve system performance, but the "business case" is that better performance would improve customer satisfaction, require less task processing time, or reduce system maintenance costs. A compelling business case adequately captures both the quantifiable and non-quantifiable characteristics of a proposed project. Business cases can range from comprehensive and highly structured, as required by formal project management methodologies, to informal and brief. Information included in a formal business case could be the background of the project, the expected business benefits, the options considered (with reasons for

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rejecting or carrying forward each option), the expected costs of the project, a gap analysis and the expected risks.

Business cases are created to help decision-makers ensure that:

➢ The proposed initiative will have value and relative priority compared to alternative initiatives based on the objectives and expected benefits laid out in the business case.

➢ The performance indicators found in the business case are identified to be used for proactive realization of the business and behavioral change.

Executive Summary

A good executive summary is compelling. It reveals the company's mission statement, along with a short description of its products and services. It might also be a good idea to briefly explain why to starting the company and include details about the experience in the industry to entering.

Company Description

The next section that should appear in your business plan is a company description. It's best to include key information about the business, the goals and the customers plan to serve.

Market Analysis

Ideally, the market analysis will show that to know the ins and outs of the industry and the specific market are planning to enter. In that section, We need to use data and statistics to talk about where the market has been, where it's expected to go and how about the company will fit into it.

Competitive Analysis

A good business plan will present a clear comparison of business to direct and indirect competitors. Need to show that to know their strengths and weaknesses and know how the business will stack up.

Description of Management & Organization

Following the market analysis, the business plan will outline the way that the organization will be set up. Introduce the company managers and summarize their skills and primary job responsibilities.

Marketing Plan

In business plan, it's important to describe how to intend to get the products and services in front of potential clients. That's what marketing is all about. As pinpoint the steps are going to take to promote the products, need to mention the budget and need to implement your strategies.

Financial Projections

In the final section of business plan is to reveal the financial goals and expectations that to set based on market research.

2.5. STEPS TO DESIGN AND DEVELOP AN E-COMMERCE WEBSITE

In the competitive world of the Web, however, growing your business and increasing your profits online requires some careful planning. For every successful e-commerce business, there are dozens that

fail by not addressing basic risks and pitfalls along the way. The following steps to ensure that your e-commerce business gives you the competitive edge.

Step-1: - Establish your online identity with the right Web address.

The first step toward e-commerce is selecting the name of your site. Your Web address tells customers who you are and how to find you on the Internet. It is the core of your Internet identity—your online brand. And, because no two parties can have the same Web address, your online identity is totally unique.

Step-2: - Build a user-friendly site.

With a domain name in place, you're ready to start building your e-commerce storefront. But, before you begin, take some time to plan. You must first identify clear marketing goals for your site, such as generating leads, building a database of potential customers' names and e-mail addresses, or putting a product catalog online to save the time and expense of printing and mailing. You also need to plan the structure of your site, focusing on making it easy for customers to learn what they need to know, make a purchase decision, and then buy quickly. In addition, you need to create a site map that outlines every page on your site from the home page down and how customers get from one page to the next.

Step-3: - Set up your Web server—or select an ISP to host your site.

Web site is a series of files that reside on a special computer, called a Web server, connected to the Internet. For customers to visit your site, they must actually connect to that Web server via the Internet and view the files. Web servers and the Internet connections that link them to visitors must be fast and powerful enough to quickly respond to all the visitors' requests to view your site.

Step-4: - Secure your site.

In person-to-person transactions, security is based on physical cues. Consumers accept the risks of using credit cards in places such as department stores because they can see and touch the merchandise and make judgments about the store.

Digital certificates for your Web site (or "SSL certificates") are the answer for the preceding security questions. Installed on your Web server, a SSL certificate is a digital credential that enables your customers to verify your site's authenticity and to securely communicate with it. SSL certificates allow your e-business to provide customers with the world's highest level of trust.

Step-5: -. Accept and manage all kinds of payments.

With an SSL-secured site, your customers will have the confidence to purchase your goods and services. But enabling customers to pay you online takes more than just collecting their credit card numbers or other payment information. The basic steps of an online payment transaction using a payment gateway system include the following:

1. The customer places an order online by selecting items from your Web site and sending you a list. Your site often replies with an order summary of the items, their price, a total, and an order number.
2. The customer sends the order, including payment data, to you. The payment information is usually encrypted by an SSL pipeline set up

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between the customer's Web browser and your Web server's SSL certificate.

3. Your e-commerce site requests payment authorization from the payment gateway, which routes the request to banks and payment processors. Authorization is a request to charge a cardholder, and must be settled for the cardholder's account to be charged. This ensures that the payment is approved by the issuer, and guarantees that you will be paid.

4. You confirm the order and supply the goods or services to the customer.

5. You then request payment, sending the request to the payment gateway, which handles the payment processing with the processor.

6. Transactions are settled, or routed by the acquiring bank to your acquiring bank for deposit.

Step-6: - Test, test, test.

A personalized message from a real customer service representative is best, but sending an automatic reply works as well. Set minimum response times and standards for replying to customer questions and concerns, and ensure that your customer support staff is fully knowledgeable about all your products and services, their features and benefits, pricing, and availability.

Step-7: - Promote your site.

Now, you've established a compelling, secure, and easy-to-use Web storefront for your products and services.

➢ **Register your site with search engines:** Over 90 percent of Internet users search one or more of the top engines to find what they need. Make sure your business is part of the results when customers look for the products and services you offer.

➢ **Put your domain name everywhere:** Brochures, advertisements, business cards, and even hats, jackets, and t-shirts can be effective ways to promote your site and establish your corporate identity. Don't forget to include your domain name in your press release, too.

➢ **Advertise:** Placing a banner ad on other well-trafficked sites can attract huge numbers of prospective customers—and doesn't have to cost a fortune.

Step-8: - Now, starts selling.

Finally, your e-commerce business is now ready to succeed in the competitive world of the Web: with an online identity, a Web host, an eye-catching, professional-looking Web storefront, rock-solid security, easy-to-use payment management, and the right promotions.

2.6. LET US SUM UP

In this unit, you have learnt about the various e-commerce activities, categories of programming languages and problem solving strategies. This knowledge would make you understand the various programming domain and types of languages used to develop the programs for real time problems. Thus, the principles of programming unit would have brought you to closer to know the concept of basics of programming.

2.7. UNIT – END QUESTIONS

1. List out the manpower associated with e-commerce.
2. Explain about the steps to develop the e-commerce website.

2.8. ANSWER TO CHECK YOUR PROGRESS

1. It is an interesting thing about e-commerce, that what starts with a lean, technology led approach, quickly translates into a large team, operationally intensive business.

   This is typical to a marketplace e-commerce model, and for branded retailers they already have a strong and set merchandising sourcing function. Their e-commerce can simply plug into their existing teams.
   1. Software Professionals.   2. Order/ Customer management
   3. Accounting   4. Store Management
5. Logistics and Warehousing

2. In the competitive world of the Web, however, growing your business and increasing your profits online requires some careful planning. For every successful e- commerce business, there are dozens that fail by not addressing basic risks and pitfalls along the way. The following steps to ensure that your e-commerce business gives you   the competitive edge.
   Step-1: - Establish your online identity with the right Web address.
   Step-2: - Build a user-friendly site.
   Step-3: - Set up your Web server—or select an ISP to host site
   Step-4: - Secure your site.
   Step-5: -.Accept and manage all kinds of payments.
   Step-6: - Test, test, test.
   Step-7: - Promote your site.
   Step-8: - Now, starts selling.

2.8. ANSWER TO CHECK YOUR PROGRESS

1. E - Commerce: Strategy, Technologies and Applications, David Whiteley**,** McGraw Hill Education, 2007.
2. E-Commerce, by Gaurav Gupta, and Sarika Gupta, Khanna Publishing; Second edition, 2015.

UNIT III – INTERNET

Structure

3.1. INTRODUCTION

As an end in itself, understanding internet concepts and terms is important to enable you learn more about e-commerce and components of internet after the course is over. Without understanding these concepts and terms, you will have difficulty discussing internet and backbone of e-commerce ideas with others, and will have difficulty in reading the technical literature.

3.2. OBJECTIVES

After going through this lesson you will be able to
- ➢ Use ideas from the various paradigms when internet is backbone of e-commerce that is not explicitly suited to that paradigm.
- ➢ Evaluate components of internet used to develop and design or by analogy to historically important e-commerce application.
- ➢ Design features of web site communication, cookies and strategic capabilities and justify your e-commerce website design decisions.

3.3. THE BACKBONE FOR E-COMMERCE

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

Internet has been the most useful technology of the modern times which helps us not only in our daily lives, but also our personal and professional lives developments. The internet helps us achieve this in several different ways. For the students and educational purposes the internet is widely used to gather information so as to do the research or add to the knowledge of various subjects. Even the business professionals and the professionals like doctors, access the internet to filter the necessary information for their use. The internet is therefore the largest encyclopedia for everyone, in all age categories. The internet has served to be more useful in maintaining contacts with friends and relatives who live abroad permanently.

3.3.1. Early Ages of Internet

Internet is a network for the elite, but it is very egalitarian. It has valuable information but works at no extra charge.

The Internet is a rapidly growing network of thousands of business, educational and research networks connecting millions of computers and their users in over 100 countries. Internet is very popular in the recent days, though it took birth in the late 1960's. The US Government started the process when they laid the framework for the Internet. The Department of Defence (DOD) decided to fund a network of computers that would all talk the same language. The intention was to connect researchers, government workers and defence contractors who were providing systems and data to government agencies. Most brands of computers at that time applied different rules for communication (protocols). DOD decided to develop a vendor-independent suite of protocols. The new network was named ARPANET (after the Advanced Research Projects Agency) within DOD that provided the funding.

3.3.2. Networking Categories

Computer networking is the connectivity among computers to allow communication between computer systems or devices. A computer network is any set of computers or devices connected to each other with the ability to exchange data.

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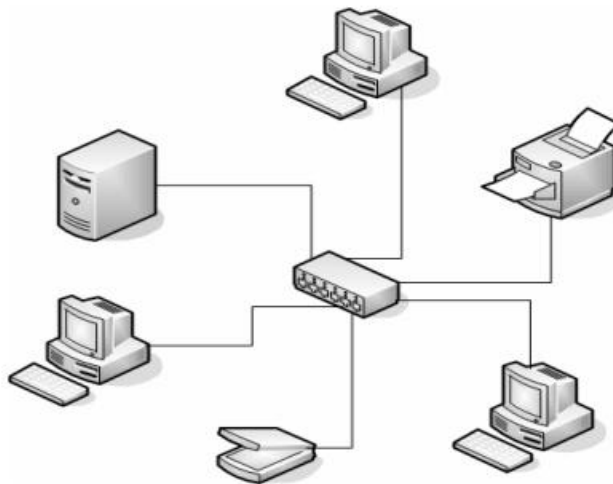
Figure 3: - Network Structure

Network Services
➢ Email service.
➢ File service - Allows users to use and share file space on a computer with a lot of file space.
➢ Print service - Allows printing to printers connected on the network.
➢ Web surfing - Allowing someone to open web pages and see web sites on the internet. Filtering out undesired sites on the internet.
➢ Allowing someone to access the network from the outside (from home).
➢ Updating virus definitions on workstations.
➢ Allowing someone to log onto the network.
Even giving a workstation an address on the network is a service. If your computer does not have an address, it cannot access the internet or any other resource on the network.
➢ **Local Area Network (LAN)**, which is usually a small network, constrained to a small geographic area like a home, office, or group of buildings e.g. a school.
➢ **Wide Area Network (WAN)** is usually a larger network that covers a large geographic area. WANs are used to connect LANs and other types of networks together, so that users and computers in one location can communicate with users and computers in other locations.
➢ **Metropolitan Area Network:** A Metropolitan Area Network is a network that connects two or more Local Area Networks or Campus Area Networks together but does not extend beyond the boundaries of the immediate town, city, or metropolitan area. Multiple routers, switches & hubs are connected to create a MAN.
➢ **Wireless LANs and WANs (WLAN & WWAN)** is the wireless equivalent of the LAN and WAN. Wireless telecommunications networks are generally implemented with some type of remote information transmission system that uses electromagnetic waves, such as radio waves, for the carrier and this implementation usually takes place at the physical level or "layer" of the network.

3.3.3. Characteristics of Internet
There are many characteristics of using the internet such as:

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> ➢ **Communication:**
> The foremost target of internet has always been the communication By the advent of computer's Internet, our earth has reduced and has attained the form of a global village. Now we can communicate in a fraction of second with a person who is sitting in the other part of the world. Today, for better communication, we can avail the facilities of e-mail; we can chat for hours with our loved ones.
> ➢ **Information:**
> Information is probably the biggest advantage that internet offers. The Internet is a virtual treasure trove of information. Any kind of information on any topic under the sun is available on the Internet. The search engines like Google, yahoo is at your service on the Internet.
> ➢ **Entertainment:**
> Entertainment is another popular area why many people prefer to surf the Internet. Downloading games, songs, movies are certain examples.
> ➢ **Services:**
> Many services are now provided on the internet such as online banking, job seeking, booking railway tickets, etc.
> ➢ **E-Commerce:**
> Ecommerce is the concept used for any type of business deals that involves the transfer of information across the globe via Internet. Eg. Shopping online for books, household goods etc.

3.4. COMPONENTS OF INTERNET

The Internet components most Internet users are familiar with are e-mail, the web, and web access. But if you are considering setting up a web site for your business and/or becoming your own web master there are other Internet components to consider.

3.4.1. Internet Services

Internet Services allows us to access huge amount of information such as text, graphics, sound and software over the internet. Following diagram shows the four different categories of Internet Services.
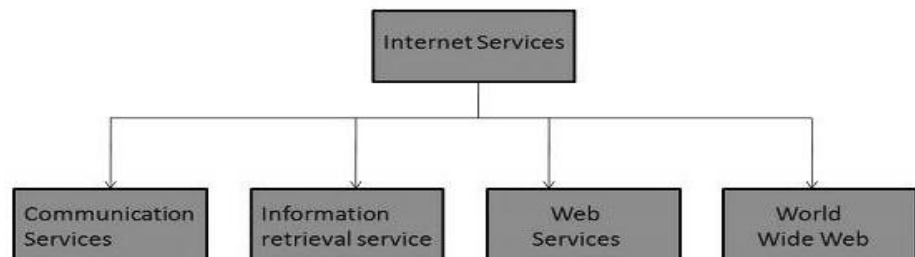
Figure 4: - Various internet services

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Communication Services

There are various Communication Services available that offer exchange of information with individuals or groups. The following table gives a brief introduction to these services:

Table 2: - Communication Services

S.No	Service Description
1.	**Electronic Mail** Used to send electronic message over the internet.
2.	**Telnet** Used to log on to a remote computer that is attached to internet.
3.	**Newsgroup** Offers a forum for people to discuss topics of common interests.
4.	**Internet Relay Chat (IRC)** Allows the people from all over the world to communicate in real time.
5.	**Mailing Lists** Used to organize group of internet users to share common information through e-mail.
6.	**Internet Telephony (VoIP)** Allows the internet users to talk across internet to any PC equipped to receive the call.
7.	**Instant Messaging** Offers real time chat between individuals and group of people. Eg. Yahoo messenger, MSN messenger.

Information Retrieval Services

There exist several Information retrieval services offering easy access to information present on the internet. The following table gives a brief introduction to these services:

Table 3: - Information Retrieval Services

S.No	Service Description
1.	**File Transfer Protocol (FTP)** Enable the users to transfer files.
2.	**Archie**

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	It's updated database of public FTP sites and their content. It helps to search a file by its name.
3.	**Gopher** Used to search, retrieve, and display documents on remote sites.
4.	**Very Easy Rodent Oriented Netwide Index to Computer Achieved (VERONICA)** VERONICA is gopher based resource. It allows access to the information resource stored on gopher's servers.

Web Services
Web services allow exchange of information between applications on the web. Using web services, applications can easily interact with each other. The web services are offered using concept of Utility Computing.

World Wide Web (WWW)
WWW is also known as W3. It offers a way to access documents spread over the several servers over the internet. These documents may contain texts, graphics, audio, video, hyperlinks. The hyperlinks allow the users to navigate between the documents.

Video Conferencing
Video conferencing or Video teleconferencing is a method of communicating by two-way video and audio transmission with help of telecommunication technologies.

3.4.2. Elements of Internet
(a) Modem:
A modem (modulator-demodulator) is a device that converts digital signals from your computer to analogue to allow transportation over most media and again to convert back the signals from analogue to digital on the receiving computer.

(b) Internet Software:
This is software that is used to establish communication links between computers on the internet and enable one to access internet resources such as:
(i) Web browsers which include Google chrome, Internet Explorer or Mozilla Firefox.
(ii) Email software which includes Hotmail, Yahoo or gmail. These programmes work under set of standards called protocols (or protocols can be defined as set of rules and procedures that govern how computers and related devices communicate and transfer data signals.)
For the Internet, the most common protocols are:
(i) http: (Hypertext Transfer Protocol): Is a language that web clients and servers use to communicate with each other in order to send and receive data signals.
(ii) IP (Internet Protocol): Determines the addressing on the internet. IP address or network address is a numeric form of address that identifies

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every machine on the internet. Therefore every machine has a unique IP address such as 192.168.100.80 which is a 32-bit binary numbers. (iii) TCP(Transmission Control Protocol): Governs how data is transferred from one place to another over internet.

(c) Computer system:

A powerful computer system (PC or laptop) is required preferably with a high speed processor with large amount memory (RAM) capacity.

(d) Telecommunication medium channel:

In order for you to access and use the internet, telecommunication facilities like satellite transmission system and telephone lines should be availed in order for one to communicate globally.

(e) An Internet Service Provider (ISP):

ISP is a company that connects you to the Internet at a fee. It connects your home or office computer to the Internet at a fee. Such service providers include Safaricom.com, Zuku.com and Access Kenya.com

3.4.3. Uniform Resource Locator

A URL (or uniform resource locator) is the address of an Internet page on a Web site. Usually it consists of four parts: protocol, server (or domain), path, and filename. Often, when you go to the very first page of a Web site, called the home page, there's no path or filename. Here's an example:

http://www.microsoft.com/windows/default.asp

➢ http is the protocol
➢ www.microsoft.com is the server
➢ windows/ is the path
➢ default.asp is the filename of the page on the site

Communication Protocol

Protocol is a set of rules created for the process of communication with another computer or with an operating system

The first element in the URL is the protocol. This is the service that provides the resource, followed by a colon. The default taken is http: if you don't specify other service. The protocol specifies the computer language used to transfer information. Specifically, a protocol tells the browser where the information is located (for example, on a web server, an FTP (file transfer protocol) server, a local hard drive, and so on). The protocol tells the browser what to expect from the document retrieval process.

Protocol	Use
http:/ /	For HTML documents and associated files on the web
ftp://	For documents on the FTP server

Table 3: - Communication Protocol

Host Name: host name is the server that contains the resource, preceded by two slashes (either. in the form of a domain name or an IP address). In

other words the hostname is the name of the server that holds HTML documents and related files.

Folder name: folder names give document on the servers file system. Folders perform the same function on a web server that they perform on your PC (i.e. they organize documents). There's virtually no limit to how deep you can nest folders, and there's no limit as to what files the folders can contain.

File name: file names are the names of specific documents. It identifies the file (an HTML document, an image, a text file, and so on) to be displayed. In the above example, the file index.html is displayed. This file is kept in the folder virtual.

3.4.4. Internet Protocol

Transmission Control Protocol and Internet Protocol (TCP/IP) are most commonly used protocol in the Internet. They mainly deal with slicing the data into small sized packets and routing them along the communication channel. These packets are routed to their destination and passed through from node to node and are assembled in order to form the data at the destination computer.

TCP/IP is a very popular protocol used in conjunction with internet. To establish a link between two computers on the internet, it is required to frame certain rules and regulations so that the data communication between the computers may take place. A protocol means a set of rules which is accepted globally. TCP/IP is the protocol which defines the rules and algorithm for data communication between different computers.

To establish a link between two or more computers, it is required to define the address of the computer. This address must be unique. Rules and regulations for secure transmission of data over the communication channel are also required. TCP/IP is divided into two set of protocols one is called TCP or Transmission Control Protocol and other is called IP or Internet Protocol.

➢ **Transmission Control Protocol**

This deals with packets over networks. The packets are small pieces of data meant for effective and safe communication over the network. To send a block of data over a communication channel, the data is divided into various pieces and these pieces of data are communicated as packets. These packets' have to follow a long path, traversing from one computer or node to another computer. This process is called routing. The size of packets is decided on the basis of network capability. The TCP also ensures the safe delivery at the destination and the assembling of all the packets to get the complete lot of data at the destination computers.

➢ **Internet Protocol**

This mainly deals with the addresses of computers. The Internet Protocol decides the address of computer to be labelled on the packet. This allows various computers or intermediate nodes to read the address of the destination computer and route the packet to the destination node.

➢ **Hyper Text Transfer Protocol (HTTP)**

A web page is transferred to a user's computer via the hypertext transfer protocol (HTTP). HTTP is the method through which hypertext

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files such as web pages, are transferred over the internet. HTTP is a client/server based internet protocol.

Web pages generally reside on HTTP servers. A user requests a web page from an HTTP server through his or her web browser client software. Either by clicking on a hypertext link or designating a particular URL (uniform resource locator). The server then sends the requested information to the user's computer. The browser software interprets the HTML codes and presents the information contained in the web page in a readable format on the user's computer.

➢ **File Transfer Protocol (FTP)**

FTP is part of the TCP /IP protocol suite. It is a protocol or set of rules, which enables files to be transferred between computers. Ftp works on the client/ server principle. A client programme enables the user to interact with a server in order to access information and services on the server computer. Files that can be transferred are stored on computers called FTP servers. To access these files, an FTP client programme is used. This is an interface that allows the user to locate the file(s) to be transferred and initiate the transfer process.

➢ **Simple Mail Transfer Protocol (SMTP)**

This protocol is used for the delivery of E Mail. When an E mail is to be sent, then the Mail Transfer Program contacts the remote machine and forms a TCP connection over which to e-mail is transferred. Once the connection is established, then Simple Mail Transfer Protocol (SMTP) identifies the sender itself, specifies the recipient of mail and then transfers the E mail message. Other features included in the SMTP are that it allows the sender to ask whether the mailbox to which the mail is directed, does exist on the remote computer or not. It also enables the sender to keep a copy of the mail until it removed or deleted.

➢ **Post Office Protocol**

If you're accessing the Internet using a PC or Macintosh, there are several different ways you can read and send email. One of the more popular applications uses the Post Office Protocol (POP). In a nutshell, the POP system allows your personal workstation to get its email from a big computer that serves as a post office, delivering the mail when you (or your computer) ask for it. This eliminates the need for your computer to be on all the time, constantly available to receive email. In order to use a POP-based email application, you need Internet access (via dial-up or full-time connectivity) and a POP mail account on a post office computer (ask your Internet provider). All of these applications provide intuitive editors.

➢ **Point to Point Protocol (PPP)**

This is used when the Internet is accessed using a telephone line. Normally, in India, the server of the Internet Service provider (ISP) is accessed from the home or office through the telephone line. PPP is the set of rules which specify how the data will be communicated over telephone line from your computer when the connection with your ISP has been established. This protocol is used in conjunction with Serial Line Internet Protocol (SLIP).

3.5. SHOPPING CART

A shopping cart is software used in E-Commerce to assist visitors to make purchases online. Upon checkout, the software calculates the total of the order, including shipping and handling, taxes and other parameters the owner of the site has previously set. The shopping cart typically provides a means of collecting the shopper's payment information.

A shopping cart on an online retailer's site is a piece of software that facilitates the purchase of a product or service. It accepts the customer's payment and organizes the distribution of that information to the merchant, payment processor and other parties.

Why shopping carts are important

Shopping carts bridge the gap between shopping and buying, so having the best shopping cart software is extremely important on your website.

It's likely that those just starting out in the market may be unfamiliar with the concept. Most people, especially those in the ecommerce industry, have likely made a purchase online at some point in their lives. That said, most consumers don't fully realize the need and capability that shopping carts have (besides leading a customer to checkout). A cart typically has three common aspects:

1. It stores product information
2. It's a gateway for order, catalog and customer management
3. It renders product data, categories and site information for user display

Another way to look at things is as follows: The online shopping cart is similar to the tangible ones we use at the supermarket, but it wears many more hats. It's also the shelves, the building, the clearance sign, the cash register and often the credit card machine relaying information back to the bank.

What options are there?

For those seriously considering the ecommerce platform route, it's important to know that there are two basic types of carts:

- Hosted shopping carts: A third-party firm "hosts" the solution and is responsible for server backups, maintenance and upgrades. The beauty of a hosted solution is that hosting comes free, which means it doesn't cost anything for the third party to keep your site functional on the Web. The main drawback with hosted solutions is that customers will be directed to another domain for payment processing.
- Licensed shopping carts: This type of solution allows business owners to build their own type of cart and customize it to their specific needs. There is much greater flexibility in changing features and functionality, as well as in adding third-party tools if need be. However, the upfront costs are often higher and require more hands-on expertise for troubleshooting issues and technical support.

Features of a Shopping Cart

The most common feature of a shopping is to enable customers to select products and then make a payment. Other features that are often part of shopping cart solutions include:

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- A storefront, i.e. the homepage, product pages, category pages, and search pages that customers use to browse and select items to buy
- Inventory management tools
- Order management tools
- Shipping option tools
- Currency, sales tax, and accounting tools
- Marketing and promotional tools
- Third-party integrations

In reality, shopping cart features vary from provider to provider. For example, the PayPal shopping cart has very limited features while Shopify and Magento are packed with features.

3.6. COOKIES AND E-COMMERCE

A file of minute proportions that is saved on a mobile device or a computer that stores important information relating to the interaction of the user with the site. By accessing the cookies on a computer you can track what sites have been visited, and the exact pages within that site.

When sharing a computer, or using a computer in a public building such as a library it is vital that you clear the cache of cookies before logging out for security reasons. When you fail to clear your cookies, people can access your personal details, and the professional hacker can steal your identity in just seconds.

Cookies were created and designed to save user information so that a web server can deliver a web page tailored to the specific user. It allows form data to be maintained, and can improve the user experience by maintaining data from one visit to the next. Cookies are a very convenient way to maintain information from one session to the next, or even to carry information from one website to another.

Cookies (also referred to as HTTP cookies or browser cookies) are small text files stored in a web user's browser directory or data folder. Ecommerce websites place cookies on visitors' browsers to retain login credentials, identify customers, and provide a customized shopping experience.

What cookies do?

Secure websites use cookies to validate a user's identity as they browse from page to page; without cookies, login credentials would have to be entered between before every product added to cart or wish list. Cookies enable and improve:

➢ Customer log-in.
➢ Persistent shopping carts.
➢ Wish lists.
➢ Product recommendations.
➢ Custom user interfaces (i.e. "Welcome back, Steve").
➢ Retaining customer address and payment information.

How do cookies work?

Cookies can be divided into two major categories, with many subsets of:

➢ Session cookies stay on a browser and retain your information until it is closes. When a new browser window is opened, the same user is treated as a new visitor and must input their login credentials.

➢ Persistent cookies have a designated lifespan and remain in a browser until the period elapses or the cookie is manually deleted. Websites that use persistent cookies will remember users even after they close a browser. Persistent cookies enable features such as persistent shopping carts, which retain products added to cart between sessions.

When a user lands on an ecommerce website for the first time, the webpage makes a record of the activity on its remote server and it places a cookie in the user's browser files. The cookie is only a short line of text. It contains no information about the user or the user's machine. Instead, it typically contains the URL of the website that placed the cookie, a unique generated number and an expiration date for the cookie.

As the user browses the website, each new page the user visits queries the browser, looking for the cookie. If the cookie's URL matches the website's URL, the website retrieves the user information from its server by utilizing the unique generated number. In this way, the website adjusts the user's experience to reflect her browsing history.

If the user searches the site for cowboy boots, then the next time the user comes to the site, the website will retrieve the user's record and fill the landing page with more cowboy boots.

Some websites also use cookies to customize the website experience. A new user may see one version of the landing page, while a longtime user may see a different layout entirely.

Cookies in ecommerce

The single most important job of a cookie is to keep a user logged in as they browse from page to page. A user's browsing history becomes part of a database which the website then uses to improve the customer experience.

Ecommerce sites use a combination of session cookies and persistent cookies to create a seamless shopping cart experience. As the user adds items to her cart, session cookies keep track of the items. If the user abandons the cart, persistent cookies will retrieve her selections from the database the next time she visits, or allow you to create personalized retargeting campaigns that encourage her to revisit her cart. This is a huge help in encouraging conversions.

Cookies are an essential part of the Internet. Without them, WebPages would be a great deal less useful and interactive. Ecommerce would be impossible. They give websites the ability to remember and improve.

3.7. WEBSITE COMMUNICATION

Websites communicate with visitors in a number of different ways. Not all websites take the same approach, but almost every website will use at least a few common methods of communication. To get started, let's first look at some of the basic ways that websites communicate with visitors before going into more depth on the subject.

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Design

Many organisations spend a fortune on the aesthetic design of their websites, a luxury that is beyond the reach of most E-Commerce projects. If you do have budget to commission a professional web design company, be aware that many will try to sell you a service that is unnecessarily complex and expensive. A simple "brochure" site may be sufficient for many E-Commerce. Alternatively, it is relatively cheap and easy to configure and publish a straightforward website using inexpensive off-the-shelf software. Most web publishing programmes include a range of generic website templates that can be personalized easily. Keep the design minimal and professional, avoiding any sound, movement or clashes of colour. Avoid information overload: leave enough empty space. Clarity, accessibility and ease of use are vital.

Structure

Good websites have a system of links among the pages that is intuitive, straightforward, and reflected in a clear navigation facility that makes it obvious to users where in the site they are, and how to get to wherever else they want to go. The easier it is to use, the longer users will stay at the site and the more they will see. Links to all key pages or sections of the site should be displayed on the front page, and every page should contain a standard set of links to other key pages or sections since not all users will arrive at the front page. Make your structure hierarchical and as shallow as possible: no page should be more than two clicks away from the home page. **Content**

Research has shown that people read text very differently on websites from the way they read on paper. On paper, people read sentences fairly predictably from left to right, and persist through long sections. On screen, people's eyes scan around unpredictably and settle on interesting keywords. On paper, people are more likely to read to the bottom of the page. On screen, people lose interest more quickly and many people do not bother to scroll down.

Hosting

Your website can often be hosted directly by your web design company or they can suggest another company for you. If your project is part of a large organisation or local authority, there might also be an opportunity to host your website internally. Look around to find the best hosting option for your project.

Text

Text is, of course, the most obvious form of communication that takes place online. Whether the text is in the **main body content** of the page or a **headline**, most website visitors rely on text to understand the basic messages of a website. Depending on the type of the website, text may be extremely critical to communication, as in the case of blogs.

Images

"A picture is worth a thousand words". Photos and images are excellent resources not only for creating an attractive and interesting design, but also for communication purposes. Images can often communicate a message **faster**, **more clearly** and **more emphatically** than text. The designer needs to be aware of the

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messages being communicated via images and ensure they work in harmony with the rest of the website's communication.

Audio and Video

While most of the Web is made up of text, audio and video have become increasingly common over the past few years as more and more Internet users are on high-speed connections. As audio and video have become increasingly common, many new opportunities have arisen for effective communication online. Designers and website owners have plenty of options in how they communicate with their visitors, and audio and video have some definite strength that make them a tremendous method of communication.

3.8. STRATEGIC CAPABILITIES OF INTERNET

The two key capabilities in the procurement domain emerged:

➢ A process efficiency capability, namely the ability to reduce costs while maintaining relationships with external suppliers and internal activities complementary to the purchasing transaction; and

➢ A process integration capability, namely the ability to effectively incorporate procurement in the whole supply chain, reducing time-to-market and increasing the fit with market needs.

The process efficiency capability has an "inside" dimension, since it specifically refers to the procurement department and its core activities. For instance, a firm with bargaining power in relation to suppliers and/or with established routines in managing inventories is likely to be process efficient. The process integration capability takes into account an "outside" dimension, since it refers to the role of the procurement department across the whole supply chain. For instance, a firm with a closer set of relationships between its marketing department, operations and procurement is likely to have a process integration capability.

Process efficiency capability the reduction of purchasing costs has always been recognized as one of the most significant purposes in procurement, since the average manufacturing firm spends about half its sales revenue on activities related to the purchase of materials. Cost reductions in the procurement domain allow the firm to pursue price competition strategies in downstream markets and sustain growth.

Purchase prices can be reduced when a firm has a superior capacity to manage the upstream vertical market relations with both current and potential suppliers. A typical transaction-cost based explanation suggests that a buyer may increase negotiating capability by finding new supply sources, reducing the opacity of the market, and realizing savings in purchase costs.

The process integration capability is primarily related to a robust exchange of information with suppliers and with other departments, such as marketing and operations. At the same time, closer integration with other functions, such as production and marketing, allows the firm to buy the right materials, and guarantees that the entering flows of materials are consistent with product specifications. It should be pointed out that frequent information exchanges, if not correctly managed, may

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also create phenomena of information overload, thus downgrading the quality of information shared: hence it should be noted that information sharing is only a first necessary condition for creating a superior process integration capability.

3.9. LET US SUM UP

In this unit, you have learnt about the backbone of e-commerce, components of e-commerce, and website communication. This knowledge would make you understand the other elements like shopping cart, cookies, strategic capabilities of internet used to develop the e-commerce real time applications. Thus, the internet unit would have brought you to closer to know the concept of internet used in e-commerce platform.

3.10. UNIT – END QUESTIONS

1. Discuss about the components of internet.
2. Describe about the website communication of e-commerce.
3. Write about the backbone of the internet.

3.11. ANSWER TO CHECK YOUR PROGRESS

1. The Internet components most Internet users are familiar with are e-mail, the web, and web access. But if you are considering setting up a web site for your business and/or becoming your own web master there are other Internet components to consider.
Internet Services: - Communication Services, information retrieval service, web service, www.
Elements of Internet: - Modem, internet software, telecommunication system, ISP.
Uniform Resource Locator (URL).
Communication Protocol: - TCP, IP, POP, SMTP, FTP.

2. Websites communicate with visitors in a number of different ways. Not all websites take the same approach, but almost every website will use at least a few common methods of communication.
1. Design
2. Structure
3. Content
4. Hosting
5. Text
6. Images
7. Audio and Video

3. The Internet is a global system of interconnected computer networks that use the standard Internet protocol suite (TCP/ IP) to serve billions of users worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks, of local

to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies. The Internet carries a vast range of information resources and services, such as the interlinked hypertext documents of the World Wide Web (WWW) and the infrastructure to support electronic mail.

Even giving a workstation an address on the network is a service. If your computer does not have an address, it cannot access the internet or any other resource on the network.

Local Area Network (LAN), which is usually a small network, constrained to a small geographic area like a home, office, or group of buildings e.g. a school.

Wide Area Network (WAN) is usually a larger network that covers a large geographic area. WANs are used to connect LANs and other types of networks together, so that users and computers in one location can communicate with users and computers in other locations.

Metropolitan Area Network: A Metropolitan Area Network is a network that connects two or more Local Area Networks or Campus Area Networks together but does not extend beyond the boundaries of the immediate town, city, or metropolitan area. Multiple routers, switches & hubs are connected to create a MAN.

Wireless LANs and WANs (WLAN & WWAN) is the wireless equivalent of the LAN and WAN. Wireless telecommunications networks are generally implemented with some type of remote information transmission system that uses electromagnetic waves, such as radio waves, for the carrier and this implementation usually takes place at the physical level or "layer" of the network.

3.11. ANSWER TO CHECK YOUR PROGRESS

1. Selling Online: How to Become a Successful E-commerce Merchant, Jim Carroll, and Rick Broadhead, Dearborn Trade,U.S. 2001.

2. E-Commerce: The Cutting Edge of Business, by K.K. Bajaj, and Debjani Nag, McGraw Hill Education; 2 edition, 2017.

3. E-Commerce: An Indian Perspective, P.T. Joseph S.J. PHI Learning Pvt Ltd, 2nd edition, 2015.

4. E-Commerce 2017, Kenneth C. Laudon, and Carol Guercio Traver, Pearson Education; Thirteenth edition, 2018.

5. Digital Business and E-Commerce Management: 6, Dave Chaffey, Pearson; 6 edition, 2014.

UNIT IV – ISP, WWW AND PORTALS

Structure

4.1. INTRODUCTION

In this lesson you will be aware with the basic concepts of internet service provider, World Wide Web and portals used to construct the e-commerce website. These basic elements are used to construct more comprehensive e-commerce website. Some of the basic elements needs very detailed information, however, the purpose of this type of basic elements is to introduce certain basic concepts and to provide some necessary definitions for the topics that follow in next few lessons.

4.2. OBJECTIVES

After going through this lesson you would be able to
➢ Recognize the Internet Service Provider.
➢ Recognize the World Wide Web (WWW).
➢ Recognize the Portals.

4.3. INTERNET SERVICE PROVIDER

Internet Service Provider (ISP) is a company offering access to internet. They offer various services:
• Internet Access
• Domain name registration
• Dial-up access
• Leased line access
ISP Types
ISPs can broadly be classified into six categories as shown in the following diagram:
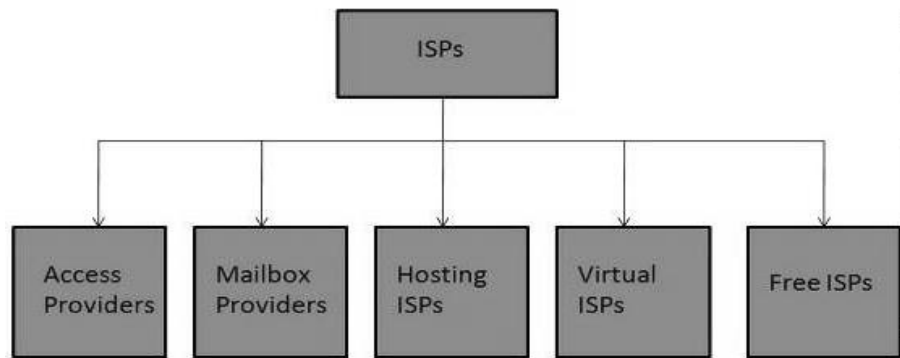
Figure 5: - Internet Service Providers (ISP)

Access providers

They provide access to internet through telephone lines, cable wi-fi or fiber optics.

Mailbox Provider

Such providers offer mailbox hosting services.

Hosting ISPs

Hosting ISPs offers e-mail, and other web hosting services such as virtual machines, clouds etc.

Virtual ISPs

Such ISPs offer internet access via other ISP services.

Free ISPs

Free ISPs do not charge for internet services.

Types of Internet Connections

There are five types of internet connections which are as follows:

1. Dial up Connection
2. ISDN Connection
3. DSL connection
4. VSAT

Dial-up Connection

Dial-up connection uses telephone line to connect PC to the internet. It requires a modem to setup dial-up connection. This modem works as an interface between PC and the telephone line.

There is also a communication program that instructs the modem to make a call to specific number provided by an ISP.

Dial-up connection uses either of the following protocols:

1. Serial Line Internet Protocol (SLIP)
2. Point to Point Protocol (PPP)

ISDN

ISDN is acronym of Integrated Services Digital Network. It establishes the connection using the phone lines which carry digital signals instead of analog signals.

There are two techniques to deliver ISDN services:

1. Basic Rate Interface (BRI)
2. Primary Rate Interface (PRI)

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DSL

DSL is acronym of Digital Subscriber Line**.** It is a form of broadband connection as it provides connection over ordinary telephone lines.

Following are the several versions of DSL technique available today:

1. Asymmetric DSL (ADSL)
2. Symmetric DSL (SDSL)
3. High bit-rate DSL (HDSL)
4. Rate adaptive DSL (RDSL)
5. Very high bit-rate DSL (VDSL)
6. ISDN DSL (IDSL)

All of the above mentioned technologies differ in their upload and download speed, bit transfer rate and level of service.

Satellite Internet Connection

Satellite Internet connection offers high speed connection to the internet. There are two types of satellite internet connection: one way connection or two way connection.

In one way connection, we can only download data but if we want to upload, we need a dialup access through ISP over telephone line.

In two way connection, we can download and upload the data by the satellite. It does not require any dialup connection.

Wireless Internet Connection

Wireless Internet Connection makes use of radio frequency bands to connect to the internet and offers a very high speed. The wireless internet connection can be obtained by either WiFi or Bluetooth.

Search Engines

Although the internet is highly rich with information, the information is not always organized in a way that a person expects. When "browsing", it is hard to get to the particular information one is looking for. To provide an alternative, there are some specialized sites that can perform the search for users, with more or less same accuracy. These sites are referred to as search engines. Some of the most popular of them are:
Examples: Google, Yahoo, MSN, Netscape, Alta Vista Search.

4.4. WORLD WIDE WEB (WWW)

WWW stands for World Wide Web**.** A technical definition of the World Wide Web is : all the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP).

A broader definition comes from the organization that Web inventor Tim Berners-Lee helped found, the World Wide Web Consortium (W3C).

The World Wide Web is the universe of network-accessible information, an embodiment of human knowledge.

In simple terms, The World Wide Web is a way of exchanging information between computers on the Internet, tying them together into a vast collection of interactive multimedia resources.

Internet and Web is not the same thing: Web uses internet to pass over the information.
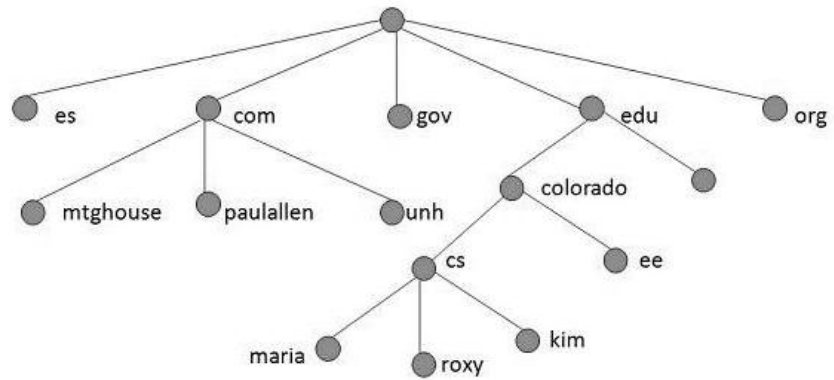
Figure 6: - World Wide Web

Evolution

World Wide Web was created by Timothy Berners Lee in 1989 at CERN in Geneva**.** World Wide Web came into existence as a proposal by him, to allow researchers to work together effectively and efficiently at CERN**.** Eventually it became World Wide Web**.**

The following diagram briefly defines evolution of World Wide Web:
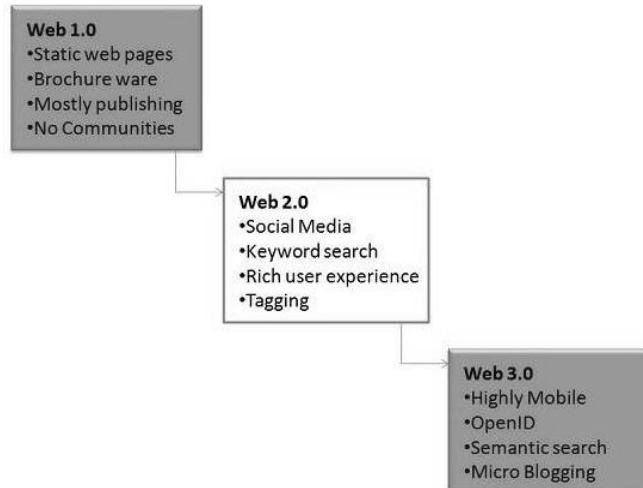
Figure 7: - WWW Evaluation

WWW Architecture: -

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

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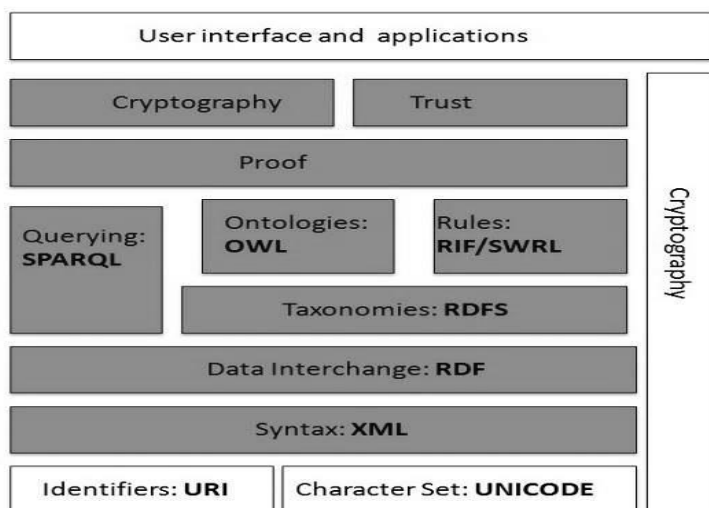
Figure 8: - WWW Architecture

➢ WWW is basically a distributed client-server service. It this, a client can access the services from a server using a browser.

➢ These services are usually distributed over many locations called sites or websites.

➢ From the user's point of view web consists of a vast worldwide collection of documents called web pages. These web pages reside on different sites or machines all over the world.

➢ Each web page can contain link to other pages any where in the world. By clicking on such link user can access another web page.

➢ This kind of link can be in form of string of text or picture, sound, movie clip etc.

➢ Such a text or image that enables the user to link to another web page is called hyperlink.

WWW Operation: -

WWW works on client- server approach. Following steps explains how the web works:

1. User enters the URL (say, http://www.tutorialspoint.com) of the web page in the address bar of web browser.

2. Then browser requests the Domain Name Server for the IP address corresponding to www.tutorialspoint.com.

3. After receiving IP address, browser sends the request for web page to the web server using HTTP protocol which specifies the way the browser and web server communicates.

4. Then web server receives request using HTTP protocol and checks its search for the requested web page. If found it returns it back to the web browser and close the HTTP connection.

5. Now the web browser receives the web page, it interprets it and display the contents of web page in web browser's window.
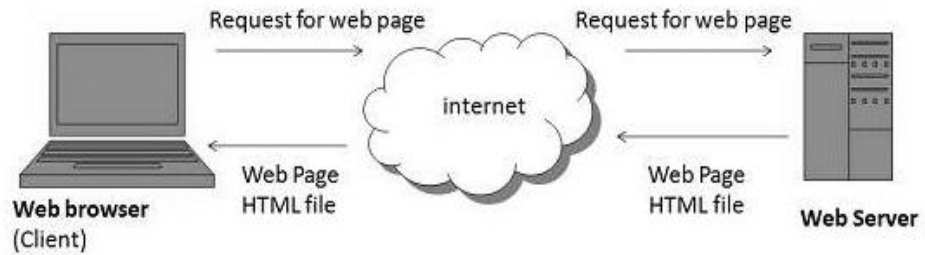
Figure 9: - World Wide Web Operation

4.5. PORTALS

A portal is a web-based platform that collects information from different sources into a single user interface and presents users with the most relevant information for their context. Over time, simple web portals have evolved into portal platforms that support digital customer experience initiatives.

A web portal is a specially designed website that brings information from diverse sources, like emails, online forums and search engines, together in a uniform way. Usually, each information source gets its dedicated area on the page for displaying information (a portlet); often, the user can configure which ones to display. Variants of portals include mashups and intranet "dashboards" for executives and managers. The extent to which content is displayed in a "uniform way" may depend on the intended user and the intended purpose, as well as the diversity of the content. Very often design emphasis is on a certain "metaphor" for configuring and customizing the presentation of the content (e.g., a dashboard or map) and the chosen implementation framework or code libraries. In addition, the role of the user in an organization may determine which content can be added to the portal or deleted from the portal configuration.

A portal may use a search engine's application programming interface (API) to permit users to search intranet content as opposed to extranet content by restricting which domains may be searched. Apart from this common search engines feature, web portals may offer other services such as e-mail, news, stock quotes, information from databases and even entertainment content. Portals provide a way for enterprises and organizations to provide a consistent "look and feel" with access control and procedures for multiple applications and databases, which otherwise would have been different web entities at various URLs. The features available may be restricted by whether access is by an authorized and authenticated user (employee, member) or an anonymous website visitor.

4.5.1. Steps to build Homepage

To understand websites properly and how they function, you must understand some basic principles of design. Design goes beyond simple graphics and aesthetics, and into usability, accessibility and writing techniques.

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In essence, a great page is simple and straightforward. Because of this, it's also often overlooked in favour of more shiny things such as typography, colours, logos etc… While important in itself, it simply makes little impact if the fundamentals aren't in place; like a house built from a poor foundation.

We have listed 6 of the most vital elements that you should seriously consider adding and are not listed by order of importance.

1) It has a great compelling headline that talks directly to the customer.

2) It Has Trust & Authority.

3) Has A Selection Of The Latest Blog Posts (if any)

4) Testimonials

5) A Simple & Effective Design.

6) Calls-To-Action (CTA)

Graphic design theories go far beyond which colors elicit which emotions. These theories, like the theories of usability, are grounded in scientific research. The following are of an important nature when discussing graphic design:

➢ **Color theory: -** The usage (and sometimes absence) of colors in differing combinations and differing intensities. Certain color combinations work well, others do not.

➢ **Balance: -** Elements in any design should be equally positioned throughout the page.

➢ **Repetition**: - repeating common elements throughout your website will create a sense of continuity for the user. They will recognize, regardless of the page they're on, that they're on your website.

➢ **Alignment: -** Aligning items helps to organize web pages, and gives user a sense of ease. Content and page elements flow much better, and more easily comprehended and remembered whenever strong alignments are used.

➢ **Typography: -** Contrast and concord is what we're aiming for here. Contrast is great; it divides up elements on the page, and gives us something distinguishable and interesting to look at. But make sure you use no more than 2 or 3 font types. Concord is simply using bold and italics and different font sizes to achieve some distinction. Just be careful to avoid conflict, which is using fonts that are similar but not exact; this is distracting and difficult to read.

Usability Issues Usability is perhaps the most commonly overlooked and/or misunderstood technique on the Internet. It is often overlooked as its dollar value is difficult to measure outside of potentially complex and expensive user testing. Usability, in the context of the Internet, is essentially the science of applying common sense and a touch of psychology to interfaces and layouts. From creating obvious and sensible navigation, to laying out pages in an easily readable format, to placing common buttons in common locations, usability is an invaluable resource to tap.

Accessibility Issues For people with disabilities, using the Internet is not always a simple task. What you or I may take for granted may be a major stumbling block to someone who cannot see or hear as well as the average web surfer.

The core elements of what makes a perfect homepage, what we now want to do is take each puzzle piece and provide a coherent structure, which you can take away and apply to your own homepage designs.

4.5.2. Metadata: -
Introduction

Metadata is structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource. Metadata is often called data about data or information about information. The term metadata is used differently in different communities. Some use it to refer to machine understandable information, while others use it only for records that describe electronic resources. In the library environment, metadata is commonly used for any formal scheme of resource description, applying to any type of object, digital or non-digital.

There are three main types of metadata:

➢ Descriptive metadata describes a resource for purposes such as discovery and identification. It can include elements such as title, abstract, author, and keywords.

➢ Structural metadata indicates how compound objects are put together, for example, how pages are ordered to form chapters.

➢ Administrative metadata provides information to help manage a resource, such as when and how it was created, file type and other technical information, and who can access it. There are several subsets of administrative data; two that sometimes are listed as separate metadata types are:

▪ Rights management metadata, which deals with intellectual property rights, and

▪ Preservation metadata, which contains information needed to archive and preserve a resource.

Metadata can describe resources at any level of aggregation. It can describe a collection, a single resource, or a component part of a larger resource (for example, a photograph in an article). Just as catalogers make decisions about whether a catalog record should be created for a whole set of volumes or for each particular volume in the set, so the metadata creator makes similar decisions.

Metadata can be embedded in a digital object or it can be stored separately. Metadata is often embedded in HTML documents and in the headers of image files. Storing metadata with the object it describes ensures the metadata will not be lost, obviates problems of linking between data and metadata, and helps ensure that the metadata and object will be updated together. However, it is impossible to embed metadata in some types of objects (for example, artifacts). Also, storing metadata separately can simplify the management of the metadata itself and facilitate search and retrieval. Therefore, metadata is commonly stored in a database system and linked to the objects described.

What Does Metadata Do?

An important reason for creating descriptive metadata is to facilitate discovery of relevant information. In addition to resource discovery, metadata can help organize electronic resources, facilitate

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interoperability and legacy resource integration, and provide digital identification, and support archiving and preservation. Resource Discovery Metadata serves the same functions in resource discovery as good cataloging does by:

➢ allowing resources to be found by relevant criteria;
➢ identifying resources;
➢ bringing similar resources together;
➢ distinguishing dissimilar resources; and
➢ Giving location information.

Organizing Electronic Resources

As the number of Web-based resources grows exponentially, aggregate sites or portals are increasingly useful in organizing links to resources based on audience or topic. Such lists can be built as static WebPages, with the names and locations of the resources "hardcoded" in the HTML. However, it is more efficient and increasingly more common to build these pages dynamically from metadata stored in databases. Various software tools can be used to automatically extract and reformat the information for Web applications.

Interoperability

Describing a resource with metadata allows it to be understood by both humans and machines in ways that promote interoperability. Interoperability is the ability of multiple systems with different hardware and software platforms, data structures, and interfaces to exchange data with minimal loss of content and functionality. Using defined metadata schemes, shared transfer protocols, and crosswalks between schemes, resources across the network can be searched more seamlessly. Two approaches to interoperability are cross-system search and metadata harvesting. **Digital Identification**

Most metadata schemes include elements such as standard numbers to uniquely identify the work or object to which the metadata refers. The location of a digital object may also be given using a file name, URL (Uniform Resource Locator), or some more persistent identifier such as a PURL (Persistent URL) or DOI (Digital Object Identifier). Persistent identifiers are preferred because object locations often change, making the standard URL (and therefore the metadata record) invalid. In addition to the actual elements that point to the object, the metadata can be combined to act as a set of identifying data, differentiating one object from another for validation purposes.

Archiving and Preservation

Most current metadata efforts center around the discovery of recently created resources. However, there is a growing concern that digital resources will not survive in usable form into the future. Digital information is fragile; it can be corrupted or altered, intentionally or unintentionally. It may become unusable as storage media and hardware and software technologies change. Format migration and perhaps emulation of current hardware and software behavior in future hardware and software platforms are strategies for overcoming these challenges. Metadata is key to ensuring that resources will survive and continue to be accessible into the future. Archiving and preservation require special elements to track the lineage of a digital object, to detail its physical

characteristics, and to document its behavior in order to emulate it on future technologies.

4.5.3. Benefits of Portal: -

Web portals are sites on the World Wide Web that typically provide personalized capabilities to their visitors. They are designed to use distributed applications, different numbers and types of middleware and hardware to provide services from a number of different sources. In addition, business portals are designed to share collaboration in workplaces. A further business-driven requirement of portals is that the content be able to work on multiple platforms such as personal computers, personal digital assistants (PDAs), and cell phones.

Commonly referred to as simply a portal, a Web site or service that offers a broad array of resources and services, such as e-mail, forums, search engines, and on-line shopping malls. The first Web portals were online services, such as AOL, that provided access to the Web, but by now most of the traditional search engines have transformed themselves into Web portals to attract and keep a larger audience.

There are several kinds of portals:

➤ **Vertical portals** provide access to a variety of information and services about a particular area of interest. For example, is a vertical portal. Such portals offer information and services customized for niche audiences (e.g., undergraduates, faculty).

➤ **Horizontal portals** often referred to as "mega portals," target the entire Internet community. Sites such as,, and are mega portals. These sites always contain search engines and provide the ability for a user to personalize the page by offering various channels (i.e., access to other information such as regional weather, stock quotes or news updates). Providers of mega portals hope individual users go to their sites first to access the rest of the Internet.

Portals offer obvious benefits to students, faculty, staff, and external stakeholders. Students benefit from:

➤ Web interface to courseware and required information about courses.

➤ Increased and easier communications with faculty.

➤ On-line access to grades, financial aid information, class schedules, graduation checks.

➤ Access to the communities of interest within the university, sports, clubs, and community services opportunities.

➤ Increased life-long learning opportunities.

Faculty and staff benefit from:

➤ Real time communications with students.

➤ Simplified course management tools.

➤ Instant access to information for advising students.

➤ Easily accessible information for every facet of their job.

More generally, a portals, even called portal software, this web based application brings audience, application, systems, and processes together to form a centralized collaboration experience. Portal software integrates technologies to build personalized work areas and communities to increase productivity for users. Portal Software is built for corporate intranets, extranets, communities, web sites, and projects just to name a

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few. Depending on the kind of business needs and the portal software, one can expect to gain several benefits from using portal software in any environment. Some of the benefits are:

➢ Efficiently deliver information to the audience.
➢ Increase productivity for the end user.
➢ Provides customizable features and development tools.
➢ Increase interaction between customers and employees.
➢ Personalized environments for end users.
➢ Integration of external applications and services by portlets.

These are just several benefits that may be achieved by implementing portal software for any business

4.5.4. Enterprise Information Portal (EIP): -

Portals originally came to exist to help users to find information on the World Wide Web. As more and more information became available on the World Wide Web, it became very difficult to find useful information without knowing first where to look. The early web portals consisted mainly of simple search engines. These tools returned a list of web sites containing user-specified keywords and/or phrases. Soon after the creation of web- enabled search engines, it became obvious that users needed more than an unsorted list of thousands of web sites containing the specified keywords. This need led to the development of web portals. The early portals were essentially web search engines containing various categories that could be searched and explored independent of the rest of the web. Many search engines today still have this feature.

The next step in EIP development came as businesses tried to use web technology to bring order to their own internal information. Businesses created internal web sites or intranets. Typically, these sites consisted of static information such as policies and employee manuals. The first true corporate portals were those that integrated both internal information and external information via the World Wide Web. These early sites linked internal information with various sources of external information from the web— anything from stock quotes to news feeds to maps and personal finance services.

Need of EIP

An EIP provides a single point of access to all information that is relevant to the individual and the enterprise. Currently, many organizations use a number of different systems to provide different types of information. To a certain extent, ERP systems address this issue by consolidating and relating data related to basic business operations— shipping and receiving, production, inventory, and financial data. Even with a single ERP system, users may sometimes need to log into various points of the system to gain access to all of the information that they need. Additionally, there are a large number of systems that individuals may need to access to find other types of information such as e-mail, Internet sites, and document management systems. An EIP can provide a single point of access for all of this information and can also aggregate it into a single location. This allows the user to save enormous amounts of time previously spent accessing various systems and finding relevant and useful information.

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An EIP also provides a tremendous capability in managing knowledge. Structured and unstructured information can be aggregated in a single place where it is explicitly related. In general, an EIP system is web-based, which allows hyperlinks to be used.
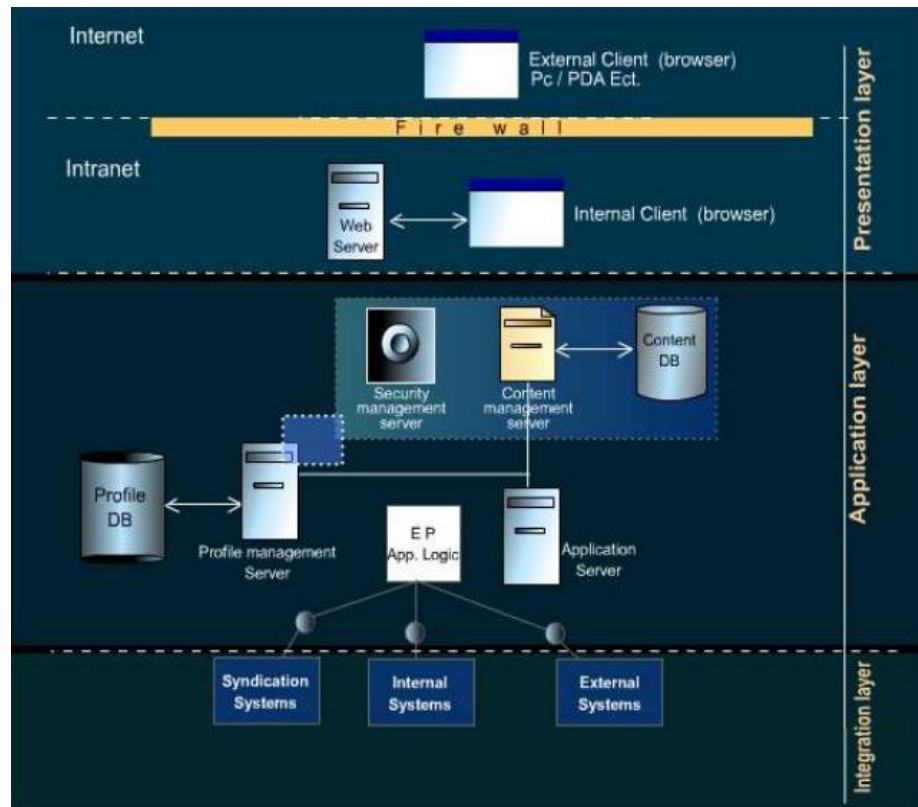
Figure 10: - EIP Intelligent Design

Enterprise information portals are bringing together the worlds of business intelligence and knowledge management into a new, centralized desktop environment the knowledge portal. In the millennium, the knowledge portal will play a key role in empowering the virtual enterprise and employees by providing a personalized single point of access to all relevant information enabling better, faster-decision making. EIPs, or knowledge portals, are also beginning to help organizations capture and leverage their intellectual assets by facilitating assembly of communities of interest, best practice, and expert systems within a single, intuitive, Web-based user interface. The EIP should be viewed as an evolving technology platform, and in the future EIPs will incorporate streaming video and audio to include e-learning and e-training components, thereby potentially reducing overall organizational training costs.

Critical Features of EIP

➢ Application Integration & Connectivity.
➢ Functional Support
➢ Implementation & Administration
➢ Knowledge Management
➢ Personalization & Customisation
➢ Profile management & Security
➢ Security
➢ Scalability

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EIP design model called the Five-force model stipulates five steps:
- ➢ Enterprise modeling.
- ➢ Service Identification.
- ➢ Portal application.
- ➢ Architecture Planning.
- ➢ Technology Mapping.

4.6. LET US SUM UP

In this unit, you have learnt about the basics concepts of internet ervice provider, World Wide Web and Portals. This knowledge would make you understand the backbone of e-commerce website design and development for real time applications. Thus, the ISP, WWW and portals unit would have brought you to closer to know the concept of above mentioned things.

4.7. UNIT – END QUESTIONS

1. Write short notes on internet service provider (ISP).
2. Explain about the World Wide Web.
3. Describe the concept of Portals.

4.8. ANSWER TO CHECK YOUR PROGRESS

1. Internet Service Provider (ISP) is a company offering access to internet. They offer various services:
   1. Internet Access.   2. Domain name registration
   3. Dial-up access   4. Leased line access
   Types of Internet Connections
   There are five types of internet connections which are as follows:
1. Dial up Connection   2. ISDN Connection
3. DSL connection   4. VSAT

4. WWW stands for World Wide Web**.** A technical definition of the World Wide Web is : all the resources and users on the Internet that are using the Hypertext Transfer Protocol (HTTP).
- ➢ A broader definition comes from the organization that Web inventor Tim Berners-Lee helped found, the World Wide Web Consortium (W3C).
- ➢ The World Wide Web is the universe of network-accessible information, an embodiment of human knowledge.
- ➢ WWW is basically a distributed client-server service. It this, a client can access the services from a server using a browser.
- ➢ These services are usually distributed over many locations called sites or websites.
- ➢ From the user's point of view web consists of a vast worldwide collection of documents called web pages. These web pages reside on different sites or machines all over the world.
- ➢ Each web page can contain link to other pages any where in the world. By clicking on such link user can access another web page.

➢ This kind of link can be in form of string of text or picture, sound, movie clip etc.

➢ Such a text or image that enables the user to link to another web page is called hyperlink.

5. A portal is a web-based platform that collects information from different sources into a single user interface and presents users with the most relevant information for their context. Over time, simple web portals have evolved into portal platforms that support digital customer experience initiatives.

A web portal is a specially designed website that brings information from diverse sources, like emails, online forums and search engines, together in a uniform way. Usually, each information source gets its dedicated area on the page for displaying information (a portlet); often, the user can configure which ones to display..

Metadata is structured information that describes, explains, locates, or otherwise makes it easier to retrieve, use, or manage an information resource. Metadata is often called data about data or information about information. The term metadata is used differently in different communities. Some use it to refer to machine understandable information, while others use it only for records that describe electronic resources.

4.9. ANSWER TO CHECK YOUR PROGRESS

1. Selling Online: How to Become a Successful E-commerce Merchant, Jim Carroll, and Rick Broadhead**,** Dearborn Trade,U.S. 2001.
2. E-Commerce: The Cutting Edge of Business, by K.K. Bajaj, and Debjani Nag**,** McGraw Hill Education; 2 edition, 2017.

BLOCK II – MODELS, PROTOCOL AND E-MARKETING

UNIT V – REFERENCE MODELS

Structure

5.1. INTRODUCTION

As an end in itself, understanding the reference models of network and important protocols to enable you learn more about network structure and background aspects of e-commerce after the course is over. Without understanding these concepts and terms, you will have difficulty discussing e-commerce design and development ideas with others, and will have difficulty in reading the technical literature. Since computer science is rapidly evolving new development of e-commerce website and since these issues are important in many areas of computer science the ability to learn more quickly is important to maintaining your technical edge.

5.2. OBJECTIVES

After going through this lesson you would be able to
➢ Use ideas from the various reference models when understanding the network for e-commerce that is not explicitly suited to that model.
➢ Implement and recognize the important protocols which are used in TCP/IP protocol suite.
➢ Design features of network, and justify your protocol selection and design decisions of e-commerce website.

5.3. REFERENCE MODELS

Tanenbaum defines a network as an interconnected collection of autonomous computers. Two computers are said to be interconnected if they are capable of exchanging information. Central to this definition is the fact that the computers are autonomous. This means that no computer on the network can start, stop, or control another.

There are two important network architectures, the OSI reference model and the TCP/IP reference model. Although the protocols associated with the OSI model are rarely used any more, the model itself is actually quite general and still valid, and the features discussed at each layer are still very important. The TCP/IP model has the opposite properties: the model itself is not of much use but the protocols are widely used. For this reason we will look at both of them in detail. Also, sometimes you can learn more from failures than from successes.

5.3.1. The Open Systems Interconnection (OSI) Model

The OSI model is based on a proposal developed by the International Standards Organization (ISO) as a first step toward international standardization of the protocols used in the various layers. The model is called the ISO OSI (Open Systems Interconnection) Reference Model because it deals with connecting open systems-that is, systems that are open for communication with other systems. We will just call it the OSI model for short.

The OSI model has seven layers. The principles that were applied to arrive at the seven layers can be briefly summarized as follows:
1. A layer should be created where a different abstraction is needed.
2. Each layer should perform a well-defined function.
3. The function of each layer should be chosen with an eye toward defining internationally standardized protocols.
4. The layer boundaries should be chosen to minimize the information flow across the interfaces.
5. The number of layers should be large enough that distinct functions need not be thrown together in the same layer out of necessity and small enough that the architecture does not become unwieldy.

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5.3.1.1. Physical Layer

The Physical Layer is the first layer of OSI model. This layer specifies the standards for devices, media and technologies which are used in moving the data across the network such as:-

➢ Type of cable used in connecting the devices
➢ Patterns of pin used in both sides of cable
➢ Type of interface card used in networking device
➢ Type of connector used to connect the cable with network interface
➢ Encoding of digital signals received from the Data Link layer based on the attached media type such as electrical for copper, light for fiber, or a radio wave for wireless.

On sending computer, it converts digital signals received from the Data Link layer, in analog signals and loads them in physical media. On receiving computer, it picks analog signals from media and converts them in digital signals and transfers them to the Data Link layer for further processing.

5.3.1.2. Datalink Layer

The main task of the data link layer is to transform a raw transmission facility into a line that appears free of undetected transmission errors to the network layer. It accomplishes this task by having the sender break up the input data into data frames (typically a few hundred or a few thousand bytes) and transmits the frames sequentially. If the service is reliable, the receiver confirms correct receipt of each frame by sending back an acknowledgement frame.

Another issue that arises in the data link layer (and most of the higher layers as well) is how to keep a fast transmitter from drowning a slow receiver in data. Some traffic regulation mechanism is often needed to let the transmitter know that how much buffer space the receiver has at .the moment. Frequently, this flow regulation and the error handling are integrated. Broadcast networks have an additional issue in the data link layer: how to control access to the shared channel. A special sub layer of the data link layer, the medium access control sub layer, deals with this problem.

➢ **Addressing.**
➢ **Flow Control**.
➢ **Media Access Control (MAC**.
➢ **Synchronization**.
➢ **Error control**.
➢ **Node-to-node delivery**.

5.3.1.3. Network Layer

The basic purpose of the network layer is to provide an end-to-end communication capability in contrast to machine-to-machine communication provided by the data link layer. This end-to-end is performed using two basic approaches known as connection oriented or connectionless network-layer services.

Four issues:
1. **Interface between the host and the network.**
2. **Routing.**
3. **Congestion and deadlock.**
4. **Internetworking.**

5.3.1.4. Transport Layer

The basic 'function' of the transport layer is to accept data from above, split it up into smaller units if need be, pass these to the network layer, and ensure that the pieces all arrive correctly at the other end. Furthermore, all this must be done, efficiently and in a way that isolates the upper layers from the inevitable changes in the hardware technology. The transport layer also determines what type of service to provide to the session layer, and, ultimately, to the users of the network. The most popular type of transport connection is an error-free point-to-point channel that delivers messages or bytes in the order in which they were sent. However, other possible kinds of transport service are the transporting of isolated messages, with no guarantee about the order of delivery, and the broadcasting of messages to multiple destinations. The type' of service is determined when the connection is established.

It provides following functionality: -
➢ **Segmentation**
➢ **Data transportation.**
➢ **Multiplexing**
.

5.3.1.5. Session Layer

This layer allows users on different machines to establish session between them. A session allows ordinary data transport but it also provides enhanced services useful in some applications. A session may be used to allow a user to log into a remote time sharing machine or to transfer a file between two machines. Some of the session related services are:
1. **This layer manages Dialogue Control**.
2. **Token management**.
3. **Synchronization**..

5.3.1.6. Presentation Layer

This layer is concerned with Syntax and Semantics of the information transmitted, unlike other layers, which are interested in moving data reliably from one machine to other. Few of the services that Presentation layer provides are:
1. Encoding data in a standard agreed upon way.
2. It manages the abstract data structures and converts from representation used inside computer to network standard representation and back.

5.3.1.7. Application Layer

The application layer consists of what most users think of as programs. The application does the actual work at hand. Although each application is different, some applications are so useful that they have become standardized. The Internet has defined standards for:

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- File transfer (FTP): Connect to a remote machine and send or fetch an arbitrary file. FTP deals with authentication, listing a directory contents, ASCII or binary files, etc.
- Remote login (telnet): A remote terminal protocol that allows a user at one site to establish a TCP connection to another site, and then pass keystrokes from the local host to the remote host.
- Mail (SMTP): Allow a mail delivery agent on a local machine to connect to a mail delivery agent on a remote machine and deliver mail.
- News (NNTP): Allows communication between a news server and a news client.
- Web (HTTP): Base protocol for communication on the World Wide Web.

5.3.2. Transmission Control Protocol / Internet Protocol

- The OSI reference model was the first communication model and was termed as general purpose model because of its ability to fit in any type of network but without fitting the protocols in. Due to its inability to fit protocols, TCP/IP reference model which is commonly known as Internet Model was developed in year 1983 by US Military Wing called ARPANET.
- In 1983 January 1, TCP/IP was made active permanently for the commercial use. From then, TCP/IP has made a revolution in the field of networking and telecommunication as it was able to overcome the drawbacks of general purpose OSI Model.
- TCP/IP stands for Transmission Control Protocol with the help of which, protocol implementation over the network can be achieved.
- The TCP/IP model also has a layered architecture which allows easy data communication along with the facility of integrating multiple protocols. The layout remains similar to OSI Model but the number of layer, their functionalities and properties got changed.
- This Internet Model (TCP/IP) comprises of only four layers as compared to seven layers of OSI Model. These four layers are generated by combining the layers of OSI model internally so that protocols can be implemented. These layers have fixed positions too and their positions cannot be altered.
- Application Layer, Transport Layer, Internet Layer and Network Access Layers are the four layers of TCP/IP Model.

Figure 11: - TCP/IP Reference Model

The Network Access Layer
- The Network Access Layer of TCP/IP reference model is also known as the Host-to-Host or Host-to-Network layer as it is responsible for performing roles of the Physical Layer along with the functions of Data Link Layer.
- Data in the form of bits received in the Network Access Layer are connected in the form of data packets to Internet Layer.
- Network Access Layer = Data Link Layer + Physical Layer.

b) The Internet Layer
- Internet layer is also called Network Layer which is responsible for establishment of connection to send or receive data packets between multiple users or nodes or devices or networks. This layer is placed on the 2nd position from bottom.
- The Internet Layer en-routes the data packets from source to destination through the process of routing with the help of various routing techniques and routing protocols.

c) The Transport Layer
- The Transport Layer performs the same functions and have similar features as that in OSI Model. The functionality of Transport Layer is, it provides end to end data transfer by using the technique of connection oriented services between sender and receiver with the help of various protocols.

d) The Application layer
- The Application Layer resides on the top of the TCP/IP reference model as line in OSI Model. The functionality of Application Layer of TCP/IP reference model is to provide interface between users and the applications. In some cases depending upon the requirements, it can perform the functions of Session Layer (to provide sessions) and Presentation Layer (data representation).
- Application Layer = Session Layer + Presentation Layer + Application Layer.

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5.4. PROTOCOL

TCP/IP is the protocol suite upon which all Internet communication is based. Protocols are sometimes referred to as protocol stacks or protocol suites. A protocol stack is an appropriate term because it indicates the layered approach used to design the networking software. Each host or router in the internet must run a protocol stack. The details of the underlying physical connections are hidden by the software. The sending software at each layer communicates with the corresponding layer at the receiving side through information stored in headers. Each layer adds its header to the front of the message from the next higher layer. The header is removed by the corresponding layer on the receiving side.

5.4.1. Internet Protocol

IP provides communication between hosts on different kinds of networks (i.e., different data-link implementations such as Ethernet and Token Ring). It is a connectionless, unreliable packet delivery service. Connectionless means that there is no handshaking, each packet is independent of any other packet. It is unreliable because there is no guarantee that a packet gets delivered; higher-level protocols must deal with that.

➢ **IP Address:**

IP defines an addressing scheme that is independent of the underlying physical address (e.g, 48-bit MAC address). IP specifies a unique 32-bit number for each host on a network. This number is known as the Internet Protocol Address, the IP Address or the Internet Address. These terms are interchangeable. Each packet sent across the internet contains the IP address of the source of the packet and the IP address of its destination. For routing efficiency, the IP address is considered in two parts: the prefix which identifies the physical network, and the suffix which identifies a computer on the network. A unique prefix is needed for each network in an internet. For the global Internet, network numbers are obtained from Internet Service Providers (ISPs). ISPs coordinate with a central organization called the Internet Assigned Number Authority (IANA).

➢ **IP Address Classes:**

The first four bits of an IP address determine the class of the network. The class specifies how many of the remaining bits belong to the prefix (aka Network ID) and to the suffix (aka Host ID). The first three classes, A, B and C, are the primary network classes.

When interacting with mere humans, software uses dotted decimal notation; each 8 bits is treated as an unsigned binary integer separated by periods. IP reserves host address 0 to denote a network. 140.211.0.0 Denotes the network that was assigned the class B prefix 140.211.

➢ **Netmask:**

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Netmask are used to identify which part of the address is the Network ID and which part is the Host ID. This is done by a logical bitwise-AND of the IP address and the netmask. For class A networks the netmask is always 255.0.0.0; for class B networks it is 255.255.0.0 and for class C networks the netmask is 255.255.255.0.

➢ **Subnet Address:**

All hosts are required to support subnet addressing. While the IP address classes are the convention, IP addresses are typically subnetted to smaller address sets that do not match the class system. The suffix bits are divided into a subnet ID and a host ID. This makes sense for class A and B networks, since no one attaches as many hosts to these networks as is allowed. Whether to subnet and how many bits to use for the subnet ID is determined by the local network administrator of each network. If subnetting is used, then the netmask will have to reflect this fact. On a class B network with subnetting, the netmask would not be 255.255.0.0. The bits of the Host ID that were used for the subnet would need to be set in the netmask.

5.4.2. User Datagram Protocol (UDP)

User datagram protocol (UDP) is a part of TCP/IP suite. It provides full transport layer services to applications. It belongs to the transport layer in the TCP/IP suite model. UDP provides a connection between two processes at both ends of transmission. This connection is provided with minimal overhead, without flow control or acknowledgment of received data. The minimal error control is provided by ignoring (dropping) received packets that fail the checksum test. The UDP is standardized by Internet Society, which is an independent international not-for-profit organization.

Underlying IP provides data transport through the network between two hosts. UDP allows addressing particular processes at each host so that incoming data is handled by a particular application. While underlying IP provides logical addressing and is responsible for data transmission through networks, UDP provides additional addressing that allows setting up connections for multiple applications and services on the same end. Addressing the processes is implemented by assigning a number to each connection to the network, which is called a port number. UDP packets are also called datagrams. Each datagram is characterized by four parameters—the IP address and the port number at each end of the connection. Certain class of destination IP addresses may not describe individual computers but a group of processes on multiple hosts that are to receive the same datagram. Computers that need to receive multicast messages must "join" the multicast group associated with a particular multicast IP address.

UDP Datagram

UDP has a constant size 8 byte header prepended to the transmitted data, as shown in Figure. The meaning of each header field is described below:

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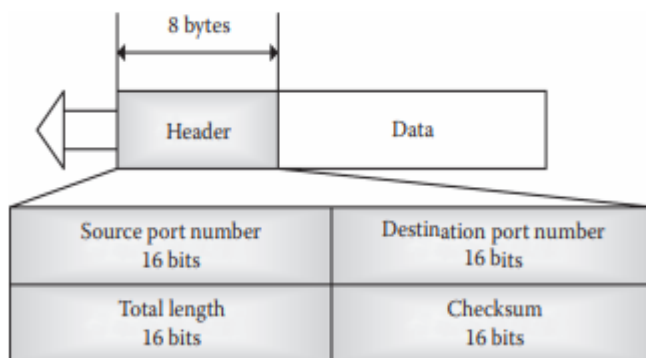
Figure 12: - User Datagram Format

➢ Source port address: This is a 16 bit field that contains a port number of the process that sends options or data in this segment.

➢ Destination port address: This is a 16 bit field that contains a port number of the process that is supposed to receive options or data carried by this segment.

➢ Total length: This is a 16 bit field that contains the total length of the packet. Although the number could be in the range from 0 to 65,535, the minimum length is 8 bytes that correspond to the packet with the header and no data. The maximum length is 65,507 because 20 bytes are used by the IP header and 8 bytes by the UDP header. Thus, this information is redundant to the packet length stored in the IP header. An extension to UDP that allows for transmission of larger datagrams over IPv6 packets has been standardized [RFC2675] [RFC2147]. In such a case, the UDP header specified total length is ignored.

➢ Checksum: This 16 bit field contains the checksum. The checksum is calculated by

✓ Initially filling it with 0's.

✓ Adding a pseudoheader with information from IP.

✓ Treating the whole segment with the pseudoheader prepended as a stream of 16 bit numbers. If the number of bytes is odd, 0 is appended at the end.

✓ Adding all 16 bit numbers using 1's complement binary arithmetic.

✓ Complementing the result. This complemented result is inserted into the checksum field.

➢ Checksum verification: The receiver calculates the new checksum for the received packet that includes the original checksum, after adding the so-called pseudoheader. If the new checksum is nonzero, then the datagram is corrupt and is discarded.

5.4.3. Transmission Control Protocol (TCP)

The transmission Control Protocol (TCP) is one of the most important protocols of Internet Protocols suite. It is most widely used protocol for data transmission in communication network such as internet.

Features

➢ TCP is reliable protocol. That is, the receiver always sends either positive or negative acknowledgement about the data packet to the sender, so that the sender always has bright clue about whether the data packet is reached the destination or it needs to resend it.

- TCP ensures that the data reaches intended destination in the same order it was sent.
- TCP is connection oriented. TCP requires that connection between two remote points be established before sending actual data.
- TCP provides error-checking and recovery mechanism.
- TCP provides end-to-end communication.
- TCP provides flow control and quality of service.
- TCP operates in Client/Server point-to-point mode.
- TCP provides full duplex server, i.e. it can perform roles of both receiver and sender.

It was specifically designed to provide a reliable end-to end byte stream over an unreliable network. It was designed to adapt dynamically to properties of the inter network and to be robust in the face of many kinds of failures. Each machine supporting TCP has a TCP transport entity, which accepts user data streams from local processes, breaks them up into pieces not exceeding 64kbytes and sends each piece as a separate IP datagram. When these datagrams arrive at a machine, they are given to TCP entity, which reconstructs the original byte streams. It is up to TCP to time out and retransmits them as needed, also to reassemble datagrams into messages in proper sequence.

The TCP Protocol

- A key feature of TCP, and one which dominates the protocol design, is that every byte on a TCP connection has its own 32-bit sequence number.
- When the Internet began, the lines between routers were mostly 56-kbps leased lines, so a host blasting away at full speed took over 1 week to cycle through the sequence numbers.
- The basic protocol used by TCP entities is the sliding window protocol.
- When a sender transmits a segment, it also starts a timer.
- When the segment arrives at the destination, the receiving TCP entity sends back a segment bearing an acknowledgement number equal to the next sequence number it expects to receive.
- If the sender's timer goes off before the acknowledgement is received, the sender transmits the segment again.

The TCP Segment Header

Every segment begins with a fixed-format, 20-byte header. The fixed header may be followed by header options. After the options, if any, up to 65,535 - 20 - 20 = 65,495 data bytes may follow, where the first 20 refer to the IP header and the second to the TCP header. Segments without any data are legal and are commonly used for acknowledgements and control messages.

- Source Port, Destination Port: Identify local end points of the connections.
- Sequence number: Specifies the sequence number of the segment.
- Acknowledgement Number: Specifies the next byte expected.
- TCP header length: Tells how many 32-bit words are contained in TCP header.
- URG: It is set to 1 if URGENT pointer is in use, which indicates start of urgent data.
- ACK: It is set to 1 to indicate that the acknowledgement number is valid.

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- PSH: Indicates pushed data.
- RST: It is used to reset a connection that has become confused due to reject an invalid segment or refuse an attempt to open a connection.
- FIN: Used to release a connection.
- SYN: Used to establish connections.

TCP Connection Establishment

To establish a connection, one side, say, the server passively waits for an incoming connection by executing the LISTEN and ACCEPTS primitives, either specifying a specific source or nobody in particular.

The other side, say, the client, executes a CONNECT primitive, specifying the IP address and port to which it wants to connect, the maximum TCP segment size it is willing to accept, and optionally some user data (e.g., a password).

The CONNECT primitive sends a TCP segment with the SYN bit on and ACK bit off and waits for a response.

TCP Connection Release

- Although TCP connections are full duplex, to understand how connections are released it is best to think of them as a pair of simplex connections.
- Each simplex connection is released independently of its sibling. To release a connection, either party can send a TCP segment with the FIN bit set, which means that it has no more data to transmit.
- When the FIN is acknowledged, that direction is shut down for new data. Data may continue to flow indefinitely in the other direction, however.
- When both directions have been shut down, the connection is released.
- Normally, four TCP segments are needed to release a connection, one FIN and one ACK for each direction. However, it is possible for the first ACK and the second FIN to be contained in the same segment, reducing the total count to three.

5.4.4. Dynamic Host configuration Protocol (DHCP)

Dynamic Host Configuration Protocol (DHCP) is a protocol used by networked devices or clients to obtain the parameters necessary for operation in an Internet Protocol network. This protocol reduces system administration workload, allowing devices to be added to the network with little or no manual configurations. Dynamic Host Configuration Protocol is a way to administrator network parameter assignment from a single DHCP server, or a group of DHCP servers arranged in a fault-tolerant manner. Even in small networks.

Dynamic Host Configuration Protocol is useful because it can make it easy to add new machines to the local network.

DHCP is also recommended even in the case of servers whose addresses rarely change, so that if a server needs to be readdressed, changes can be made in as few places as possible. DHCP can be used to directly assign addresses to servers and desktop machines, and, through a Point-to-Point Protocol (PPP) proxy, to dialup and broadband on-demand hosts, as well as for residential Network address translation (NAT) gateways and routers. DHCP is generally not appropriate for infrastructure such as non-edge routers and DNS servers**.**

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The Dynamic Host Configuration Protocol (DHCP) provides a framework for passing configuration information to hosts on a TCP/IP network. DHCP is based on the BOOTP protocol, adding the capability of automatic allocation of reusable network addresses and additional configuration options.

DHCP consists of two components:

➢ A protocol that delivers host-specific configuration parameters from a DHCP server to a host.

➢ A mechanism for the allocation of temporary or permanent network addresses to hosts.

IP requires the setting of many parameters within the protocol implementation software. Because IP can be used on many dissimilar kinds of network hardware, values for those parameters cannot be guessed at or assumed to have correct defaults. The use of a distributed address allocation scheme based on a polling/defense mechanism, for discovery of network addresses already in use, cannot guarantee unique network addresses because hosts might not always be able to defend their network addresses.

How DHCP Works

As its name indicates, DHCP provides dynamic IP address assignment. What this means is that instead of having to rely on a specific IP address, a computer will be assigned one that is available from a subnet or "pool" that is assigned to the network. DHCP also extends BOOTP functionality to provide IP addresses that expire. BOOTP indirectly uses a form of leasing that never expired, but the term wasn't actually used until the introduction of DHCP. When DHCP assigns an IP address, it actually leases the identifier to the host computer for a specific amount of time.

5.4.5. Hypertext Transfer Protocol (HTTP)

HTTP full form Hypertext Transfer Protocol used mainly to access data on the World Wide Web. HTTP is a Server and Client communication Protocol, which is primarily set of rules for formatting and transferring webpage data (text, images, video and Multimedia files) over the world wide web. This is the Protocol used to create communication between Web Servers and Web Users. HTTP is an application layer Protocol that works on the top of the TCP/IP suite of Protocols.

HTTP protocol basically uses server and client model. It acts as a request-response protocol. For Example, A client who is use web browser and a server is a Web host that hosts the website. Whenever a client transmits a request to the Website server, HTTP protocol proceeds that request and creates a connection between client and server through TCP. After that HTTP sends a request to the server, which picks up the requested data and HTTP sends the response back to the client.

HTTP protocol functions like a combination of FTP and SMTP. It is similar to FTP because it transfers files and uses the services of TCP. However, it is much simpler than FTP because it uses only one TCP connection. There is no separate control connection; only data is transferred between the client and the server.

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HTTP protocol is like SMTP protocol because the data transferred between the client and the server look like SMTP messages. In addition, MIME-like headers control the format of the messages. However, HTTP differs from SMTP in the way the messages are sent from the client to the server and from the server to the client. Unlike SMTP, the HTTP messages are not destined to be read by humans; they are read and interpreted by the HTTP server and HTTP client (browser). SMTP messages are stored and forwarded, but HTTP messages are delivered immediately.

The idea of HTTP protocol is very simple. A client sends a request, which looks like mail, to the server. The server sends the response, which looks like a mail reply, to the client. The request and response messages carry data in the form of a letter with MIME-like format.

Features of HTTP Protocol
The features of the http protocol are as follows:
➢ Http is Connectionless: The http client, i.e., the web browser makes an http request and waits for the server to respond. Now, it is the task of the server to process the request made by the client. So after processing, the server gives the response to the client. After receiving the response, the client disconnects the connection.
➢ Http is media independent: Here, media independent means that any data can send. Also, we have to mention the content type as per the requirement of the client and the server.
➢ Http is stateless: http is a stateless protocol. Only during the current request, the client and the server know about each other and when the connection disconnects, both client and the server forgets about each other. Due to this nature, both the client and the server do not retain the information between the different requests processed.

HTTPS is a Hyper Text Transfer Protocol Secure. This is the secure version of HTTP Protocol. HTTPS means a secure layer between client and server. HTTPS encrypted our data by Transport Security Layer (TLS). HTTPS is a sign of security most of the websites are secured with HTTPS.

5.4.6. File Transfer Protocol (FTP)
One of the most popular uses of the Internet is to download files - that is, transfer files from a computer on the Internet to your computer. Many thousands of files are downloaded every day from the Internet. Most of these files are downloaded using the Internet's File Transfer Protocol, commonly referred to as FTP. This protocol can also be used to upload files from your computer to another computer on the Internet.

File Transfer Protocol is a standard network protocol used to exchange and manipulate files over a TCP/IP-based network, such as the Internet. FTP is built on client-server architecture and utilizes separate control and data connections between the client and server applications. FTP is used with user-based password authentication or with anonymous user access. Applications were originally interactive command-line tools with standardized command syntax, but graphical user interfaces have

been developed for all desktop operating systems in use today. The Trivial File Transfer Protocol (TFTP) is a similar, but simplified, not interoperable, and unauthenticated version of FTP.

Numerous FTP servers all over the world allow users anywhere on the Internet to log in and down-load files placed on them. The main competitor for FTP is HTTP (Hyper Text Transfer Protocol) and the day is not very far when sites would run HTTP servers instead of the FTP servers. It is so because HTTP servers can do whatever FTP server can do and do it more efficiently.

Features of FTP

The basic features of FTP are:

1. Data representation

➢ FTP handles three types of data representations-ASCII (7 bit), EBCDIC (8-bit) and 8-binary data.

➢ The ASCII file is the default format for transferring text files

➢ Each character is encoded using 7-bit ASCII. The sender transforms the file from its own representation into ASCII characters and the receiver transforms the ASCII character to its own representation.

➢ The image file is the default format for transferring binary files. The file is sent as continuous streams of bits without any interpretation or encoding.

2. File organization and Data structures

➢ FTP supports both unstructured and structured file.

➢ An unstructured file contains string of bytes and is enl-marked by EOF (End of file). The data structure that corresponds to such a file is called file structure.

➢ A structured file contains a list of records and each record is delimited by EDR (End of Record). The data structure of such file is called record structure i.e. file is divided into records.

➢ Another structured file contains pages, with each page having a page number and a page header. The pages can be stored and accessed randomly or sequentially. The corresponding data structure is called page structure i.e. file is divided into pages.

3. Transmission modes

FTP can transfer a file by using one of the following three modes:

➢ Stream mode

➢ Block mode

➢ Compressed mode

4. Error control

Since TCP is used for data transfer no additional error recovery mechanism is required.

5. Access control

File access protection is done using login procedure with login name and password.

FTP operation

➢ FTP uses client/server model for communication.

➢ Two TCP connections are used for file transfer.

➢ On one connection control signals (commands and responses) are exchanged and the other connection is used for actual data transfer. These

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two connections are called control connection and data connection respectively.

✓ Control Connection
✓ Data Connection

Thus file transfer in FTP means one of three things:

1. A file is to be copied from the server to the client. This is called retrieving a file. It is done with help of RETR command.
2. A file is to be copied from the client to the server. This is called storing a file. It is done with STOR command.
3. A list of directory or file names is to be sent from the server to the client. This is done with LLST command.

Anonymous FTP

➢ To Use FTP, a user needs an account (user name) and a password on the Remote server.
➢ Some sites have a set of files available for public access; to enable anonymous FTP.
➢ To access these files, a user does not need to have an account or password. Instead, the user can use Anonymous as the user name and guest as the password.

5.4.7. Telnet

A client/server model can create a mechanism that allows a user to establish a session on the remote machine and then run its applications. This application is known as remote login. This can be done by a client/server application program for the desired service. Two remote login protocols are TELNET and SSH.

TELNET Protocol

TELNET (terminal network) is a TCP/IP standard for establishing a connection to a remote system. TELNET allows a user to log in to a remote machine across the Internet by first making a TCP connection and then pass the detail of the application from the user to the remote machine.

Logging to Remote Servers

With TELNET, an application program on the user's machine becomes the client. The user's keyboard and its monitor also attach directly to the remote server. The remote logging operation is based on timesharing, whereby an authorized user has a login name and a password. TELNET has the following properties.

➢ Client programs are built to use the standard client/server interfaces without knowing the details of server programs.
➢ A client and a server can negotiate data format options.
➢ Once a connection is established through TELNET, both ends of the connection are treated symmetrically.

When a user logs in to a remote server, the client's terminal driver accepts the keystrokes and interprets them as characters by its operating system. Characters are typically transformed to a universal character set called network virtual terminal (NVT), which uses 7-bit USASCII representation for data. The client then establishes a TCP connection to the server. Texts in the NVT format are transmitted using a TCP session and are delivered

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to the operating system of the remote server. The server converts the characters back from NVT to the local client machine's format.

Telnet model

For the connections, TELNET uses the TCP protocol. The TELNET service is offered in the host machine's TCP port 23. The user at the terminal interacts with the local telnet client. The TELNET client acts as a terminal accepting any keystrokes from the keyboard, interpreting them and displaying the output on the screen. The client on the computer makes the TCP connection to the host machine's port 23 where the TELNET server answers. The TELNET server interacts with applications in the host machine and assists in the terminal emulation.
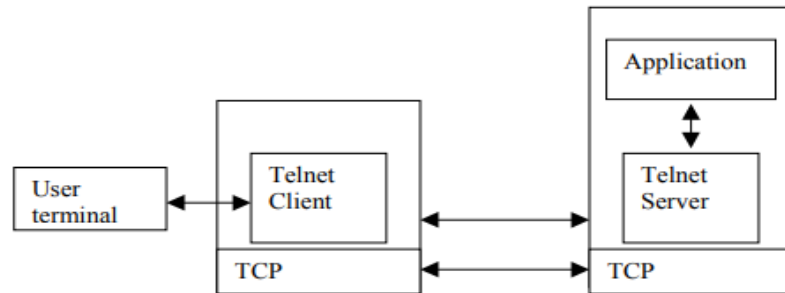
Figure 13: - Telnet Protocol Model

As the connection is setup, the both ends of the TELNET connection are assumed to be originated and terminated at the network virtual terminal (NVT). The NVT is a network wide terminal which is host independent so that both the server and the client in the connection may not need to keep any information about each others terminal's characteristics as both sees each other as a NVT terminal. As there are several types of terminals, which may be able to provide additional services from those provided by the NVT, the TELNET protocol contains a negotiation method for the user and the server to negotiate changes to the terminal provided in the NVT. Typically the client and the server stays in the NVT just as long as it takes to negotiate some terminal type to be emulated.

5.4.8. Post office Protocol (POP)

POP stands for Post Office Protocol. It is generally used to support a single client. There are several versions of POP but the POP 3 is the current standard.

Key Points

➢ POP is an application layer internet standard protocol.
➢ Since POP supports offline access to the messages, thus requires less internet usage time.
➢ POP does not allow search facility.
➢ In order to access the messaged, it is necessary to download them.
➢ It allows only one mailbox to be created on server.
➢ It is not suitable for accessing non mail data.

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➢ POP commands are generally abbreviated into codes of three or four letters. Eg. STAT.

It is a simple protocol used for opening the remote e-mail boxes. This protocol is defined in RFC 1225. Post Office Protocol version 3 (POP3) is a message access protocol that enables the client to fetch an e-mail from the remote mail server.

SMTP expects the destination host, the mail server receiving the mail, to be on-line all the time; otherwise TCP connection cannot be established. The server receives the mail on behalf of its clients.

A POP3 server stores messages for each user until the user connects to download and read them using a POP3 client such as Microsoft Outlook 98, Microsoft Outlook Express, or Microsoft Mail and News.

Mail access by POP3

➢ The client POP3 software is installed on the receiver's computer the server POP3 software is installed on the mail server.

➢ POP3 is described in RFC 1939 and it uses well-known TCP port 110.

➢ The communication procedure is similar to SMTP and uses ASCII characters.

➢ POP3 begins when user starts the mail reader.

➢ The mail reader calls up the ISP (or mail server) and establishes a TCP connection with the message transfer agent at port 110.

Once the connection has been established, the POP3 protocol goes through three states in sequence

➢ The Authorization state deals with user log in. The client sends its user name and password.

➢ The transaction state deals with the user collecting the e-mails and marking them for deletion from the mailbox.

➢ The update state causes the e-mails to be deleted.

5.4.9. Simple Mail Transfer Protocol (SMTP)

SMTP stands for Simple Mail Transfer Protocol. It is a TCP/IP protocol that specifies how computers exchange electronic mail. It works with post office protocol (POP).

SMTP is used to upload mail directly from the client to an intermediate host, but only computers constantly connected such as Internet Service Providers (ISP) to the Internet can use SMTP to receive mail. The ISP servers then offload the mail to the users to whom they provide the Internet service.

SMTP uses TCP port number 25 for his service. Therefore e-mail is delivered from source to destination by having the source machine established a TCP connection to port 25 of the destination machine.

To send a mail, a system must have a client MTA, and to receive a mail, a system must have a server MTA. SMTP transfers this message from client MTA to server MTA. SMTP uses commands and responses to transfer the message between an MTA client and MTA server In order to send a mail, SMTP is used two times: one between the sender and the sender's mail server, and the other between the two mail servers.

Working of SMTP

SMTP is a simple ASCII protocol that is based on client-server model. After establishing the TCP connection, the sending machine, operating as the client, waits for the receiving machine, operating as the server, to talk first. The server starts by sending a line of text giving its identity and telling whether or not it is prepared to receive mail. If it is not, the client releases the connection and tries again later.

If the server is willing to accept e-mail, the client announces whom the e-mail is coming from and destination, the server gives the client the go ahead to send the message. Then the client sends the message and the server acknowledges it.

Mail Transfer Phases

The basic SMTP operation occurs in three phases:

1. Connection set up
2. Mail transfer
3. Connection termination

Connection Setup

An SMTP sender will attempt to set up a TCP connection with a target host when it has one or more mail message to deliver to that host. The following sequence occurs during connection setup:

1. The sender opens a TCP connection with the receiver.
2. Once the connection is established, the receiver identifies itself with '220 Service Ready".
3. The sender identifies itself with the HELO command.
4. The receiver accepts the sender's identification with "250 'OK".
5. If the mail service on the destination is not available, the destination host returns a "421 Service Not Available" reply in step 2 and the process is terminated.

Mail transfer

Once the connection has been established, the SMTP sender may send one or more messages to the SMTP receiver. There are three logical phases to the transfer of a message:

1. A MAIL command identifies the originator of the message.
2. One or more RCPT commands identify the recipients of this message.
3. A DATA command transfers the message text.

Connection termination

The SMTP sender closes the connection in the following manner:

1. The sender sends a QUIT command and waits for a reply.
2. Sender initiates TCP close operation for the TCP connection.
3. The receiver initiates its TCP close after sending is reply to the QUIT command.

5.5. LET US SUM UP

In this unit, you have learnt about the reference models of local area and wide area network and various protocols under the TCP/IP family. This knowledge would make you understand the various layers of reference models and protocols for various services used to develop the e-commerce website communication for real time problems. Thus, the

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reference models unit would have brought you to closer to know the concept of computer networks and protocols.

5.6. UNIT – END QUESTIONS

1. Discuss about the OSI reference models.
2. Examine the functions of TCP/IP reference model.
3. Write about the various protocols used in TCP/IP suite.

5.7. ANSWER TO CHECK YOUR PROGRESS

1. The OSI model is based on a proposal developed by the International Standards Organization (ISO) as a first step toward international standardization of the protocols used in the various layers. The model is called the ISO OSI (Open Systems Interconnection) Reference Model because it deals with connecting open systems-that is, systems that are open for communication with other systems. We will just call it the OSI model for short.

The OSI model has seven layers. The principles that were applied to arrive at the seven layers can be briefly summarized as follows:

i. A layer should be created where a different abstraction is needed.
ii. Each layer should perform a well-defined function.
iii. The function of each layer should be chosen with an eye toward defining internationally standardized protocols.
iv. The layer boundaries should be chosen to minimize the information flow across the interfaces.
v. The number of layers should be large enough that distinct functions need not be thrown together in the same layer out of necessity and small enough that the architecture does not become unwieldy.

The OSI reference models layers are,
1. Physical Layer.
2. Datalink Layer.
   3. Network Layer.
   4. Transport Layer.
   5. Session Layer.
   6. Presentation Layer.
   7. Application layer.

2. TCP/IP stands for Transmission Control Protocol with the help of which, protocol implementation over the network can be achieved.

The TCP/IP model also has a layered architecture which allows easy data communication along with the facility of integrating multiple protocols. The layout remains similar to OSI Model but the number of layer, their functionalities and properties got changed.

This Internet Model (TCP/IP) comprises of only four layers as compared to seven layers of OSI Model. These four layers are generated by combining the layers of OSI model internally so that protocols can be

implemented. These layers have fixed positions too and their positions cannot be altered.

1. Application Layer.
2. Transport Layer.
3. Internet Layer.
4. Network Access Layer.

3. A protocol stack is an appropriate term because it indicates the layered approach used to design the networking software. Each host or router in the internet must run a protocol stack.

Internet Protocol - IP provides communication between hosts on different kinds of networks (i.e., different data-link implementations such as Ethernet and Token Ring). It is a connectionless, unreliable packet delivery service.

User Datagram Protocol (UDP) - User datagram protocol (UDP) is a part of TCP/IP suite. It provides full transport layer services to applications. It belongs to the transport layer in the TCP/IP suite model. UDP provides a connection between two processes at both ends of transmission.

Transmission Control Protocol (TCP) - The transmission Control Protocol (TCP) is one of the most important protocols of Internet Protocols suite. It is most widely used protocol for data transmission in communication network such as internet.

Dynamic Host configuration Protocol (DHCP) - Dynamic Host Configuration Protocol (DHCP) is a protocol used by networked devices or clients to obtain the parameters necessary for operation in an Internet Protocol network. This protocol reduces system administration workload, allowing devices to be added to the network with little or no manual configurations.

Hypertext Transfer Protocol (HTTP) - HTTP full form HyperText Transfer Protocol used mainly to access data on the World Wide Web. HTTP is a Server and Client communication Protocol, which is primarily set of rules for formatting and transferring webpage data (text, images, video and Multimedia files) over the World Wide Web.

File Transfer Protocol (FTP) - One of the most popular uses of the Internet is to download files - that is, transfer files from a computer on the Internet to your computer. Many thousands of files are downloaded every day from the Internet. Most of these files are downloaded using the Internet's File Transfer Protocol, commonly referred to as FTP. This protocol can also be used to upload files from your computer to another computer on the Internet.

Post office Protocol (POP) - POP stands for Post Office Protocol. It is generally used to support a single client. There are several versions of POP but the POP 3 is the current standard.

Simple Mail Transfer Protocol (SMTP) - SMTP stands for Simple Mail Transfer Protocol. It is a TCP/IP protocol that specifies how computers exchange electronic mail. It works with post office protocol (POP).

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5.8. SUGGESTED READINGS

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UNIT VI – XML AND DATA WAREHOUSING

Structure

6.1. INTRODUCTION

As an end in itself, understanding extended markup language, XML development goals, difference between HTML and XML and data warehousing concepts and terms is important to enable you learn more about XML programming and structure of XML document after the course is over. Without understanding these concepts and terms, you will have difficulty discussing XML programming language ideas with others, and will have difficulty in reading the technical literature.

6.2. OBJECTIVES

After going through this lesson you will be able in a position to
➢ Recognize the XML language goals and difference between HTML and XML.
➢ Recognize the structure of XML and X-Secure functions.
➢ Recognize the concept of Data Warehousing and Data marts.

6.3. DEFINITION OF EXTENSIBLE MARKUP LANGUAGE (XML)

XML stands for **E**xtensible **M**arkup **L**anguage. It is a text-based markup language derived from Standard Generalized Markup Language (SGML).

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XML tags identify the data and are used to store and organize the data, rather than specifying how to display it like HTML tags, which are used to display the data. XML is not going to replace HTML in the near future, but it introduces new possibilities by adopting many successful features of HTML.

XML is used to define documents with a standard format that can be read by any XML-compatible application. The language can be used with HTML pages, but XML itself is not a markup language. Instead, it is a "metalanguage" that can be used to create markup languages for specific applications. For example, it can describe items that may be accessed when a Web page loads. Basically, XML allows you to create a database of information without having an actual database. While it is commonly used in Web applications, many other programs can use XML documents as well.

There are three important characteristics of XML that make it useful in a variety of systems and solutions −

➢ **XML is extensible** − XML allows you to create your own self-descriptive tags, or language, that suits your application.

➢ **XML carries the data does not present it** − XML allows you to store the data irrespective of how it will be presented.

➢ **XML is a public standard** − XML was developed by an organization called the World Wide Web Consortium (W3C) and is available as an open standard.

XML Usage

A short list of XML usage says it all −

➢ XML can work behind the scene to simplify the creation of HTML documents for large web sites.

➢ XML can be used to exchange the information between organizations and systems.

➢ XML can be used for offloading and reloading of databases.

➢ XML can be used to store and arrange the data, which can customize your data handling needs.

➢ XML can easily be merged with style sheets to create almost any desired output.

➢ Virtually, any type of data can be expressed as an XML document.

What is Markup?

XML is a markup language that defines set of rules for encoding documents in a format that is both human-readable and machine-readable. So what exactly is a markup language? Markup is information added to a document that enhances its meaning in certain ways, in that it identifies the parts and how they relate to each other. More specifically, a markup language is a set of symbols that can be placed in the text of a document to demarcate and label the parts of that document.

6.4. XML DEVELOPMENT GOALS

The XML specification sets out the following goals for XML:
Table 4: - XML Goals

S. No	Goals
1.	It shall be straightforward to use XML over the Internet. Users must be able to view XML documents as quickly and easily as HTML documents. In practice, this will only be possible when XML browsers are as robust and widely available as HTML browsers, but the principle remains.
2.	XML shall support a wide variety of applications. XML should be beneficial to a wide variety of diverse applications: authoring, browsing, content analysis, etc. Although the initial focus is on serving structured documents over the web, it is not meant to narrowly define XML.
3.	XML shall be compatible with SGML. Most of the people involved in the XML effort come from organizations that have a large, in some cases staggering, amount of material in SGML. XML was designed pragmatically, to be compatible with existing standards while solving the relatively new problem of sending richly structured documents over the web.
4.	It shall be easy to write programs that process XML documents. The colloquial way of expressing this goal while the spec was being developed was that it ought to take about two weeks for a competent computer science graduate student to build a program that can process XML documents.
5.	The number of optional features in XML is to be kept to an absolute minimum, ideally zero. Optional features inevitably raise compatibility problems when users want to share documents and sometimes lead to confusion and frustration.
6.	XML documents should be human-legible and reasonably clear. If you don't have an XML browser and you've received a hunk of XML from somewhere, you ought to be able to look at it in your favorite text editor and actually figure out what the content means.
7.	The XML design should be prepared quickly. Standards efforts are notoriously slow. XML was needed immediately and was developed as quickly as possible.
8.	The design of XML shall be formal and concise. In many ways a corollary to rule 4, it essentially means that XML must be expressed in EBNF and must be amenable to modern compiler tools and techniques. There are a number of technical reasons why the SGML grammar *cannot* be expressed in EBNF. Writing a proper SGML parser requires handling a variety of rarely used and difficult to parse language features. XML does not.
9.	XML documents shall be easy to create. Although there will eventually be sophisticated editors to create and edit XML content, they won't appear immediately. In the

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	interim, it must be possible to create XML documents in other ways: directly in a text editor, with simple shell and Perl scripts, etc.
10.	Terseness in XML markup is of minimal importance. Several SGML language features were designed to minimize the amount of typing required to manually key in SGML documents. These features are not supported in XML. From an abstract point of view, these documents are indistinguishable from their more fully specified forms, but supporting these features adds a considerable burden to the SGML parser.

The other development aspects of XML are,
- XML shall be straightforwardly usable over the Internet.
- XML shall support a wide variety of applications.
- XML shall be compatible with SGML.
- It shall be easy to write programs which process XML documents.
- The number of optional features in XML is to be kept to the absolute minimum, ideally zero.
- XML documents should be human-legible and reasonably clear.
- The XML design should be prepared quickly.
- The design of XML shall be formal and concise.
- XML documents shall be easy to create.
- Terseness in XML markup is of minimal importance.

6.5. COMPARISON BETWEEN XML AND HTML

Definition of XML

XML (Extensible Markup Language) is a language that enables a user to define a representation of data or data structure where values are assigned in each field in the structure. IBM devised it as a GML (Generalized Markup Language) in 1960's. When the IBM's GML is adopted by ISO, it named as SGML (Standard Generalized Markup Language) and it was the foundation for the complex documentation system. XML language provides a platform to define markup elements and generate customized markup language. In XML to create a language or elements, one must follow some set of rules defined in the XML. The XML document includes data as strings and text which is surrounded by text markup. The fundamental unit in the XML is known as an element.

XML is well-formed and valid markup language. Here well-formed specifies that the XML parser could not pass the code if it is filled with syntax, punctuation, grammar errors. Additionally, it is only valid until it is well-formed and valid means that the element structure and the markup must match with a standard set of rules.

XML document involves two parts – prolog and body. The prolog part of the XML consists of administrative metadata such as XML declaration, optional processing instruction, Document type declaration and comments. The body part is partitioned into two parts – structural and the content (Present in the plain text).

Definition of HTML

HTML (Hypertext Markup Language) is the markup language for constructing web pages. The markup commands employed in the web-based content signifies structure of the document and its layout to the browser. Browsers simply read the document with the HTML markup in it and render it on the screen through examining the placed HTML elements in the document. An HTML document is considered as a text file that holds the information need to be published.

The embedded instructions are known as elements which show the structuring and presentation of the document in the web browser. These elements are comprised of tags inside the angle bracket which surrounds some text. The tags usually come in a pair – beginning and ending tag.

Key Differences between XML and HTML

1. XML is a text-based markup language which has the self-describing structure and can effectively define another markup language. On the other hand, HTML is a predefined markup language and has a limited capability.
2. XML provides logical structuring of the document while HTML structure is predefined where "head" and "body" tags are used.
3. When it comes to language type HTML is case insensitive. As against, XML is case sensitive.
4. HTML was designed with the emphasis on the presentational features of the data. In contrast, XML is data specific where the data storage and transfer was the prior concern.
5. XML does not permit any mistake if there are some errors in the code it could not be parsed. Inversely, in HTML small errors can be neglected.
6. Whitespaces in XML are used for a specific use as XML considers every single character. On the contrary, HTML can ignore the whitespaces.
7. The tags in XML are mandatory to be closed, whereas in HTML an open tag can also work completely fine.
8. Nesting in XML should be done correctly; it has a big importance in XML syntax. Conversely, HTML does not care much about nesting.

6.6. BUSINESS IMPORTANCE IN USING XML BASED TECHNOLOGY

As the Web continues to evolve, eXtensible Markup Language (XML) will be the language of choice used to send internet content and electronic transactions. XML is a syntax that provides the ability to identify pieces of information based upon hierarchy and content. It is important to understand that XML is syntax and not a vocabulary. Organizations have the ability to define information based upon their business rules in XML using their own vocabularies.

The ability for an organization to create their own vocabulary is an empowering capability of XML. However, this ability also comes at a price of interoperability problems, or the exchange of information. Traditional EDI (Electronic Data Interchange) was based upon well established standards. The EDI standards developed a standard

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vocabulary. The vocabulary was a paper-based product. Delimiters within the EDI message differentiated the fields within an EDI message. The messages are concise.

There are currently two international standards for performing EDI transactions, ANSI X12 and UN/EDIFACT. The X12 standard is mainly used in North America while UN/EDIFACT is used by the rest world. These two EDI standards are not interoperable. Complex EDI mappers have been developed to enable the interchange of information between company databases and agreed upon EDI messages. The EDI standards requires that additional paperwork, meetings and telephone conversations have to take place in order to develop an agreement between two parties. The agreement between these two parties may not fit third parties requirements so more agreements are necessary.

Why XML for E-Business

Companies that use traditional EDI systems today are either Fortune 500 companies or companies who have been mandated to use EDI in order to do business with large companies and Government agencies. The larger companies and Government entities have EDI systems in use. In North America, there are over 6 million companies. Today around 100,000 companies use traditional standard EDI . These statistics show that the vast majority of companies are not using traditional EDI. Two reasons why EDI has not been embraced by small and medium-sized enterprises (SME) is cost and complexity. The SMEs do not use traditional EDI unless mandated from outside the organization. XML provides the mechanism for SMEs to play in the global marketplace.

Current methods for performing EDI predate the World Wide Web. EDI has not become thoroughly adopted by the business world. EDI continues to be used for one-to-one data exchange between businesses. When two organizations want to exchange EDI transactions, they must develop an EDI agreement based on the EDI standard. These agreements are usually defined in prose and implemented in software. The messages or transactions are usually accomplished through proprietary networks or using telephone dial-up communication or a VAN (Value Added Network). The use of internet for doing business is rapidly being deployed. EDI uses proprietary protocols that take time to optimize and, once instituted, are difficult and costly to change. XML can include the structural information and may prove to be a solution for many of EDI adoption barriers. XML provides greater levels of standardization, an intelligent structural framework, and eventual widespread use on the Web. Currently, electronic commerce is alive and active on the internet but it is not being conducted using standard EDI methods. Instead, these transactions occur through customized programs and databases. XML is becoming popular as the underlying data format. Using XML as the standard for EDI transactions can provide standardized protocols that allow for exchange of information. Such standardization and flexibility can only increase the use of EDI, both through existing proprietary networks and over the World Wide Web.

Traditional EDI is delimited text. Transactions are usually sent in batch mode by a VAN (Value Added Network). Below is an example of a

name segment in an X12 transaction. As you can see, this information is very succinct and difficult for a human to understand. If a piece of information were missing a delimiter would still be required as a place holder in order for the receiving computer to understand the fields.

6.7. BENEFITS, DISBENEFITS AND APPLICATIONS OF XML

As the Internet emerged and rapidly became a viable place to conduct business, communicate, and entertain, it became apparent that the need to exchange data in an open manner was still unmet. SGML provided a solution for exchanging data in a structured, standardized manner, but it was inappropriate for direct application on the Internet.HTML was a pure Internet approach for displaying and presenting information in a plat- form-independent manner, but it was wholly inadequate for representing data structures. EDI had proven its merit in conducting electronic business transactions but was ill-suited to being exchanged on the Internet and lacked the sophisticated features of either HTML or SGML. It was obvious something more was needed.

In this environment, an initiative led Jon Bosak and supported by a group of SGML and industry notables, including Tim Bray, C. M. Sperberg-McQueen, Jean Paoli, and James Clark, sought to take some of the best features of SGML and ─put them on the Web. Their goal was to take the standard, generalized manner for marking up data and extend it with metadata while stripping out all the complexities and optional features that made SGML too difficult to implement. On top of that, the new language would be designed inherently for the Internet and have the support of the Internet's top standards-setting body, the World Wide Web Consortium (W3C). Originally called Web SGML, this new language was later named the Extensible Markup Language (XML).

Benefits of XML

The very nature of XML is that it is a structured document format that represents not only the information to be exchanged but also the metadata encapsulating its meaning.

➢ **XML Separates Data from HTML**

If you need to display dynamic data in your HTML document, it will take a lot of work to edit the HTML each time the data changes. With XML, data can be stored in separate XML files. This way you can concentrate on using HTML for layout and display, and be sure that changes in the underlying data will not require any changes to the HTML.

➢ **XML Simplifies Data Sharing**

In the real world, computer systems and databases contain data in incompatible formats. XML data is stored in plain text format. This provides a software- and hardware-independent way of storing data. This makes it much easier to create data that can be shared by different applications.

➢ **XML Simplifies Data Transport**

One of the most time-consuming challenges for developers is to exchange data between incompatible systems over the Internet.

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Exchanging data as XML greatly reduces this complexity, since the data can be read by different incompatible applications.

➢ **XML Simplifies Platform Changes**

Upgrading to new systems (hardware or software platforms), is always time consuming. Large amounts of data must be converted and incompatible data is often lost. XML data is stored in text format. This makes it easier to expand or upgrade to new operating systems, new applications, or new browsers, without losing data.

➢ **XML Makes Your Data More Available**

Different applications can access your data, not only in HTML pages, but also from XML data sources. With XML, your data can be available to all kinds of "reading machines" (Handheld computers, voice machines, news feeds, etc), and make it more available for blind people, or people with other disabilities.

➢ **XML is used to Create New Internet Languages**

A lot of new Internet languages are created with XML.

Dis-Benefits of XML

1. XML syntax is redundant or large relative to binary representations of similar data, especially with tabular data.
2. The redundancy may affect application efficiency through higher storage, transmission and processing costs.
3. XML syntax is verbose, especially for human readers, relative to other alternatives 'text-based' data transmission formats.
4. The hierarchical model for representation is limited in comparison to an object-oriented graph.
5. Expressing overlapping (non-hierarchical) node relationships requires extra effort.
6. XML namespaces are problematic to use and namespace support can be difficult to correctly implement in an XML parser.
7. XML is commonly depicted as "self-documenting" but this depiction ignores critical ambiguities.
8. The distinction between content and attributes in XML seems unnatural to some and makes designing XML data structures harder.
9. Transformations, even identity transforms, result in changes to format (whitespace, attribute ordering, attribute quoting, whitespace around attributes, newlines). These problems can make diff-ing the XML source very difficult.
10. Encourages non-relational data structures.
11. XML is very concrete and highly non-canonical. It introduces a very strong coupling between the actual representation chosen and the processing program.

Applications of XML

XML has a variety of uses for Web, e-business, and portable applications. The following are some of the many applications for which XML is useful:

➢ **Web publishing**: XML allows you to create interactive pages, allows the customer to customize those pages, and makes creating e-commerce applications more intuitive. With XML, you store the data once and then render that content for different viewers or devices based on style sheet processing using an Extensible Style Language (XSL)/XSL Transformation (XSLT) processor.

➢ **Web searching and automating Web tasks**: XML defines the type of information contained in a document, making it easier to return useful results when searching the Web:

For example, using HTML to search for books authored by Tom Brown is likely to return instances of the term 'brown' outside of the context of author. Using XML restricts the search to the correct context (for example, the information contained in the <author> tag) and returns only the information that you want. By using XML, Web agents and robots (programs that automate Web searches or other tasks) are more efficient and produce more useful results.

➢ **General applications**: XML provides a standard method to access information, making it easier for applications and devices of all kinds to use, store, transmit, and display data.

➢ **E-business applications**: XML implementations make electronic data interchange (EDI) more accessible for information interchange, business-to-business transactions, and business-to-consumer transactions.

➢ **Metadata applications**: XML makes it easier to express metadata in a portable, reusable format.

➢ **Pervasive computing**: XML provides portable and structured information types for display on pervasive (wireless) computing devices such as personal digital assistants (PDAs), cellular phones, and others. For example, WML (Wireless Markup Language) and VoiceXML are currently evolving standards for describing visual and speech-driven wireless device interfaces.

6.8. STRUCTURE OF AN XML DOCUMENT

An XML document consists of a number of discrete components or sections. Although not all the sections of an XML document may be necessary, their use and inclusion helps to make for a well-structured XML document that can easily be transported between systems and devices.

The major portions of an XML document include the following:

➢ The XML declaration
➢ The Document Type Declaration
➢ The element data
➢ The attribute data

XML Declaration

The first part of an XML document is the declaration. A declaration is exactly as it sounds: It is a definite way of stating exactly what the document contains.

The XML declaration is a processing instruction of the form <?xml ...?>. Although it is not required, the presence of the

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declaration explicitly identifies the document as an XML document and indicates the version of XML to which it was authored. In addition, the XML declaration indicates the presence of external markup declarations and character encoding. Because a number of documents formats use markup similar to XML, the declaration is useful in establishing the document as being compliant with a specific version of XML without any doubt or ambiguity. In general, every XML document should use an XML declaration. As documents increase in size and complexity, this importance likewise grows.

Document Type Declaration

The next step is to be more specific about the content contained within. The Document Type Declaration (DOCTYPE) gives a name to the XML content and provides a means to guarantee the document's validity, either by including or specifying a link to a Document Type Definition (DTD). Although SGML requires a Document Type Declaration, XML has no restrictions of the sort, although one should be included to avoid an ambiguous under-standing of document content.

Although well-formed XML documents don't require the inclusion of the DOCTYPE, valid XML documents do. This discussion of "well formed" and "valid" will be covered later in this document, but the basic gist is that XML documents can be fairly freeform or comply to a strict guideline of what content can be contained within. Valid XML documents must declare the document type to which they comply, whereas well-formed XML documents can include the DOCTYPE to simplify the task of the various tools that will be manipulating the XML document.

A Document Type Declaration names the document type and identifies the internal con-tent by specifying the root element, in essence the first XML tag that the XML-process-ing tools will encounter in the document. A DOCTYPE can identify the constraints on the validity of the document by making a reference to an external DTD subset and/or include the DTD internally within the document by means of an internal DTD subset.

<!DOCTYPE NAME SYSTEM "file"> <!DOCTYPE NAME [ ]>
<!DOCTYPE NAME SYSTEM "file" [ ]>

Markup and Content

In addition to the XML declaration and the Document Type Declaration, XML documents are composed of markup and content. In general, six kinds of markup can occur in an XML document: elements, entity references, comments, processing instructions, marked sections, and Document Type Declarations. The following sections explore these markup types and illustrate how they are used. Of course, needless to say, that which is not markup is content, and this content must comply with rules of its own.

Elements

Within an XML document, elements are the most common form of markup. XML elements are either a matched pair of XML tags or single XML tags that are "self-closing." Matching XML tags consist of markup tags that contain the same content, except that the ending tag is

prefixed with a forward slash. For example, our shirt element begins with <shirt> and ends with </shirt>. Everything between these tags is additional XML text that has either been defined by a DTD or can exist by virtue of the document merely being well formed. When elements do not come in pairs, the element name is suffixed by the forward slash.

Attributes

Within elements, additional information can be communicated to XML processors that modify the nature of the encapsulated content. For example, we may have specified a <price> element, but how do we know what currency this applies to? Although it's possible to create a <currency> subtag, another more viable approach is to use an attribute. Attributes are name/value pairs contained within the start element that can specify text strings that modify the context of the element.

6.9. XHTML AND X/SECURE

XHTML stands for **EXtensible HyperText Markup Language.** It is a cross between HTML and XML language.

XHTML is almost identical to HTML but it is stricter than HTML. XHTML is HTML defined as an XML application. It is supported by all major browsers.

Although XHTML is almost the same as HTML but It is more important to create your code correctly, because XHTML is stricter than HTML in syntax and case sensitivity. XHTML documents are well-formed and parsed using standard XML parsers, unlike HTML, which requires a lenient HTML-specific parser.

Features of XHTML:

➢ Unlike HTML, which is standard generalized markup language based, XHTML is XML-based.

➢ Compared to the rules of HTML, XHTML is stricter and does not allow any lapses in coding or structure. It prohibits the omission of any tags or usage of attribute minimization. All elements in XHTML must have a starting or ending tag.

➢ It is a restrictive subset of XML and needs to be parsed with help of standard XML parsers.

➢ XHTML documents has only one root element.

➢ As they are XML conforming, XHTML documents are easily viewed edited using standard XML tools.

➢ Unlike HTML, XHTML provides a more cleaner, consistent and well-structured format which helps in making the webpages easily parseable for present and future browsers.

➢ Sustainability is more pronounced in case of XHTML than HTML.

➢ As the error processing routines are shorter, future browsers can support faster processing of XHTML documents.

➢ As XHTML can support wide range of applications, using the same complex websites can be created.

➢ XHTML elements needs to be nester properly and should always be in lower case.

XHTML was developed to make HTML more extensible and increase interoperability with other data formats. There are two main reasons behind the creation of XHTML:

➢ It creates a stricter standard for making web pages, reducing incompatibilities between browsers. So it is compatible for all major browsers.

➢ It creates a standard that can be used on a variety of different devices without changes.

➢ Let's take an example to understand it.

HTML is mainly used to create web pages but we can see that many pages on the internet contain "bad" HTML (not follow the HTML rule).

Security has always been vitally important in the business world to ensure the integrity of content and transactions, to maintain privacy and confidentiality, and to make sure information is used appropriately. However, in today's web-based business environment, the means for providing that security have changed. Using physical security no longer works as well as it did in the past when all the computing resources were locked in a central computing room with all jobs submitted locally.

Efforts to create a single pervasive security infrastructure do not scale effectively to the Internet, due to the heterogeneous nature of hardware and software systems and to conflicting administrative, application and security requirements. There is too much to administer, too many applications, too many variations, and too rapid a pace of technology change to design a single infrastructure to meet all requirements effectively. Extensible standards are required that can adapt to changing requirements, that can incorporate new technologies while continuing to work with legacy technologies, and that can be deployed modularly as needed without requiring use of unnecessary portions. These standards should work well together, not replicate functionality, and should fit with new technologies to enable open distributed systems, application integration and content management.

Older security technologies provide a set of core security algorithms and technologies that can be used in XML Security, but the actual formats used to implement security requirements are inappropriate for most XML Security applications. One reason is that these standards use binary formats that require specialized software for interpretation and use, even for extracting portions of the security information. A second reason is that these standards are not designed for use with XML and do not support common XML technical approaches for managing content, such as specifying content with uniform resource identifier strings (URIs) or using other XML standard definitions for locating portions of XML content (like XPath [XPath]). In addition, some existing security technologies assume that security-specific software will be integrated with applications to enable security. In practice, this is not always the case due to the details of custom integration.

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6.10. DATA WAREHOUSING

The term "Data Warehouse" was first coined by Bill Inmon in 1990. According to Inmon, a data warehouse is a subject oriented, integrated, time-variant, and non-volatile collection of data. This data helps analysts to take informed decisions in an organization.

An operational database undergoes frequent changes on a daily basis on account of the transactions that take place. Suppose a business executive wants to analyze previous feedback on any data such as a product, a supplier, or any consumer data, then the executive will have no data available to analyze because the previous data has been updated due to transactions.

A data warehouses provides us generalized and consolidated data in multidimensional view. Along with generalized and consolidated view of data, a data warehouses also provides us Online Analytical Processing (OLAP) tools. These tools help us in interactive and effective analysis of data in a multidimensional space. This analysis results in data generalization and data mining.

Data mining functions such as association, clustering, classification, prediction can be integrated with OLAP operations to enhance the interactive mining of knowledge at multiple level of abstraction. That's why data warehouse has now become an important platform for data analysis and online analytical processing.

Understanding a Data Warehouse

➢ A data warehouse is a database, which is kept separate from the organization's operational database.

➢ There is no frequent updating done in a data warehouse.

➢ It possesses consolidated historical data, which helps the organization to analyze its business.

➢ A data warehouse helps executives to organize, understand, and use their data to take strategic decisions.

➢ Data warehouse systems help in the integration of diversity of application systems.

➢ A data warehouse system helps in consolidated historical data analysis.

Why a Data Warehouse is Separated from Operational Databases

A data warehouses is kept separate from operational databases due to the following reasons −

• An operational database is constructed for well-known tasks and workloads such as searching particular records, indexing, etc. In contract, data warehouse queries are often complex and they present a general form of data.

• Operational databases support concurrent processing of multiple transactions. Concurrency control and recovery mechanisms are required for operational databases to ensure robustness and consistency of the database.

• An operational database query allows to read and modify operations, while an OLAP query needs only read only access of stored data.

• An operational database maintains current data. On the other hand, a data warehouse maintains historical data.

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Data Warehouse Features

The key features of a data warehouse are discussed below –

➢ Subject Oriented – A data warehouse is subject oriented because it provides information around a subject rather than the organization's ongoing operations. These subjects can be product, customers, suppliers, sales, revenue, etc. A data warehouse does not focus on the ongoing operations; rather it focuses on modelling and analysis of data for decision making.

➢ Integrated – A data warehouse is constructed by integrating data from heterogeneous sources such as relational databases, flat files, etc. This integration enhances the effective analysis of data.

➢ Time Variant – the data collected in a data warehouse is identified with a particular time period. The data in a data warehouse provides information from the historical point of view.

➢ Non-volatile – Non-volatile means the previous data is not erased when new data is added to it. A data warehouse is kept separate from the operational database and therefore frequent changes in operational database are not reflected in the data warehouse.

Data Warehouse Applications

As discussed before, a data warehouse helps business executives to organize, analyze, and use their data for decision making. A data warehouse serves as a sole part of a plan-execute-assess "closed-loop" feedback system for the enterprise management. Data warehouses are widely used in the following fields –

➢ Financial services
➢ Banking services
➢ Consumer goods
➢ Retail sectors
➢ Controlled manufacturing

Types of Data Warehouse

Information processing, analytical processing and data mining are the three types of data warehouse applications that are discussed below –

➢ Information Processing – A data warehouse allows to process the data stored in it. The data can be processed by means of querying, basic statistical analysis, reporting using crosstabs, tables, charts, or graphs.

➢ Analytical Processing – A data warehouse supports analytical processing of the information stored in it. The data can be analyzed by means of basic OLAP operations, including slice-and-dice, drill down, drill up, and pivoting.

➢ Data Mining – Data mining supports knowledge discovery by finding hidden patterns and associations, constructing analytical models, performing classification and prediction. These mining results can be presented using the visualization tools.

6.11. DATA MARTS AND OPERATIONAL DATA STORES

6.11.1. Data Marts

A data mart is focused on a single functional area of an organization and contains a subset of data stored in a Data Warehouse.

A data mart is a condensed version of Data Warehouse and is designed for use by a specific department, unit or set of users in an organization, e.g., marketing, sales, HR or finance. It is often controlled by a single department in an organization.

Data Mart usually draws data from only a few sources compared to a Data warehouse. Data marts are small in size and are more flexible compared to a Data warehouse.

Type of Data Mart

There are three main types of data marts are:

1. Dependent: Dependent data marts are created by drawing data directly from operational, external or both sources.
2. Independent: Independent data mart is created without the use of a central data warehouse.
3. Hybrid: This type of data marts can take data from data warehouses or operational systems.

Steps in Implementing a Data mart

Implementing a Data Mart is a rewarding but complex procedure. Here are the detailed steps to implement a Data Mart:

Designing

Designing is the first phase of Data Mart implementation. It covers all the tasks between initiating the request for a data mart to gathering information about the requirements. Finally, we create the logical and physical design of the data mart.

Constructing

This is the second phase of implementation. It involves creating the physical database and the logical structures.

Populating:

In the third phase, data in populated in the data mart.

The populating step involves the following tasks:

- Source data to target data Mapping
- Extraction of source data
- Cleaning and transformation operations on the data
- Loading data into the data mart
- Creating and storing metadata

Accessing

Accessing is a fourth step which involves putting the data to use: querying the data, creating reports, charts, and publishing them. End-user submit queries to the database and display the results of the queries

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Managing

This is the last step of Data Mart Implementation process. This step covers management tasks such as-

- Ongoing user access management.
- System optimizations and fine-tuning to achieve the enhanced performance.
- Adding and managing fresh data into the data mart.
- Planning recovery scenarios and ensure system availability in the case when the system fails.

6.11.2. Operational Data Store (ODS)

The operational data store (ODS) serves as a primary data source for all OMS applications and has to make provision for production data as well as operational data. It serves as the pipeline of data flowing between the ERP and control systems. Customization within the database is required since the data requirements are determined by the required functionality and changes to the database should be made online.

➢ ODS functionality.
➢ Fast and configurable real-time data acquisition.
➢ Less space for compressed data store.
➢ Real-time access to data through structured query language (SQL).
➢ Configurable handling of events and summaries.
➢ Connection to third party applications.
➢ Scalable – capable to handle huge data transactions.
➢ Disaster recovery by strong back-up.
➢ Tabular view of live data and trend analysis.

Production data

Different people required different production data for different purposes. It is therefore important to capture the necessary real-time process data in an easy accessible database, which can be accessed from a number of different tools to extract data. Production data is normally stored in a historian.

Operational data

It is required to store data (history) produced by the various OMS modules on an easy accessible database. Operational data does not have the same time restrictions as production data and an ordinary relational database can be used.

Data exchange

The ODS has to provide this functionality to ensure consistent interfacing between the various clients and other solution components.

6.12. LET US SUM UP

In this unit, you have learnt about the XML programming basics, development goals of XML, difference between HTML and XML and the concept of Data warehousing. This knowledge would make you understand the basics of XML programming domain and structure of XML document used to develop the programs for real time problems. Thus, the XML and Data warehousing unit would have brought you to

closer to know the concept of basics of XML programming and data marts.

6.13. UNIT – END QUESTIONS

1. Explain about the eXtensible Markup Language and its structure.
2. Discuss about the Data Warehousing and Data Marts.

6.14. ANSWER TO CHECK YOUR PROGRESS

1. XML stands for **E**xtensible **M**arkup **L**anguage. It is a text-based markup language derived from Standard Generalized Markup Language (SGML). XML tags identify the data and are used to store and organize the data, rather than specifying how to display it like HTML tags, which are used to display the data. XML is not going to replace HTML in the near future, but it introduces new possibilities by adopting many successful features of HTML.

    XML is used to define documents with a standard format that can be read by any XML-compatible application. The language can be used with HTML pages, but XML itself is not a markup language. Instead, it is a "metalanguage" that can be used to create markup languages for specific applications. For example, it can describe items that may be accessed when a Web page loads. Basically, XML allows you to create a database of information without having an actual database. While it is commonly used in Web applications, many other programs can use XML documents as well.

    An XML document consists of a number of discrete components or sections. Although not all the sections of an XML document may be necessary, their use and inclusion helps to make for a well-structured XML document that can easily be transported between systems and devices.

    The major portions of an XML document include the following:
    a. The XML declaration
    b. The Document Type Declaration
    c. The element data
    d. The attribute data

2. An operational database undergoes frequent changes on a daily basis on account of the transactions that take place. Suppose a business executive wants to analyze previous feedback on any data such as a product, a supplier, or any consumer data, then the executive will have no data available to analyze because the previous data has been updated due to transactions.

    A data warehouses provides us generalized and consolidated data in multidimensional view. Along with generalized and consolidated view of data, a data warehouses also provides us Online Analytical Processing (OLAP) tools. These tools help us in interactive and effective analysis of

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data in a multidimensional space. This analysis results in data generalization and data mining.

Understanding a Data Warehouse

A data warehouse is a database, which is kept separate from the organization's operational database.

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Data warehouse systems help in the integration of diversity of application systems.

A data warehouse system helps in consolidated historical data analysis.

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A data mart is a condensed version of Data Warehouse and is designed for use by a specific department, unit or set of users in an organization, e.g., Marketing, Sales, HR or finance. It is often controlled by a single department in an organization.

Data Mart usually draws data from only a few sources compared to a Data warehouse. Data marts are small in size and are more flexible compared to a Data warehouse.

6.15. SUGGESTED READINGS

1. E-Commerce: Fundamentals and Applications, Henry Chan, Raymond Lee, Tharam Dillon, and Elizabeth Chang, Wiley; 1 edition, 2007.

2. E - Commerce: Strategy, Technologies and Applications, David Whiteley, McGraw Hill Education, 2007.

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5. E-Commerce: The Cutting Edge of Business, by K.K. Bajaj, and Debjani Nag, McGraw Hill Education; 2 edition, 2017.

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UNIT VII – E-MARKETING

Structure

7.1. INTRODUCTION

We learn through this lesson as web presence goals, website decides the part of e-commerce to identify the need of e-marketing; it also determines the site adhesion of an e-commerce. The web presence goals define the uniqueness of website and illustrate the need of the website visitors. All site adhesion defined a content, format, and metrics defining internet units.

7.2. OBJECTIVES

After going through this lesson you will be in a position to
➢ Understand the traditional marketing and e-marketing.
➢ Explain of web presence goals.
➢ Describe the access of website adhesion.
➢ Recognize the benefits of online marketing.

7.3. TRADITIONAL MARKETING

Traditional marketing is a rather broad category that incorporates many forms of advertising and marketing. It's the most recognizable tyspe of marketing, encompassing the advertisements that we see and hear every day. Most traditional marketing strategies fall under one of four categories: print, broadcast, direct mail, and telephone.

Marketing activities continue to evolve from traditional strategies to nontraditional methods that involve the Internet. Both traditional and nontraditional marketing have advantages and disadvantages. A small business can benefit from integrating both approaches to market its products. Traditional marketing activities typically involve advertising, publicity, sales, merchandising and distribution.

Direct Mail

Direct-mail marketing creates awareness of a product through postcards, brochures, letters and fliers sent through mail. Direct mail is called a targeted type of marketing strategy because information is sent to a specific target market. However, direct-mail marketing can be expensive as a business incurs design and printing costs as well as postage expenses to reach its target.

Print

Print marketing includes advertising products and services through newspapers and magazines. Print marketing is both a mass-marketing and niche-marketing strategy. As a mass-marketing strategy, printed advertisements reach different classes of people, who might or might not have an interest in the product. In magazines, print marketing reaches out to the niche market that reads the magazine, such as women, fathers, teens or car lovers.

Broadcast

Television and radio are traditional avenues still widely used. Broadcast marketing reaches a large audience within a limited period of time. Television advertisements also bring authenticity and realism to a product as people can see how the product works. However, broadcast messages have a shorter lifespan compared with printed messages. Additionally, marketing through television and radio is costlier, compared with other forms of traditional marketing.

Referral

Referral marketing, also known as word of mouth, relies on customers to spread information about products or services. Referral is not a strategic or planned marketing activity, but it might help a business build a loyal client base. It also costs close to nothing for the business. However, a business shouldn't rely primarily on referral marketing; it should combine this with the other types of marketing to reach a wider target market.

Advantages of Traditional Marketing:
➢ We can easily reach a group of audience,
➢ Reuse and recycling,
➢ Hard copies can be easily processed,
➢ Greater exposure.

Disadvantages of Traditional Marketing:
➢ It takes more time to reach people,
➢ Based on our stories the product will reach more people,

➢ Expensive high,

➢ Nowadays most of the people prefer online marketing than traditional marketing

   Traditional marketing strategies have a wide dispersion across media such as television or radio. In addition, the rapid increase in Internet users is causing an enormous shift in target groups. Print media have also moved further into the background in times of environmental protection and sustainability. Traditional marketing can therefore only stand alone in special cases. As a result, the budgets of advertisers are shifting.

7.4. E-MARKETING

   E-marketing is referred to those strategies and techniques which utilized online ways to reach target customers. There are millions of Internet users that daily access different websites using a variety of tools like computers, laptops, tablet and smart or android phone devices, and the number of internet users are increasing very rapidly. So every business seems to be jumping on the internet marketing bandwagon. The internet is most powerful tool that can put any business on solid footing with market leaders companies. There are many free as well as economical way on internet to promote your business. Successful companies must ask themselves some tough questions about how they will promote their business online? What their company expectations are? And what will be their plan to meet those expectations? After answer all these questions a company should design an effective marketing plan.

   E-marketing also known as online or internet advertising which uses the internet technology to promote online message to customer. E-marketing examples are email or social media advertising, web banners and mobile advertising.

E-Marketing Strategy

   The e-Marketing Strategy is normally based and built upon the principles that govern the traditional, offline Marketing the well-known 4 P's (Product Price Promotion Positioning) that form the classic Marketing mix. Add the extra 3 P's (People Processes Proof) and you got the whole extended Marketing mix. Until here, there are no much aspects to differentiate e-Marketing from the traditional Marketing performed offline: the extended Marketing mix (4 + 3 P's) is built around the concept of "transactional" and its elements perform transactional functions defined by the exchange paradigm. What gives e-Marketing its uniqueness is a series of specific functions, relational functions, that can be synthesized in the 2P + 2C+ 3S formula: Personalization, Privacy, Customer Service, Community, Site, Security, Sales Promotion. These 7 functions of the e-Marketing stay at the base of any e-Marketing strategy and they have a moderating character, unlike the classic Marketing mix that comprises situational functions only. Moderating functions of e-Marketing have the quality of moderate operate upon all situational functions of the mix (the classic 4 P's) and upon each other.

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1. **Personalization: -** The fundamental concept of personalization as a part of the e-Marketing mix lies in the need of recognizing, identifying a certain customer in order to establish relations (establishing relations is a fundamental objective of Marketing). It is crucial to be able to identify our customers on individual level and gather all possible information about them, with the purpose of knowing our market and be able to develop customized, personalized products and services.

2. **Privacy: -** Privacy is an element of the mix very much connected to the previous one personalization. When we gather and store information about our customers and potential customers (therefore, when we perform the personalization part of the e-Marketing mix) a crucial issue arises: that of the way this information will be used, and by whom. A major task to do when implementing an e-Marketing strategy is that of creating and developing a policy upon access procedures to the collected information.

3. **Customer Service: -** Customer service is one of the necessary and required activities among the support functions needed in transactional situations. We will connect the apparition of the customer service processes to the inclusion of the "time" parameter in transactions. When switching from a situational perspective to a relational one, and e-Marketing is mostly based on a relational perspective, the marketer saw himself somehow forced into considering support and assistance on a non-temporal level, permanently, over time.

4. **Community: -** We can all agree that e-Marketing is conditioned by the existence of this impressive network that the internet is. The merely existence of such a network implies that individuals as well as groups will eventually interact. A group of entities that interact for a common purpose is what we call a "community" and we will soon see why it is of absolute importance to participate, to be part of a community.

5. **Site: -** We have seen and agreed that e-Marketing interactions take place on a digital media the internet. But such interactions and relations also need a proper location, to be available at any moment and from any place a digital location for digital interactions. Such a location is what we call a "site", which is the most widespread name for it. It is now the time to mention that the "website" is merely a form of a "site" and should not be mistaken or seen as synonyms.

6. **Security: -** The "security" function emerged as an essential function of e-Marketing once transactions began to be performed through internet channels. What we need to keep in mind as marketers are the following two issues on security: - security during transactions performed on our website, where we have to take all possible precautions that third parties will not be able to access any part of a developing transaction; - security of data collected and stored, about our customers and visitors.

7.5. WEB PRESENCE GOALS

A web presence is a location on the World Wide Web where a person, business, or some other entity is represented (see also web property and point of presence).

Examples of a web presence for a person could be a personal website, a blog, a profile page, a wiki page, or a social media point of presence (e.g. a LinkedIn profile, a Facebook account, or a Twitter account). Examples of a web presence for a business or some other entity could be a corporate website, a microsite, a page on a review site, a wiki page, or a social media point of presence (e.g., a LinkedIn company page and/or group, a Facebook business/brand/product page, or a Twitter account).

Every web presence is associated with a unique web address to distinguish one point of presence from another. A Web presence (or Web site) is a collection of Web files on a particular subject that includes a beginning file called a home page . For example, most companies, organizations, or individuals that have Web sites have a single address that they give you. This is their home page address. From the home page, you can get to all the other pages on their site. For example, the Web site for IBM has the home page address of http://www.ibm.com.

7.5.1. Achieving Web Presence Goals

For creating a web site that is effective, the following objectives should be considered:

➤ To attract visitors to the Web site.
➤ To make the site interesting so that the visitor stay and explore.
➤ To persuade the visitors to follow the site's links to obtain information.
➤ To create the desired image of the organisation in the visitors mind.
➤ To reinforce positive images that the visitor may already have about the organisation.

Why do Visitors arrive at a Web site?

➤ To obtain general information about the company or organisation.
➤ Learning about the company's products or services.
➤ Buying the products and services offered by the company.
➤ Finding out the services conditions and warranties applicable for the products they have purchased.
➤ Obtaining financial information helpful in making investment or credit granting decision.
➤ Identifying the people who manage the company or organisation.

Business should try to meet the following goals while constructing their Web Sites:

➤ Convey an integrated image of the organisation
➤ Offer easily accessible facts about the organisation.
➤ Allow visitors to experience the site in different ways and at different levels.
➤ Provide visitors with a meaningful two way interactive communication link with the organisation.
➤ Sustain visitor attention and encourage return visits.

> Offer easily accessible information about products and services and how to use them.

7.5.2. Uniqueness of the Web

A website can help broadcast information about your organization to the general public. It can help you increase awareness of your organization, pass information to your employees or volunteers, or publicize fundraising events. With these instructions, you will be able to quickly and easily create a well-organized website.

Planning

Before you can complete any of the other steps, you must have a good idea of what your website will be like.

The important aspect of website planning is ongoing maintenance. You should try to keep the information up-to-date by changing the content frequently. In order to implement a website you must:

1) Acquire a domain name.
2) Secure a web server to host your site.
3) Secure software to build website.
4) Design and build the website.
5) Track website use. Refer to the Web Analytics document.

Acquiring a Domain Name

A domain name is the "easy to remember nickname" for the Internet server where you will be able to upload the contents of your website. It is also part of the website address that people will use to get to your website. The ideal situation is that your organization has its own domain name for several reasons:

1. People will be able to easily remember your domain name. They will simply type in your organization and add an extension to reach your webpage.
2. This domain name will not be trademarked by another organization. Since your organization name is owned by your organization, you will have the rights to the domain name. If your website does use trademarked phrases or words, you could easily be sued by the company that owns that phrase.

Registering Your Domain Name

After deciding on your desired domain name, the name must be registered with the ICANN organization. You can do this through a domain name registrar. You pay the registrar for the use of your domain name annually. Popular registrars include Register.com and GoDaddy.com. If you have your website hosted, then that hosting organization may be able to register your domain name, too.

Use the domain extension appropriate for your organization. Common extensions are listed below. Register all three extensions so that visitors can find the website from all three and your website will get more publicity.

> .org – used for nonprofits and other types of organizations.
> .com – most common

➢ .net – commonly used by internet service providers, web hosts, or other businesses involved in internet infrastructure; also, often used by businesses for their intranet websites.

Securing a Web Server to Host Your Website

You must secure space on a server where the files of your website will be accessible on the Internet. This server is referred to as a web host. There are two options for hosting: you can either host your own website or you can buy space from an online web hosting service.

Secure Software to Design Your Website

The next step is to install software that allows you to write your own website code or automatically generate the code you need to create your website. You can either use HTML coding (not recommended), a web development software package, or a content management system
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Content Management Systems

A content management system (CMS) is a software package that lets you build and maintain a website quickly and easily. It stores the actual website content in a database and can automatically pull the content out and show it on the appropriate pages based on the design you set up in advance. This allows the CMS to separate the content of the website from the graphics of the website.

7.5.3. Meeting the needs of website visitors

The Web changes the nature of communication between firms and ustomers. The traditional advertiser decides the message content, and on the Web, the customer selects the message. Traditional advertising primarily centers on the firm broadcasting a message. The flow of information is predominantly from the seller to the buyer. However, the Web puts this flow in reverse thrust. Customers have considerable control over which messages they receive because it is primarily by visiting Web sites that they are exposed to marketing communications. The customer intentionally seeks the message.

The Web increases the richness of communication because it enables greater interactivity between the firm and its customers and among customers.

The Web, compared to other media, provides a relatively level playing field for all participants in that:

➢ Access opportunities are essentially equal for all players, regardless of size;

➢ Share of voice is essentially uniform–no player can drown out others;

➢ Initial set-up costs present minimal or nonexistent barriers to entry.

A small company with a well-designed home page can look every bit as professional and credible as a large, multinational company. People can't tell if you do business from a 90-story office building or a two-room rented suite. Web home pages level the playing field for small companies.

7.6. SITE ADHESION

E-commerce web design and development presents some unique challenges that you won't always face with other types of web design. For sites that exist primarily to sell products, it's very easy to look at sales and have a measuring stick to use when evaluating the success of the website. However, there are any numbers of factors that can influence the success of an e-commerce site, and identifying areas of strength and weakness is not always so simple.

7.6.1. Content

A customer access a website for the content of the site. Initially a customer will want to navigate quickly to gain a clear understanding of the site's progression to more detailed information. The key to this is to match a user's psychological and technological sophistication profile with that of the site's initial and subsequent impact.

7.6.2. Format and access

The format of an organization's site is improvement with respect to the customer's technical sophistication. Vendors need to create a balance between information provision and information delivery speed. The selection of data format is crucial, as initially the goal is to create viewer interest and engage the viewer in a prolonged interaction.

Online data access depends on the bandwidth requirement. The clear rule in the initial interaction phase is to use as minimal a bandwidth as is feasible to facilitate as wide an audience a possible.

7.6.3. Maintaining a Website

Create a website that meets the needs of visitors with such a wide range of motivations can be challenging. Not only do website visitors arrive with different needs, but also they arrive with different experience and expectation levels. In addition to the problems posed by the diversity of visitor characteristics, technology issues can also arise. These website visitors will be connected to the internet through a variety of communication channels that provide different bandwidth and data transmission speeds. They also will be using several different web browsers. Even those who are using the same browser can have a variety of configuration.

The wide array of browsers add-in and plug-in software's adds yet another dimension to visitor variability. Considering and addressing the implications of these many visitor characteristics when building a website can help convert those visitors into customers.

One of the best ways to accommodate a broad range of visitor needs is to build flexibility into the website's interface. Many sites offer separate versions with and without frames and give visitors the option of choosing either one. Some sites offer a text-only version. Regular maintenance makes website functionality smoother. You will not be facing situations where customers may be disgruntled because they may have come across that didn't work for them just because it was a broken link. The process of website maintenance is referred to checking your

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website for broken links, outdated information, vulnerable code scripts, and other relevant activities on a consistent basis.

A well regulated and updated website does not only allure more visitors but also helps you in getting higher rankings in search engines. So, the success of your business is hidden in the secret of website maintenance.

Content for the website may comprise of images, written text, paid or free downloads, typographies, and videos, etc. you may use anything that is relevant and may drag the attention of new visitors and transform them into potential clients. You may consider the following ideas for content optimization:

Updating products is a crucial activity, especially if your website has an ecommerce setup and performs as an online store.

➢ You may need to announce or add new products frequently.

➢ You should not forget to update the navigation plan, i.e. when you add a product or service, you must add a page for them and add it to the sitemap immediately.

➢ If it is a blog that you own then it may have a sidebar for navigation which means any updates added by you will be updated in that area, so, it won't matter a lot as the visitors will see those changes immediately irrespective of the page on which they may land.

➢ If you have planned to exclude or discontinue some products, a good practice would be to announce the new products that would be replacing them on the side navigation bar.

➢ Changes in rates might something that may require an announcement too as this may help in spurring rush sales too.

7.6.4. Metrics Defining Internet Units of Measurement

The e-commerce world has, since inception been attempting to measure parameters associated with the web and websites in order to assess two things:

Advertising – How many people saw our banner as?

Visitation - How many people came to our site?

For advertising, the metrics measured and their interpretation depend on the position of the measurer. The advertising perspective is that metrics can give the advertiser the most accurate interpretation of the customer-to-site usage ratio, but this has come under increasing scrutiny as the technology and systems associated with web interfaces and networks become well understood by the advertisers. There is a problem with using hits as a measuring tool.

In software metrics theory, one problem is the separation of direct and indirect metrics or measurement. Direct measurement of an attribute is the measurement that does not depend on the measurement of any other attribute. Indirect measurement of an attribute is the measurement that involves the measurement of one or more other attributes.

Examples of Direct Metrics: -

➢ Top referencing sites.

➢ Most-used platforms.

➢ Advertising 'captures'

➢ Most-downloaded files.

➢ Authenticated user sessions by location.
➢ Authenticated user profiles by region.
 Examples of Indirect Metrics: -
➢ Number of hits per page.
➢ Number of successful hits per page.
➢ Most-accessed segments.
➢ Views of banners.
➢ Total hits.
➢ Cached hits.
➢ Successful hits.

Many organizations using indirect metrics, as advertised by the vendors of packages and software tools, and this will significantly hinder the ability of the executives of these firms to track directly the impact of their dollars being spent on their websites. Organizations in the online customer acquisition phase have attempted to refine some of the indirect metrics to their needs, by understanding their limitations. These include the following,

➢ Click-through Captures.
➢ Time Spent.
➢ Time Spent Searching.
➢ Time Spent before click through.
➢ E-Mails and telephone calls.
➢ Registered users.

By assessing these metrics in conjunction with data from other sources such as the direct sales and marketing channels, an organization can estimate the content, format and access of the online site.

7.7. ONLINE MARKETING

Marketing is the activity, set of institutions and processes for creating, communicating, delivering, and exchanging offers that have value for customers, clients, partners, and society at large. Marketing changes the perspective of a person. There are two approaches of marketing:
➢ Traditional marketing
➢ Online marketing

Online marketing is advertising and marketing the products or services of a business over Internet. Online marketing relies upon websites or emails to reach to the users and it is combined with e-commerce to facilitate the business transactions. In online marketing, you can promote the products and services via websites, blogs, email, social media, forums, and mobile Apps. Online marketing is also termed as Internet marketing, Web marketing, or simply, OLM.

There are three new market segments which are as follows,

➢ **Cyber buyers**

These are professionals who spend a good deal of time online, mainly at their places of business. These professionals often have to make complex purchasing decisions that require reams of data and difficult to locate sources of supply, all within a tight time frame. That is a perfect fit with the capabilities of online technology.

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➢ **Cyber consumers**

These are the home computer users wired upto commercial online services and the internet.

➢ **Cyber surfers**

They use online technology to expand their horizons, challenge their abilities, and for fun. This segment is typically younger and possesses shorter attention spams.

7.7.1. Benefits of Online Marketing

Online marketing is a set of tools and methodologies used for promoting products and services through the internet. Online marketing includes a wider range of marketing elements than traditional business marketing due to the extra channels and marketing mechanisms available on the internet.

Online marketing enables you to build relations with customers and prospects through regular, low-cost personalized communication, reflecting the move away from mass marketing.

Online marketing has several advantages, including:

➢ Low costs: Large audiences are reachable at a fraction of traditional advertising budgets, allowing businesses to create appealing consumer ads.

➢ Flexibility and convenience: Consumers may research and purchase products and services at their leisure.

➢ Analytics: Efficient statistical results are facilitated without extra costs.

➢ Multiple options: Advertising tools include pay-per-click advertising, email marketing and local search integration (like Google Maps).

➢ Demographic targeting: Consumers can be demographically targeted much more effectively in an online rather than an offline process.

The main limitation of online marketing is the lack of tangibility, which means that consumers are unable to try out, or try on items they might wish to purchase. Generous return policies are the main way to circumvent such buyer apprehension.

7.8. LET US SUM UP

In this unit, you have learnt about the traditional marketing and e-marketing, web presence goals, site adhesion and benefits of online marketing. This knowledge would make you understand the difference between traditional marketing and E-Marketing and needs of the web, content and format used to develop the e-commerce website for transaction. Thus, the E-Marketing unit would have brought you to closer to know the concept of benefits of online marketing.

7.9. UNIT – END QUESTIONS

1. Describe about the e-marketing and its benefits.
2. Identify the web presence goals.
3. State the various site adhesions.

7.10. ANSWER TO CHECK YOUR PROGRESS

1. E-marketing is referred to those strategies and techniques which utilized online ways to reach target customers. There are millions of Internet users that daily access different websites using a variety of tools like computers, laptops, tablet and smart or android phone devices, and the number of internet users are increasing very rapidly.

   The e-Marketing Strategy is normally based and built upon the principles that govern the traditional, offline Marketing the well-known 4 P's (Product Price Promotion Positioning) that form the classic Marketing mix. Add the extra 3 P's (People Processes Proof) and you got the whole extended Marketing mix.

   Online marketing has several advantages, including:

   ➢ Low costs: Large audiences are reachable at a fraction of traditional advertising budgets, allowing businesses to create appealing consumer ads.

   ➢ Flexibility and convenience: Consumers may research and purchase products and services at their leisure.

   ➢ Analytics: Efficient statistical results are facilitated without extra costs.

   ➢ Multiple options: Advertising tools include pay-per-click advertising, email marketing and local search integration (like Google Maps).

   ➢ Demographic targeting: Consumers can be demographically targeted much more effectively in an online rather than an offline process.

2. A web presence is a location on the World Wide Web where a person, business, or some other entity is represented (see also web property and point of presence).

   Examples of a web presence for a person could be a personal website, a blog, a profile page, a wiki page, or a social media point of presence (e.g. a LinkedIn profile, a Facebook account, or a Twitter account).

   Every web presence is associated with a unique web address to distinguish one point of presence from another. A Web presence (or Web site) is a collection of Web files on a particular subject that includes a beginning file called a home page

   a. Achieving Web Presence Goals
   b. Uniqueness of the Web
   c. Meeting the needs of website visitors

3. E-commerce web design and development presents some unique challenges that you won't always face with other types of web design. For sites that exist primarily to sell products, it's very easy to look at sales and have a measuring stick to use when evaluating the success of the website. However, there are any numbers of factors that can influence the success of an e-commerce site, and identifying areas of strength and weakness is not always so simple.

   a. Content
   b. Format and access
   c. Maintaining a Website
   d. Metrics Defining Internet Units of Measurement

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7.11. SUGGESTED READINGS

1. E-Commerce, by Gaurav Gupta, and Sarika Gupta, Khanna Publishing; Second edition, 2015.
2. Selling Online: How to Become a Successful E-commerce Merchant, Jim Carroll, and Rick Broadhead**,** Dearborn Trade,U.S. 2001.
3. E-Business and E-Commerce Management, Dave Chaffey, Financial Times/ Prentice Hall; 3 edition, 2006.
4. E-Commerce, Jeffrey F. Rayport and Bernard J. Jaworski, McGraw-Hill Higher Education; International student ed edition, 2001.

UNIT VIII – E-SECURITY

Structure

8.1. INTRODUCTION

In this lesson you will be aware with the basic elements used to construct security for e-commerce website. These elements include the E-Security, Network and website security, and Firewall. These basic elements are used to construct more comprehensive security feature to website. Some of the basic informations like attacks, viruses and Vulnerabilities of network needs very detailed information; however, the purpose of this type of basic informations is to introduce certain basic concepts and to provide some necessary definitions for the topics that follow in next few lessons.

8.2. OBJECTIVES

After going through this lesson you will be in a position to
➢ Recognize the E-Security and types of Vulnerabilities of network.
➢ Define the various network and website security.
➢ Explain the Firewall and its types.

8.3. E-SECURITY

Security is an essential part of any transaction that takes place over the internet. Customers will lose his/her faith in e-business if its security is compromised.

E-security can be described on the one hand as those policies, guidelines, processes, and actions needed to enable electronic transactions to be carried out with a minimum risk of breach, intrusion, or theft. On the other hand, e-security is any tool, technique, or process used to protect a system's information assets. Information is a valuable strategic asset that must be managed and protected accordingly. The degree of e-security used for any activity should be proportional to the activity's underlying value. Thus, security is a risk-management or risk-mitigation tool, and appropriate security means mitigation of the risk for the underlying transaction in proportion to its value.

8.3.1. Security on the Internet

Internet security is defined as a process to create rules and actions to take to protect against attacks over the Internet. Internet security is a broad term that refers to the various steps individuals and companies take to protect computers or computer networks that are connected to the Internet. One of the basic truths behind Internet security is that the Internet itself is not a secure environment. The Internet was originally conceived as an open, loosely linked computer network that would facilitate the free exchange of ideas and information. Data sent over the Internet—from personal e-mail messages to online shopping orders—travel through an ever-changing series of computers and network links. As a result, unscrupulous hackers and scam artists have ample opportunities to intercept and change the information. It would be virtually impossible to secure every computer connected to the Internet around the world, so there will likely always be weak links in the chain of data exchange.

Small business owners need to recognize the various threats involved in conducting business over the Internet and establish security policies and procedures to minimize their risks. Internet security measures range from hardware and software protection against hackers and viruses, to training and information programs for employees and system administrators. It may be impossible—or at least impractical—for a small business to achieve 100 percent secure computer systems. But small business owners can find ways to balance the risks of conducting business over the Internet with the benefits of speedy information transfer between the company and its employees, customers, and suppliers.

Common Security Problems

Several common security problems that affect small business computers. For example, a well-known cause of computer problems is viruses, or damaging programs that are introduced to computers or networks. Some viruses rewrite coding to make software programs

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unusable, while others scramble or destroy data. Many viruses spread quickly and operate subtly, so they may not be noticed until the damage has already been done.

Hackers have two main methods of causing problems for businesses' computer systems: they either find a way to enter the system and then change or steal information from the inside, or they attempt to over-whelm the system with information from the outside so that it shuts down. One way a hacker might enter a small business's computer network is through an open port, or an Internet connection that remains open even when it is not being used. They might also attempt to appropriate passwords belonging to employees or other authorized users of a computer system. Many hackers are skilled at guessing common passwords, while others run programs that locate or capture password information.

Another common method of attack used by hackers is e-mail spoofing. This method involves sending authorized users of a computer network fraudulent e-mail that appears as if it were sent by someone else, most likely a customer or someone else the user would know. Then the hacker tries to trick the user into divulging his or her password or other company secrets. Finally, some hackers manage to shut down business computer systems with denial of service attacks. These attacks involve bombarding a company's Internet site with thousands of messages so that no legitimate messages can get in or out.

Measures to ensure Security

Major security measures are following −

➢ Encryption − It is a very effective and practical way to safeguard the data being transmitted over the network. Sender of the information encrypts the data using a secret code and only the specified receiver can decrypt the data using the same or a different secret code.

➢ Digital Signature − Digital signature ensures the authenticity of the information. A digital signature is an e-signature authenticated through encryption and password.

➢ Security Certificates − Security certificate is a unique digital id used to verify the identity of an individual website or user.

8.3.2. Network and Website Security Risks

The term network security refers to protecting your digital assets (computer systems, programs, and information) from intrusion, destruction, theft, modification, or misuse. Network security can be made up of hardware devices, specialized software, physical security (i.e. locked computer rooms), and rules for people to follow. Just like securing your home, a network security system must protect against threats coming in from the outside and also deal with intruders if they make it inside. Criminals who access data or networks illegally are known as hackers.

Network security is an over-arching term that describes that the policies and procedures implemented by a network administrator to avoid and keep track of unauthorized access, exploitation, modification, or denial of the network and network resources.

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This means that a well-implemented network security blocks viruses, malware, hackers, etc. from accessing or altering secure information.

The first layer of network security is enforced through a username/password mechanism, which only allows access to authenticated users with customized privileges. When a user is authenticated and granted specific system access, the configured firewall enforces network policies, that is, accessible user services.

However, firewalls do not always detect and stop viruses or harmful malware, which may lead to data loss. Anti-virus software or an intrusion prevention system (IPS) is implemented to prevent the virus and/or harmful malware from entering the network.

The basic business logic of a website and an internet application which has the client interface and the server end on a web server and made known by a Uniform Resource Locator (URL). The internet server is understood by its name. The browser (client) and server talk via a transport protocol TCP. The transport protocol is HTTP; the data format is Cascading Style Sheets (CSS) and hypertext mark-up language (HTML). The user clicks or enters a URL to call the application or access the website (Vandana et al., 2014). A request via communication protocol is sent to the server from the clients. A script at the net server removes input from the consumer knowledge and creates a request to a backend application server, e.g. a mysql query to a database. The result is received from the backend by the web server and returns a hypertext mark-up language (HTML) result page to the consumer. The result is displayed as a page by the client's browser. To show a page, the browser creates an interior picture for it.

Weakness of the Website Risks

Ten security risks have also been identified by Open Web Application Security Project (OWASP) as the most critical security risks associated with web applications. These risks are known to be common forms of attacks. Aside that they are known to be exploitable and can have a negative impact on websites when executed hence their rank as the top 10. The top 10 risks as published by OWASP are:

➢ Injection flaws.
➢ Broken authentication and session management.
➢ Cross site scripting.
➢ Insecure direct object references.
➢ Security mis-configuration.
➢ Sensitive data exposure.
➢ Missing level access control.
➢ Cross Site Request Forgery (CSRF).
➢ Using components with known vulnerabilities.
➢ Invalidated redirects and forwards.

8.3.3. Denial-of-Service attacks

A denial-of-service (DoS) is any type of attack where the attackers (hackers) attempt to prevent legitimate users from accessing the service. In a DoS attack, the attacker usually sends excessive messages asking the network or server to authenticate requests that have invalid

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return addresses. The network or server will not be able to find the return address of the attacker when sending the authentication approval, causing the server to wait before closing the connection. When the server closes the connection, the attacker sends more authentication messages with invalid return addresses. Hence, the process of authentication and server wait will begin again, keeping the network or server busy.

A DoS attack can be done in a several ways. The basic types of DoS attack include:

1. Flooding the network to prevent legitimate network traffic.
2. Disrupting the connections between two machines, thus preventing access to a service.
3. Preventing a particular individual from accessing a service.
4. Disrupting a service to a specific system or individual.
5. Disrupting the state of information, such resetting of TCP sessions.

There are many different methods for carrying out a DoS attack. The most common method of attack occurs when an attacker floods a network server with traffic. In this type of DoS attack, the attacker sends several requests to the target server, overloading it with traffic. These service requests are illegitimate and have fabricated return addresses, which mislead the server when it tries to authenticate the requestor. As the junk requests are processed constantly, the server is overwhelmed, which causes a DoS condition to legitimate requestors.

➢ In a **Smurf Attack**, the attacker sends Internet Control Message Protocol broadcast packets to a number of hosts with a spoofed source Internet Protocol (IP) address that belongs to the target machine. The recipients of these spoofed packets will then respond, and the targeted host will be flooded with those responses.

➢ A **SYN flood** occurs when an attacker sends a request to connect to the target server, but never completes the connection through what is known as a three-way handshake—a method used in a TCP/IP network to create a connection between a local host/client and server. The incomplete handshake leaves the connected port in an occupied status and unavailable for further requests. An attacker will continue to send requests, saturating all open ports, so that legitimate users cannot connect.

Individual networks may be affected by DoS attacks without being directly targeted. If the network's internet service provider (ISP) or cloud service provider has been targeted and attacked, the network will also experience a loss of service.

8.3.4. Viruses

A computer virus is a computer program that can replicate itself and infect a computer. The term "computer virus" is also commonly but erroneously used to refer to other types of malware, adware, and spyware programs that do not have this reproductive ability. Malware includes worms, Trojans, most rootkits, spyware, dishonest adware, crimeware, and other unwanted software, including true viruses. Viruses are sometimes confused with computer worms and Trojan horses, which are technically different. A worm can exploit security vulnerabilities to spread itself to other computers through networks, while a Trojan is a

program that appears harmless but hides malicious functions. Worms and Trojans, like viruses, may harm a computer system's data or performance.

A true virus can only spread from one computer to another (in some form of executable code) when its host is taken to the target computer; for instance because a user sent it over a network or the internet, or carried it on a removable medium such as a floppy disk, CD, DVD, or USB drive. Transmission of viruses can increase by infecting files on a network file system or a file system that is accessed by another computer. Computer viruses were labeled as viruses because of the fact that they are similar to biological viruses in the aspect of multiplying themselves. Similarly they find a host and then infect and multiply themselves. However, in both cases there must be a cause in order for the problem to begin. Some viruses and other malware have symptoms noticeable to the computer user, but many are surreptitious and go unnoticed.

Different types of viruses

➢ **Boot sector viruses -** A boot sector virus infects the boot sector of floppy disks or hard drives. These blocks contain a small computer program that participates in starting the computer. A virus can infect the system by replacing or attaching itself to these blocks. These viruses replicate very slowly because they can only travel from one computer to another on a diskette. In addition, a boot attempt must be made on the target computer using the infected diskette before the virus can infect it. The virus may, however, reside on the diskette and infect new computers even if there is no operating system on it.

➢ **"Direct action viruses" -** replicate and take action when executed. When a specific condition is met, the virus comes into action and infects files in the directory or folder that it is in and in directories that are specified in the AUTOEXEC.BAT file PATH. This batch file is always located in the root directory of the hard disk and carries out certain operations when the computer is booted.

➢ **"FAT viruses" -** use the file allocation table or FAT part of a disk used to connect information and is vital to normal functioning of the computer. This type of virus attack can be especially dangerous, by preventing access to certain sections of the hard drive where important files are stored. Damage caused can result in information losses from individual files or even entire directories.

➢ **"Stealth viruses" -** try to trick antivirus software by intercepting its requests to the operating system. It has the ability to avoid detection from some antivirus software programs.

8.3.5. Unauthorized access to a computer network

Unauthorized access is when someone gains access to website, program, server, service, or other system using someone else's account or other methods. For example, if someone kept guessing a password or username for an account that was not theirs until they gained access, it is considered unauthorized access.

Unauthorized access could also occur if a user attempts to access an area of a system they should not be accessing. When attempting to

access that area, they would be denied access and possibly see an unauthorized access message.

Some system administrators set up alerts to let them know when there is an unauthorized access attempt, so that they may investigate the reason. These alerts can help stop hackers from gaining access to a secure or confidential system. Many secure systems may also lock an account that has had too many failed login attempts.

When you have a network of computers, they are connected together so that every user has access to all of the shared network files. If your network isn't protected correctly, you are leaving these shared network files and the integrity of your network open for outsiders to access. You can protect your home or work network by ensuring you have a password set up, creating a network security key, changing the advanced settings, and turning on Windows firewall protection.

The risks posed by unauthorized network access are: unauthorized join or network expansion, VLAN join, VLAN tagging or hopping. The Ethernet is easy to deploy with minimal administration required. Hence anybody can connect to an Ethernet segment by gaining access to an unconnected port on a switch. This can be done by: gaining physical access to the switch, or wall socket, removing the cable from a computer and plugging it into another computer, or plugging in a switch between the existing computer and the socket. If a switch listens for VLAN management protocols on host ports, a host can act as a switch and join all VLANs. Also an attacker can create Ethernet frames that have a VLAN tag and thus inject frames to VLANs to which they are not supposed to have access

8.3.6. Vulnerability of Internet Sites

Website vulnerability is a weakness or mis-configuration in a website or web application code that allows an attacker to gain some level of control of the site, and possibly the hosting server. Most vulnerability is exploited through automated means, such as vulnerability scanners and botnets. Cybercriminals create specialized tools that scour the internet for certain platforms, like WordPress or Joomla, looking for common and publicized vulnerabilities. Once found, these vulnerabilities are then exploited to steal data, distribute malicious content, or inject defacement and spam content into the vulnerable site.

Types of Vulnerabilities

There are five common types of website vulnerabilities that are frequently exploited by attackers. While this isn't an exhaustive list of all the possible vulnerabilities a determined attacker may find in an application, it does include some of the most common vulnerabilities websites contain today.

➢ **SQL Injection Vulnerabilities (SQLi)** – SQL injection vulnerabilities refer to areas in website code where direct user input is passed to a database. Bad actors utilize these forms to inject malicious code, sometimes called payloads, into a website's database.

➢ **Cross-Site Scripting (XSS)** – Cross-site scripting occurs when attackers inject scripts through unsanitized user input or other fields on a website to execute code on the site. Cross-site scripting is used to target website

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visitors, rather than the website or server itself. This often means attackers are injecting JavaScript on the website, so that the script is executed in the visitor's browser.

➢ **Command Injection** – Command injection vulnerabilities allow attackers to remotely pass and execute code on the website's hosting server. This is done when user input that is passed to the server, such as header information, is not properly validated, allowing attackers to include shell commands with the user information.

➢ **File Inclusion (LFI/RFI)** – Remote file inclusion (RFI) attacks use the include functions in server-side web application languages like PHP to execute code from a remotely stored file. Attackers host malicious files and then take advantage of improperly sanitized user input to inject or modify an include function into the victim site's PHP code.

➢ **Cross-Site Request Forgery (CSRF)** – Cross-site request forgery attacksare less common, but can be quite jeopardous. CSRF attacks trick site users or administrators to unknowingly perform malicious actions for the attacker.

8.4. NETWORK AND WEBSITE SECURITY

Network security is the security provided to a network from unauthorized access and risks. It is the duty of network administrators to adopt preventive measures to protect their networks from potential security threats.

Computer networks that are involved in regular transactions and communication within the government, individuals, or business require security. The most common and simple way of protecting a network resource is by assigning it a unique name and a corresponding password.

Network security is a computer networking system policy to assure the security to its organization assets, software and hardware resources. The term network security also emphasis on monitoring and controlling of unauthorized access, misuse and any unwanted modification in the networking system.

The most common authentication process practiced everywhere is to assign an exclusive user ID and password to the user for authentication and to access the resources of the network. Website security is any action or application taken to ensure website data is not exposed to cybercriminals or to prevent exploitation of websites in any way. Network security combines multiple layers of defenses at the edge and in the network. Each network security layer implements policies and controls. Authorized users gain access to network resources, but malicious actors is blocked from carrying out exploits and threats.

8.4.1. Transaction security and data protection

Secure Electronic Transaction (SET) is a system for ensuring the security of financial transactions on the Internet. It was supported initially by Mastercard, Visa, Microsoft, Netscape, and others. With SET, a user is given an electronic wallet (digital certificate) and a transaction is conducted and verified using a combination of digital certificates

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and digital signatures among the purchaser, a merchant, and the purchaser's bank in a way that ensures privacy and confidentiality. SET makes use of Netscape's Secure Sockets Layer (SSL), Microsoft's Secure Transaction Technology (STT), and Terisa System's Secure Hypertext Transfer Protocol (S-HTTP). SET uses some but not all aspects of a public key infrastructure (PKI).

Security is an essential part of any transaction that takes place over the internet. Customers will lose his/her faith in e-business if its security is compromised. Following are the essential requirements for safe e-payments/transactions −

➢ Confidentiality − Information should not be accessible to an unauthorized person. It should not be intercepted during the transmission.

➢ Integrity − Information should not be altered during its transmission over the network.

➢ Availability − Information should be available wherever and whenever required within a time limit specified.

➢ Authenticity − There should be a mechanism to authenticate a user before giving him/her an access to the required information.

➢ Non-Reputability − It is the protection against the denial of order or denial of payment. Once a sender sends a message, the sender should not be able to deny sending the message. Similarly, the recipient of message should not be able to deny the receipt.

➢ Encryption − Information should be encrypted and decrypted only by an authorized user.

➢ Auditability − Data should be recorded in such a way that it can be audited for integrity requirements.

Secure Electronic Transaction

It is a secure protocol developed by MasterCard and Visa in collaboration. Theoretically, it is the best security protocol. It has the following components −

➢ Card Holder's Digital Wallet Software − Digital Wallet allows the card holder to make secure purchases online via point and click interface.

➢ Merchant Software − This software helps merchants to communicate with potential customers and financial institutions in a secure manner.

➢ Payment Gateway Server Software − Payment gateway provides automatic and standard payment process. It supports the process for merchant's certificate request.

➢ Certificate Authority Software − This software is used by financial institutions to issue digital certificates to card holders and merchants, and to enable them to register their account agreements for secure electronic commerce.

The term data protection is used to describe both the operational backup of data and business continuity/disaster recovery (BC/DR). Data protection strategies are evolving along two lines: data availability and data management.

Data availability ensures users have the data they need to conduct business even if the data is damaged or lost.

A key area on the data management side is data lifecycle management, which is the process of automating the movement of critical data to online and offline storage, and information lifecycle

management, a comprehensive strategy for valuing, cataloging and protecting information assets from application and user errors, malware and virus attacks, machine failure, or facility outages and disruptions. More recently, data management has come to include finding ways to unlock business value from otherwise dormant copies of data for reporting, test/dev enablement, analytics and other purposes.

8.4.2. Security audits and penetration testing

IT networks keep on changing based on business needs. It is often found that various changes performed by multiple technical teams usually lead to vulnerabilities from cyber security standpoint. It is advised to conduct network security audit occasionally to ensure network health. Upon completion of such an audit, the firm gains stable, scalable and secure IT network infrastructure.

Regularly scheduled network vulnerability scanning can help an organization identify weaknesses or security holes in their network security before the hackers can plant an attack. A security audit is the first step toward your IT infrastructure security and it can be defined as a methodical evaluation of your business IT infrastructure protection. Through the process of this testing, security specialists will scale how strongly your security protocols go along with a catalog of established criteria to verify their security aspect.

IT infrastructure security audits should be thoroughgoing and organized on a routine to secure your data and IT assets. If you are in an extremely regulated industry, participating in this activity will also benefit your business to make sure compliance. A standard security audit will evaluate the following:

➢ Email
➢ Information handling processes
➢ Hardware configurations
➢ Data and access-related details (like cards, tokens, password and)
➢ User practices
➢ The physical configuration of the system and setting
➢ Network
➢ Software configurations
➢ Smart devices

The audit should assess any of the above against past and possible future challenges. This implies that your security team should be updated on the newest security tendency and the steps taken by other organizations to answer to them.

A penetration test, also known as a pen test, is an authorized simulated attack on a computer system that looks for security weaknesses, potentially gaining access to the system's features and data. Following steps typically form the penetration testing. The primary objective for a network penetration test is to identify exploitable vulnerabilities in networks, systems, hosts and network devices (ie: routers, switches) before hackers are able to discover and exploit them.

Network penetration testing will reveal real-world opportunities for hackers to be able to compromise systems and networks in such a

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way that allows for unauthorized access to sensitive data or even take-over systems for malicious/non-business purposes.

There are various kinds of penetration tests, but more usually than not they're separated into three contrasts.

➢ **External Penetration Tests**

These tests will be conducted from the viewpoint of a hacker to reveal vulnerabilities that can possibly present internal systems.

➢ **Internal Penetration Tests**

In this situation, penetration tests will be conducted on inside systems that can be entered and managed remotely by a bad character.

➢ **Hybrid Penetration Tests**

Hybrid penetration tests strength both external and internal attacks to discover if a combination of both approaches can lead to a data breach.

To execute these kinds of penetration tests, cyber security experts apply three approaches to attack and breach the system.

Regular security audits and penetration tests play a crucial role in improving the security of enterprise systems and networks. It's a proactive approach to remain one move ahead of cybercriminals because you're constantly conducting a thorough risk assessment of your IT infrastructure.

Security audits and penetration tests also allow security teams to concentrate on high-severity vulnerabilities and verify the security tools applied by the organization. This method also features application-level security concerns to both development and administration teams. Conducting both security audits and penetration tests can improve your organization to save money while assuring business continuity.

8.4.3. E-Business Risk Management Issues

Information assets are subject to many kinds of threats. Threats can occur from a direct or indirect source, can be from natural (environmental) or human causes (either accidental or deliberate) and it may arise from within an organization or from outside. The impact caused by the unwanted incident may be of a temporary nature or it may be permanent. Vulnerabilities of the asset may be exploited and may lead to undesirable consequences affecting the confidentiality, integrity, availability, accountability, authenticity and/or reliability of information.

Risk management plays a critical role to protect the organization and its ability to perform their business mission, not just its IT assets. Risk management is the process of identifying risk, assessing risk, and taking steps to reduce risk to an acceptable level. The risk management is an important component of an IT security program.

The risk categories can help identify and assess the risks, that are poorly managed or not mitigated represent an exposure to the health of the organization. The identification of the risk categories will help to consider where potential events might affect the achievement of e-business objectives. Typical risk categories include: external environment, operational, legal, information, regulatory, human resources, governance, financial, strategic and technology.

Layered Risk Model

Four levels of risk can be distinguished:

➢ Technical risk - includes viruses, worms, Trojans, backdoors, and other malware as well as hacker attacks plus risks due to hardware attacks.

➢ Individual risk - besides security, individuals greatly value their privacy, which is jeopardized by attacks such as phishing. Other individual risks result from fraud in ecommerce, missing or wrong information, or data manipulation.

➢ Business risk - for businesses, sales and reputation losses are major risks. Companies may never regain their full financial capacity after a computer downtime of several days, and even a company's existence can be threatened as a result of technical incidents.

➢ Societal risks - loss of privacy ("transparent user"), cyber-terrorism, and information warfare are key terms that outline the dangers on the societal level.

In order to define an efficient framework for the management of risks it is important to:

➢ Understand the background of the organization and its risks (e.g. its core processes, valuable assets, competitive areas etc.);

➢ Evaluate the Risk Management activities being undertaken so far;

➢ Develop a structure for the Risk Management initiatives and controls (countermeasures, security controls etc.) to follow.

New forms of security attacks constantly emerge, and organizations must address the business risks arising from these security issues: viruses, worms, Trojan horse, port scanning, denial of service attacks, remote administration, sniffers, spoofing, and intrusion.

8.5. FIREWALL

A firewall is a device that allows multiple networks to communicate with one another according to a defined security policy. They are used when there is a need for networks of varying levels of trust to communicate with one another. For example, a firewall typically exists between a corporate network and a public network like the Internet. It can also be used inside a private network to limit access to different parts of the network. Wherever there are different levels of trust among the different parts of a network, a firewall can and should be used.

A private network may consist of different platforms with diverse OS and applications running on them. Many of the applications were designed and developed for an ideal environment, without considering the possibility of the existence of bad guys. Moreover, most of the corporate networks are not designed for security. Therefore, it is essential to deploy a firewall to protect the vulnerable infrastructure of an enterprise.

Firewalls are similar to routers in that they connect networks together. Firewall software runs on a host, which is connected to both trusted and untrusted networks. The host operating system is responsible for performing routing functions, which many operating systems are capable of doing. The host operating system should be as secure as possible prior to installing the firewall software.

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8.5.1. Network Policy

A network security policy is a formal document that outlines the principles, procedures and guidelines to enforce, manage, monitor and maintain security on a computer network. It is designed to ensure that the computer network is protected from any act or process that can breach its security.

A network security policy primarily helps in protecting a computer network from network security threats – both internal and external – from the organization or network. It is generally a broad document and varies based on the underlying environment, organization and/or legal requirements. Typically a network security policy documents:

➢ Rules and legal procedures to access the network and to modify its characteristics.
➢ Governance and management over Web/Internet access
➢ Implementation of security procedures (access control) on network nodes and devices
➢ Role/Privilege based policies, such as identifying authorized and unauthorized services/processes any user can perform on the network
A network security policy is usually part of a broader information security policy.

Structure of a Security Policy

When you compile a security policy you should have in mind a basic structure in order to make something practical. Some of the main points which have to be taken into consideration are –

➢ Description of the Policy and what is the usage for?
➢ Where this policy should be applied?
➢ Functions and responsibilities of the employees that are affected by this policy.
➢ Procedures that are involved in this policy.
➢ Consequences if the policy is not compatible with company standards.
Network policy is to restrict the access of anyone towards the network resource and make clear who all will access the network.

8.5.2. Advanced Authentication Mechanism

Authentication is process of validating the user's identity. Users are identified using different authentication mechanisms. In a security system the authentication process checks the information provided by the user with the database. If the information matches with the database information, the user is granted access to the security system. There are three types of authentication mechanism used.

Validation is the initial phase in access control, and there are three regular variables utilized for verification – something you know, something you have, and something you are. Something you know mostly requires individual to get access to the system by typing the username and password. Something you have is where the user uses smart card for authentications. Something you are is where the user using biometrics methods to get access control.

All types of authentication mechanisms allows user to get access to the system however they all work differently. There are many

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authentications methods developed for users to gain access to the system. In password authentication, there are two forms – weak password and strong password authentications. Access control allows the user to log in into the trusted sites of an organization. Every access control has four processes – identification, authentication, authorization, and accountability. The identification is when the user enters the ID and ID is checked with the security system. Some security system generates random IDs to protect against the attackers. There are three authentication processes. Authorization is checking and matching the authenticated entity of information with access level. The authorization process is handled three ways – authorization is performed for authenticated user, authorization is performed for members of the group, authorization is performed across the multiple systems, and accountability is a process keeping system logs. Systems logs keep track of all successful and unsuccessful logins.

Types of Authentications
➢ **Password Authentication: -**
    This type of authentication requires the supplicant recall what he knows. There are two parts in this method. First, the supplicant enters the username and second, the password. The password is the secret combination of words and numbers which the supplicant knows.
➢ Strength of Password Authentication.
➢ Password Authentication
➢ **Smartcard Authentication: -**
    Smart Card authentication is ‗something a user has' factor. A smart card is a credit-card sized card that has an embedded certificate used to identify the holder. The user can insert the card into a smart card reader to authenticate the individual; Smart cards are commonly used with a PIN providing multi-factor authentication. In other words, the user must have something (the smart card) and know something.
➢ **Biometric Authentication: -**
    Biometrics user authentication is a method that identifies a user and/or verifies their identity based on the measurement of their unique physiological traits or behavioral characteristics. Physiological biometrics is fingerprint, facial recognition, iris-scan, hand geometry; retina scan. Behavioral biometrics is voice recognition, gaits, keystroke-scan, and signature-scan
➢ **Digital Certificate Authentication: -**
    A digital certificate is an encryption technology that works similar to the Internet version of a passport. Using public key and private key information, digital certificates essentially ensure to the recipient of a message that the message is coming from a specific person. The digital certificate authenticates the identity of the sender to ensure safer communication and prevent fraud on the Internet. ‖ The biggest advantages of digital certificate-based authentication are privacy-based.

8.5.3. Packet Filtering
    A router has to make a routing decision about each packet it receives; it has to decide how to send that packet on towards its ultimate destination. In general, a packet carries no information to help the router

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in this decision, other than the IP address of the packet's ultimate destination. The packet tells the router where it wants to go, but not how to get there. Routers communicate with each other using "routing protocols" such as the Routing Information Protocol (RIP) and Open Shortest Path First (OSPF) to build *routing tables* in memory to determine how to get the packets to their destinations. When routing a packet, a router compares the packet's destination address to entries in the routing table and sends the packet onward as directed by the routing table. Often, there won't be a specific route for a particular destination, and the router will use a "default route;" generally, such a route directs the packet towards smarter or better-connected routers.

A packet filter firewall is configured with a set of rules that define when to accept a packet or deny. When the firewall receives a packet, the filter checks the rules defined against IP address, port number, protocol, and so on. If the rule matches "accept," then the packet is accepted in the network, otherwise it is dropped.

To understand configuring packet filtering rules, you need to first understand TCP/IP protocol, what an IP packet is and how they are handled at each layer. RFC 7913 and RFC 7934 provide the details of IP protocol and TCP protocol. From a packet filtering point of view, the IP header contains three important pieces of information:

➢ The IP source address – four bytes long, and typically written as 192.168.2.34
➢ The IP destination address – four bytes long, Just like source address
➢ The IP protocol – specifies whether it is a TCP packet or UDP packet, an Internet Control

Two-way communication presents a challenge for network security based on packet filtering. If one blocks all incoming traffic, one prevents responses to outgoing traffic from coming in, disrupting communication. Consequently, one has to open two holes, one for outgoing traffic and one for incoming traffic, without enforcing any association of the incoming traffic with existing outgoing connections in the network. Packet filtering thus can allow in crafted malicious packets that appear to be part of existing sessions, causing damage to protected resources.

Packet filtering devices do not track dynamic protocols, where a server and a client negotiate a random port for data transmission.

8.5.4. Application gateways

Application gateway firewalls operate at the application layer (Layer 7) of the OSI model. They filter access based on application definitions. Application definitions can include not only port numbers but also specific application information like acceptable HTTP verbs. Application gateway firewalls are considered to be some of the most secure firewalls available because of their capability to inspect packets and ensure the packets are conforming to application specifications.

Because of the amount of information being processed, application gateway firewalls can be a little slower than other firewalls. Sometimes, people use application gateway firewalls in conjunction with another firewall. The application gateway firewall will be used only to

protect servers. Or the application gateway firewall will sit behind the other firewall. The first firewall will be used as a first-level filter. The application gateway firewall will process only packets that pass through the first firewall.

An application gateway or application level gateway (ALG) is a firewall proxy which provides network security. It filters incoming node traffic to certain specifications which mean that only transmitted network application data is filtered. Such network applications include File Transfer Protocol (FTP), Telnet, Real Time Streaming Protocol (RTSP) and BitTorrent.

Application gateways provide high-level secure network system communication. For example, when a client requests access to server resources such as files, Web pages and databases, the client first connects with the proxy server, which then establishes a connection with the main server.

The application gateway resides on the client and server firewall. The proxy server hides Internet Protocol (IP) addresses and other secure information on the client's behalf. A computer's internal system may communicate with an external computer using firewall protection. The application gateway and external computer function without client information or knowledge of the proxy server IP address.

An application-level gateway runs proxies that examine and filter individual packets, rather than simply copying them and blindly forwarding them across the gateway. Application-specific proxies check each packet that passes through the gateway, verifying the contents of the packet up through the application layer (which is the highest layer) of the OSI model. These proxies can filter particular kinds of commands or information in the application protocols the proxies are designed to copy, forward, and filter.

Application gateways can also restrict specific actions from being performed. For example, the gateway could be configured to prevent users from performing the FTP put command. This command lets users write to the FTP server. Prohibiting this action can prevent serious damage of the information stored on the server.

8.5.5. Defining Enterprise Wide Security Framework

Traditionally, organizations have relied on policies to communicate high-level directives from the management. These documents, once issued, provide top down influence for everyone in the company—from business units to departments to individual employees. Furthermore, these policies typically were developed at one time in the organization's evolution to capture the current environment. One of the major challenges for an organization in this area is the continued growth and adaptation of the policies to mirror the transformation within the organization. The fastest area of growth and change within an organization is Information Systems. With the rapid development and push toward new technologies, organizations find themselves striving to maintain current technical environments with outdated policies. Secondly, with the emergence of new technology strategies such as

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Intranets and Extranets, security and the protection of informational assets has become paramount.

The first step is an enterprise-wide Information Systems Security Policy that is consistently enforced even as business needs change. Unfortunately, most companies have only bits and pieces of security scattered throughout the organization. These may make some departments or individuals feel safe, but they do little to protect the enterprise as a whole.

Organizations must now focus much more on information and data: understanding where it is and how it is managed both within and outside the enterprise boundary. Enterprise security encompasses:

➢ Information security: how information technology supports safe business practices.

➢ Business security: security processes and the security control framework, in the context of the business.

➢ Physical security: how facilities and access control support the logical security model.

➢ Operational risk management: providing a risk-based approach to define priorities and identify exposure to potentially malicious activities.

Improving or maintaining the enterprise security posture is a continuous process that must be based on a robust, enterprise-level security architecture.

Every organization, from the smallest upwards, faces security challenges. These include:

➢ Obtaining relevant, high quality information which allows you to make the correct security decisions: you need to know what the real risks are, in the context of your business, at any specific point in time.

➢ Keeping up with a constantly changing threat landscape environment: how easy is it for your organisation to prevent or fix a new security problem?

➢ Identifying the 'smartest' approach to compliance with laws, regulations and industry standards.

➢ Applying agile security management models to legacy systems and the existing organisation.

➢ Managing a heterogeneous environment in a consistent way.

➢ Leveraging any investment in security to obtain a better security posture overall, rather than focusing on reducing a single, specific risk

8.6. LET US SUM UP

In this unit, you have learnt about the basics of e-security, network and website security and firewall. This knowledge would make you understand the various attacks, viruses, and data protection mechanism used to develop the secured e-commerce website and transactions for real time problems. Thus, the e-security unit would have brought you to closer to know the concept of security issues of e-commerce.

8.7. UNIT – END QUESTIONS

1. Briefly explain about the viruses.
2. Write about the vulnerabilities of internet site.
3. Define firewall?

8.8. ANSWER TO CHECK YOUR PROGRESS

1. A computer virus is a computer program that can replicate itself and infect a computer. The term "computer virus" is also commonly but erroneously used to refer to other types of malware, adware, and spyware programs that do not have this reproductive ability. Malware includes worms, Trojans, most rootkits, spyware, dishonest adware, crimeware, and other unwanted software, including true viruses. Viruses are sometimes confused with computer worms and Trojan horses, which are technically different. A worm can exploit security vulnerabilities to spread itself to other computers through networks, while a Trojan is a program that appears harmless but hides malicious functions. Worms and Trojans, like viruses, may harm a computer system's data or performance.
Different types of viruses - Stealth viruses, Direct action viruses, FAT viruses, and Boot sector viruses.

2. Website vulnerability is a weakness or mis-configuration in a website or web application code that allows an attacker to gain some level of control of the site, and possibly the hosting server. Most vulnerability is exploited through automated means, such as vulnerability scanners and botnets. Cybercriminals create specialized tools that scour the internet for certain platforms, like WordPress or Joomla, looking for common and publicized vulnerabilities. Once found, these vulnerabilities are then exploited to steal data, distribute malicious content, or inject defacement and spam content into the vulnerable site.
Types of Vulnerabilities - SQL Injection Vulnerabilities (SQLi), Cross-Site Scripting (XSS), Cross-Site Request Forgery (CSRF), File Inclusion (LFI/RFI), and Command Injection

3. A firewall is a device that allows multiple networks to communicate with one another according to a defined security policy. They are used when there is a need for networks of varying levels of trust to communicate with one another. For example, a firewall typically exists between a corporate network and a public network like the Internet. It can also be used inside a private network to limit access to different parts of the network. Wherever there are different levels of trust among the different parts of a network, a firewall can and should be used.
Firewalls are similar to routers in that they connect networks together. Firewall software runs on a host, which is connected to both trusted and untrusted networks. The host operating system is responsible for performing routing functions, which many operating systems are capable

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of doing. The host operating system should be as secure as possible prior to installing the firewall software.
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8.9. SUGGESTED READINGS

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BLOCK III: - E-PAYMENT SYSTEMS AND CRM, SCM

UNIT IX – E-PAYMENT SYSTEMS

Structure

9.1. Introduction
9.2. Objective
9.3. E-Payment Systems
9.4. Electronic Funds Transfer
9.5. Digital Token Based E-Payment Systems
9.6. Modern Payment Systems
9.7. Steps for Electronic Payment
9.8. Payment Security
9.9. Net Banking
9.10. Let Us Sum Up.
9.11. Unit – End Exercises.
9.12. Answer to Check Your Progress.
9.13. Suggested Readings.

9.1. INTRODUCTION

We learn through this lesson as electronic payment system for e-commerce decides the part of transactions to allow the user to make the purchase on their place; it also determines the scope of the secured transaction. All the payment system consists of well defined steps. The e-payment system can be achieved through the credit card, debit card, electronic fund transfer and e-money determines the easy way of the payment mode.

9.2. OBJECTIVES

After going through this lesson you will be able to
➢ Explain the modern payment systems and token based e-payment system.
➢ Define the steps for electronic payment.
➢ Recognize the net banking and security issues.

9.3. E-PAYMENT SYSTEMS

E-commerce sites use electronic payment, where electronic payment refers to paperless monetary transactions. Electronic payment has revolutionized the business processing by reducing the paperwork,

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transaction costs, and labor cost. Being user friendly and less time-consuming than manual processing, it helps business organization to expand its market reach/expansion. Listed below are some of the modes of electronic payments −

EPSs enable a customer to pay for the goods and services online by using integrated hardware and software systems. The main objectives of EPS are to increase efficiency, improve security, and enhance customer convenience and ease of use. Although these systems are in their immaturity, some significant development has been made. There are several methods and tools that can be used to enable EPS implementation.

- Credit Card
- Debit Card
- Smart Card
- E-Money
- Electronic Fund Transfer (EFT)

Credit Card

Payment using credit card is one of most common mode of electronic payment. Credit card is small plastic card with a unique number attached with an account. It has also a magnetic strip embedded in it which is used to read credit card via card readers. When a customer purchases a product via credit card, credit card issuer bank pays on behalf of the customer and customer has a certain time period after which he/she can pay the credit card bill. It is usually credit card monthly payment cycle.

Debit Card

Debit card, like credit card, is a small plastic card with a unique number mapped with the bank account number. It is required to have a bank account before getting a debit card from the bank. The major difference between a debit card and a credit card is that in case of payment through debit card, the amount gets deducted from the card's bank account immediately and there should be sufficient balance in the bank account for the transaction to get completed; whereas in case of a credit card transaction, there is no such compulsion.

Debit cards free the customer to carry cash and cheques. Even merchants accept a debit card readily. Having a restriction on the amount that can be withdrawn in a day using a debit card helps the customer to keep a check on his/her spending.

Smart Card

Smart card is again similar to a credit card or a debit card in appearance, but it has a small microprocessor chip embedded in it. It has the capacity to store a customer's work-related and/or personal information. Smart cards are also used to store money and the amount gets deducted after every transaction.

Smart cards can only be accessed using a PIN that every customer is assigned with. Smart cards are secure, as they store information in encrypted format and are less expensive/provide faster processing. Mondex and Visa Cash cards are examples of smart cards.

E-Money

E-Money transactions refer to situation where payment is done over the network and the amount gets transferred from one financial body

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to another financial body without any involvement of a middleman. E-money transactions are faster, convenient, and save a lot of time.

Online payments done via credit cards, debit cards, or smart cards are examples of e-money transactions. Another popular example is e-cash. In case of e-cash, both customer and merchant have to sign up with the bank or company issuing e-cash.

Electronic Fund Transfer

It is a very popular electronic payment method to transfer money from one bank account to another bank account. Accounts can be in the same bank or different banks. Fund transfer can be done using ATM (Automated Teller Machine) or using a computer.

Nowadays, internet-based EFT is getting popular. In this case, a customer uses the website provided by the bank, logs in to the bank's website and registers another bank account. He/she then places a request to transfer certain amount to that account. Customer's bank transfers the amount to other account if it is in the same bank, otherwise the transfer request is forwarded to an ACH (Automated Clearing House) to transfer the amount to other account and the amount is deducted from the customer's account. Once the amount is transferred to other account, the customer is notified of the fund transfer by the bank.

9.4. ELECTRONIC FUNDS TRANSFER

Electronic funds transfer is one of the oldest electronic payment systems. EFT is the groundwork of the cash-less and check-less culture where and paper bills, checks, envelopes, stamps are eliminated. EFT is used for transferring money from one bank account directly to another without any paper money changing hands. The most popular application of EFT is that instead of getting a paycheck and putting it into a bank account, the money is deposited to an account electronically.EFT is considered to be a safe, reliable, and convenient way to conduct business.

Why is electronic transfer preferred?

Electronic funds transfer is a much more preferred money transfer options it allows customers to make money transfers at the comfort of their homes using integrated banking tools such as internet and mobile banking. Besides being convenient, electronic transfer modes are considered to be safe, secure and make transferring money much simpler. Electronic transfers are processed immediately with the transferred amount being deducted from one account and credited to the other in real time, thus saving time and effort involved in physically transferring a sum of money. Opting for electronic transferring system also reduces the possibilities of any mistakes as a transaction is only authorized with complete details which include the correct account number of the beneficiary and the target bank's specific IFSC code.

How do you transfer funds?

Transferring funds via electronic gateway is much simpler than the conventional methods. You can choose to:-

➢ Transfer funds into your own linked accounts of the same bank network.
➢ Transfer funds into different account of the same bank.

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➢ Transfer funds into different bank's accounts using NEFT.
➢ Transfer funds into other bank accounts using RTGS
➢ Transfer funds into various accounts using IMPS.
    Types of electronic funds transfer?
➢ NEFT or National Electronics Funds Transfer
➢ RTGS or Real Time Gross Settlement
➢ IMPS or Immediate Payment Service.

NEFT

The National Electronic Funds Transfer is a nation-wide money Nowadays, internet-based EFT is getting popular. In this case, a customer uses the website provided by the bank, logs in to the bank's website and registers another bank account. He/she then places a request to transfer certain amount to that account. Customer's bank transfers the amount to other account if it is in the same bank, otherwise the transfer request is forwarded to an ACH (Automated Clearing House) to transfer the amount to other account and the amount is deducted from the customer's account. Once the amount is transferred to other account, the customer is notified of the fund transfer by the bank.

transfer system which allows customers with the facility to electronically transfer funds from their respective bank accounts to any other account of the same bank or of any other bank network. Not just individuals but also firms and corporate organizations may use the NEFT system to transfer funds to and fro.

RTGS

Real Time Gross Settlement as the name suggests is a real time funds transfer system which facilitates you to transfer funds from one bank to another in real time or on a gross basis. The transaction isn't put on a waiting list and cleared out instantly. RTGS payment gateway, maintained by the Reserve Bank of India makes transactions between banks electronically. The transferred amount is instantly deducted from the account of one banks and credited to the other bank's account.

IMPS

Majority of the funds transferred using electronic channels are processed via NEFT or RTGS. But as thefunds could only be cleared in batches using these transfer gateways, the National Payments Corporation of India introduced a pilot mobile payment project also known as the Immediate Payment Service (IMPS).Available to Indian Nowadays, internet-based EFT is getting popular. In this case, a customer uses the website provided by the bank, logs in to the bank's website and registers another bank account. He/she then places a request to transfer certain amount to that account. Customer's bank transfers the amount to other account if it is in the same bank, otherwise the transfer request is forwarded to an ACH (Automated Clearing House) to transfer the amount to other account and the amount is deducted from the customer's account. Once the amount is transferred to other account, the customer is notified of the fund transfer by the bank.

Public, IMPS offers instant electronic transfer service using mobile phones. IMPS interbank transfer service is available 24X7 and allows you to use your mobile phones to access your account and to authorize transfer of funds between accounts and banks. The IMPS

service also features a secure transfer gateway and an immediate confirmation on fulfilled orders.

9.5. DIGITAL TOKEN BASED ELECTRONIC PAYMENTS

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

Categories of Electronic Tokens:-

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

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

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

The Digital Token based system has following issues for which they are established:-

1. Nature of transaction for which instrument is designed:- In this category, the design issues of token take place. It may be designed to handle micro payments. It may be designed for conventional products. Some tokens are designed specifically and other generally. The design issue involves involvement of parties, purchase interaction and average amount.

2. Means of Settlement:- The Digital Tokens are used when their format must be in cash, credit, electronic bill payments etc. Most transaction settlement methods use credit cards while other used proxies for values.

3. Approach to Security, Anonymity and Authentication:- Since the electronic token are vary from system to system when the business transaction take place. So it is necessary to secure it by intruders and hackers. For this purpose various security features are provided with electronic tokens such as the method of encryption. The encryption method use the digital signatures of the customers for verification and authentication.

4. Risk Factors:- The electronic tokens may be worthless and if the Nowadays, internet-based EFT is getting popular. In this case, a customer uses the website provided by the bank, logs in to the bank's website and registers another bank account. He/she then places a request to transfer certain amount to that account. Customer's bank transfers the amount to other account if it is in the same bank, otherwise the transfer request is forwarded to an ACH (Automated Clearing House) to transfer the amount to other account and the amount is deducted from the customer's account.

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Once the amount is transferred to other account, the customer is notified of the fund transfer by the bank.

customer have currency on token than nobody will accept it, If the transaction has long time between delivery of products and payments to merchants then merchant exposes to the risk. so it is important to analysis risk factor in electronic payment system.

9.6. MODERN PAYMENT SYSTEMS

A payment system is a set of processes and technologies that transfer monetary value from one entity or person to another. Payments are typically made in exchange for the provision of goods, services or to satisfy a legal obligation. They can be made in a variety of currencies using several methods such as cash, checks, electronic payments and cards. The essence of a payment system is that it uses cash-substitutes, such as checks or electronic messages, to create the debits and credits that transfer value.

A modern payment system directly integrates to your point of sale and delivers a robust payment experience for both merchant and customer. It connects merchants to a total payment ecosystem, from merchant services to remote terminal solutions, to hardware procurement. The benefits of today's modern payment system.

1. Complete Payment Flexibility
2. Revolutionary Pricing
3. Get Paid Faster
4. Secure Payment and POS Integration
5. Remote Terminal Management
6. Lower Operational Costs
7. Access to Premium Payment Services

Businesses and consumers alike are interested in faster, safer, and more convenient payment methods, as cash is becoming obsolete and credit cards are being phased out. Mobile and social payment options could be the future of millennial-driven purchasing, creating the sort of instant gratification that millennials expect.

Mobile in-store payments and apps

The development and usage of mobile POS options will increase exponentially as the demand and usage of mobile devices grows.

Currently, options such as SMS and NFC payment methods are possible, but they are not prevalent or convenient enough to satisfy the growing demand of millennials for an easier, faster, and safer way to pay via mobile. Opening up smartphones as a POS method of payment will create innumerable opportunities for the entire payments industry;

In-store payment apps are also on the rise, with PayPal Beacon and Apple's iBeacon paving the way. Many consumers are turning towards these methods as a safer option, quicker than waiting in line, and easier to access, as each transaction has its own unique code. They allow users to simply pay for items found in the physical store via apps on their mobile phones.

Digital currencies

Digital currencies will surface and solidify their place in the economic ecosystem of financing. The popularity of digital currencies stems from the instantaneous and border-less nature of the transactions. Essentially, this payment method can be used anywhere, and it isn't being regulated by government influences and rules, yet.

Social media payment options

Social media networks will expand their reach to include payment solutions such as transferring money from one user to the next (peer-to-peer) or paying directly within the network. Social payments are being split into two categories: on-site purchases and peer-to-peer money transfer services.

The most advanced ideas of a mobile-based payment system are known as mobile wallets. With a mobile wallet, consumers can load multiple cards into one device and choose the preferred payment method for each transaction, all without carrying an actual wallet of cards.

9.7. STEPS FOR ELECTRONIC PAYMENT

An electronic payment is any kind of non-cash payment that doesn't involve a paper check. Methods of electronic payments include credit cards, debit cards and the ACH (Automated Clearing House) network. The ACH system comprises direct deposit, direct debit and electronic checks (e-checks).

Online payments are made instantly, so it's convenient and saves lots of time. It is important, especially today when every aspect of our lives happens at a fast pace.

1. **Customer action** – The process begins when a customer visits the merchant's site and adds to the cart items (products or services) they want to buy. They, then need to fill out the payment form with certain information (e.g. card number, expiration date, CVV code, address). Depending on the payment method, the customer is either redirected to external service or bank's website or continues the payment on the website or in an app.

2. **Payment authentication by the operator** – The payment gateway (with other parties involved) checks whether the payment information is valid. If everything's OK, the process continues and the payment gateway reports back the successful transaction. After that, the customer receives a payment confirmation — the notification is usually displayed in real-time.

3. **Payment to the seller's account** – An online payment provider receives a payment from a customer's bank and transfers it to the merchant's account.

The steps involved in online payment processing have significantly reduced the waiting period and hassle when purchasing commercials products and services. With new technologies and payment processes, people can easily purchase products and one-time services, set up recurring payment, and streamline payments that allow sellers to accept new orders 24/7.

The operation of the model is often referred to as the payment process and it involves four basic steps:

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➢ Payment instructions are the information contained in a wire transfer or check. These instructions are from the payer and tell the paying bank to transfer value to the beneficiary through the network and receiving bank.

➢ Payment generation is when the instructions are entered into the system—e.g. printed on a check or transmitted via ACH or wire.

➢ Clearing is the process where the banks use the payment information to transfer money between themselves on behalf of the payer and the beneficiary (payee).

➢ Settlement is the final step in the basic process and occurs when the beneficiary's (payee's) bank account is credited and the payer's bank account is debited. Final settlement occurs when the banks irrevocably pass value among themselves, a distinction that has important treasury implications.

The actual payment process will depend on the type of payment instrument that the payer and payee choose to use—or have chosen for them by their financial institutions.

The benefits of streamlined online payment processing steps that drive business success include global reach, electronic records, advanced fraud protection and secure transactions, simple integration into various website platforms and bank processing systems, and user-friendly features. These convenient features will make it easier for consumers to purchase your products and services and to keep up with a large demand.

Most of the professional payment processing service providers can configure their payment services to suit your business needs. Mobile payments comprise one of the newest forms of online payment processing. Instead of using credit cards, a buyer has to simply send a payment request via a text message or a software application that's linked to a credit card or bank account. And while there is a concern of eCommerce fraud, added security measures such as a security pin helps diminish the chance of this occurring.

9.8. PAYMENT SECURITY

Security is an essential part of any transaction that takes place over the internet. Customers will lose his/her faith in e-business if its security is compromised. Following are the essential requirements for safe e-payments/transactions −

➢ Confidentiality − Information should not be accessible to an unauthorized person. It should not be intercepted during the transmission.

➢ Integrity − Information should not be altered during its transmission over the network.

➢ Availability − Information should be available wherever and whenever required within a time limit specified.

➢ Authenticity − There should be a mechanism to authenticate a user before giving him/her an access to the required information.

➢ Non-Repudiability − It is the protection against the denial of order or denial of payment. Once a sender sends a message, the sender should not be able to deny sending the message. Similarly, the recipient of message should not be able to deny the receipt.

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➤ Encryption − Information should be encrypted and decrypted only by an authorized user.

➤ Auditability − Data should be recorded in such a way that it can be audited for integrity requirements.

The electronic payment system-the ability to pay electronically for goods and services purchased online-are an integral part of e-commerce and an essential infrastructure for e-commerce models. One of the major reasons for the widespread of e-commerce transactions is perhaps the rapid development and growth of various electronic payment systems. In the developed countries, credit cards have been used even before the advent of Internet. The present part of the study revealed many electronic payment systems and broadly this electronic payment system can be grouped or classified in to four categories: (1) Online Credit Card Payment System. (2) Online Electronic Cash System. (3) Electronic Cheque System and (4) Smart Cards based Electronic Payment System. These payment systems have numbers of requirements: e.g. security, acceptability, convenience, cost, anonymity, control, and traceability.

Measures to ensure Security

Major security measures are following −

➤ **Encryption** − It is a very effective and practical way to safeguard the data being transmitted over the network. Sender of the information encrypts the data using a secret code and only the specified receiver can decrypt the data using the same or a different secret code.

➤ **Digital Signature** − Digital signature ensures the authenticity of the information. A digital signature is an e-signature authenticated through encryption and password.

➤ **Security Certificates** − Security certificate is a unique digital id used to verify the identity of an individual website or user.

Secure Socket Layer (SSL)

It is the most commonly used protocol and is widely used across the industry. It meets following security requirements −

• Authentication

• Encryption

• Integrity

• Non-reputability

"https://" is to be used for HTTP urls with SSL, where as "http:/" is to be used for HTTP urls without SSL.

Secure Hypertext Transfer Protocol (SHTTP)

SHTTP extends the HTTP internet protocol with public key encryption, authentication, and digital signature over the internet. Secure HTTP supports multiple security mechanism, providing security to the end-users. SHTTP works by negotiating encryption scheme types used between the client and the server.

Secure Electronic Transaction

It is a secure protocol developed by MasterCard and Visa in collaboration. Theoretically, it is the best security protocol. It has the following components −

➤ **Card Holder's Digital Wallet Software** − Digital Wallet allows the card holder to make secure purchases online via point and click interface.

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> **Merchant Software** − This software helps merchants to communicate with potential customers and financial institutions in a secure manner.
> **Payment Gateway Server Software** − Payment gateway provides automatic and standard payment process. It supports the process for merchant's certificate request.
> **Certificate Authority Software** − This software is used by financial institutions to issue digital certificates to card holders and merchants, and to enable them to register their account agreements for secure electronic commerce.

9.9. NET BANKING

With the rapid development of technology, internet plays a significant role in changing the banking scenario. It provides an online platform for various banking transactions through which it offers various services like online payment, online fund transfer, online stock trading and online shopping etc. The use of internet as a delivery channel for banking services is increasing widely in banking sector. Internet banking facilities enable financial institution and customers to access their accounts, transactions and getting information financial products & services.

Internet banking (e-banking) facilitates customers to avail various small and large value banking products and services through electronic channels. Internet banking comprises banking activities or services which can be avail by the customers at any point of time and from any places with their convenience, it is also called PC banking, online banking, cyber banking, virtual banking, etc. Internet banking delivers banking services through the open-access computer network i.e. Internet, directly to customers 'home that can be used with different electronic devices such as personal computer, mobile phone with a browser or desktop software, digital television. So, we can say that Internet banking is about using banking facilities via the internet with the help various electronic devices.

Using Internet banking is beneficial for both i.e. Costumers as well as banks. The benefits of adopting internet banking are mentioned below:

Benefits for costumers
> Less waiting time:
> Ease and Convenience:
> 24/7 Availability:
> Self service channel:
> Save time and money:

Benefits for banks
> Increased Profitability:
> Cost effective mechanism:
> Reach where there is no branch:
> Improve Customer relationship:-
> Eco-friendly image:

The security of information may be one of the biggest concerns to the internet users. For Internet Banking users who most likely connect

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to the internet via dial-up modem, is faced with a smaller risk of someone breaking into their computers. Only organizations such as banks with dedicated internet connections face the risk of someone from the internet gaining unauthorized access to their computer or network. However, the electronic banking system users still face the security risks with unauthorized access into their banking accounts.

In order to provide effective and secure banking transactions, the following major controls must be ensured.

➢ Authenticity controls: To verify identity to individuals like password, pin etc.
➢ Accuracy control: To ensure the correctness of the data, following across the network
➢ Completeness control: To make sure that no data is missing
➢ Redundancy controls: To see that data is traveled and processed only once and there is no repetitive sending of data
➢ Privacy control: To protect the data from inadvertent or unauthorized access.
➢ Audit trail controls: To ensure keeping chronological role of events that are occurred in the system,
➢ Existence controls: To make sure that ongoing availability of all the system resources with the same throughout.
➢ Efficiency: To ensure that the system uses minimum resources, to achieve the desired goal.
➢ Firewall controls: To prevent unauthorized users accessing the private network, which are connected to Internet?
➢ Encryption controls: To enable only those who possess secret key to decrypt the cyber text.

9.10. LET US SUM UP

In this unit, you have learnt about the basics of e-payment systems, electronic fund transfer, modern payment system and steps for electronic payment. This knowledge would make you understand the various payment option through e-commerce website based transaction and net banking and payment security options used to do the online transaction. Thus, the E-Payment Systems unit would have brought you to closer to know the concept of electronic fund transfer.

9.11. UNIT – END QUESTIONS

1. State the various modes of e-payment systems.
2. Discuss about the steps for electronic payment.

9.12. ANSWER TO CHECK YOUR PROGRESS

1. E-commerce sites use electronic payment, where electronic payment refers to paperless monetary transactions. Electronic payment has

revolutionized the business processing by reducing the paperwork, transaction costs, and labor cost. Being user friendly and less time-consuming than manual processing, it helps business organization to expand its market reach/expansion. Listed below are some of the modes of electronic payments −

EPSs enable a customer to pay for the goods and services online by using integrated hardware and software systems. The main objectives of EPS are to increase efficiency, improve security, and enhance customer convenience and ease of use. Although these systems are in their immaturity, some significant development has been made. There are several methods and tools that can be used to enable EPS implementation.

➢ Credit Card
➢ Debit Card
➢ Smart Card
➢ E-Money
➢ Electronic Fund Transfer (EFT)

2. An electronic payment is any kind of non-cash payment that doesn't involve a paper check. Methods of electronic payments include credit cards, debit cards and the ACH (Automated Clearing House) network. The ACH system comprises direct deposit, direct debit and electronic checks (e-checks).

Online payments are made instantly, so it's convenient and saves lots of time. It is important, especially today when every aspect of our lives happens at a fast pace.

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9.13. SUGGESTED READINGS

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UNIT X – E-CUSTOMER RELATIONSHIP MANAGEMENT

Structure

10.1. INTRODUCTION

E-CRM, or Electronic Customer Relationship Management, is an integrated online sales, marketing and service strategy that are used to identify, attract and retain an organization's customers. It describes improved and increased communication between an organisation and its clients by creating and enhancing customer interaction through innovative technology. eCRM can be defined as activities to manage customer relationships by using the Internet, web browsers or other electronic touch points

10.2. OBJECTIVES

After going through this lesson you will be able to
➢ Define the Electronic CRM and its processes.
➢ Recognize the architectural components of CRM.
➢ Understand the need and applications of eCRM.

10.3. E-CUSTOMER RELATIONSHIP MANAGEMENT

Electronic customer relationship management (E-CRM) is the application of Internet-based technologies such as emails, websites, chat rooms, forums and other channels to achieve CRM objectives. It is a well-structured and coordinated process of CRM that automates the processes in marketing, sales and customer service.

An effective E-CRM increases the efficiency of the processes as well as improves the interactions with customers and enables businesses to customize products and services that meet the customers' individual needs.

E-CRM, or Electronic Customer Relationship Management, is an integrated online sales, marketing and service strategy that are used to identify, attract and retain an organization's customers. It describes improved and increased communication between an organisation and its clients by creating and enhancing customer interaction through innovative technology. E-CRM software provides profiles and histories of each interaction the organisation has with its customers, making it an important tool for all small and medium businesses. As we implement eCRM process, there are three steps life cycle:

1. Data collection: About customers preference information for actively and passively ways via website, email, questionnaire.
2. Data aggregation: Filter and analysis for firm's specific needs to fulfill their customers.
3. Customer interaction: According to customer's need, company provides the proper feedback to them.

eCRM can be defined as activities to manage customer relationships by using the Internet, web browsers or other electronic touch points.

10.3.1. Marketing automation

Marketing automation refers to the software that allows you to automate activities and operationalize communications with the goal of managing the repetitive and time-consuming tasks.

Marketing Automation is a subset of customer relationship management (CRM) or customer experience management (CXM) that focuses on the definition, segmentation, scheduling and tracking of marketing campaigns. The use of marketing automation makes processes that would otherwise have been performed manually much more efficient and makes new processes possible. Marketing Automation can be defined as a process where technology is used to automate several repetitive tasks that are undertaken on a regular basis in a marketing campaign. A tool that allows an individual to design, execute and

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automate a time-bound marketing workflow can be called a Marketing Automation platform.

Marketing Automation platforms allow marketers to automate and simplify client communication by managing complex omni-channel marketing strategies from a single tool. Marketing Automation assist greatly in areas like Lead Generation, Segmentation, Lead nurturing and lead scoring, Relationship marketing, Cross-sell and upsell, Retention, Marketing ROI measurement.

There are three categories of marketing automation software:

Marketing intelligence

Uses tracking codes in social media, email and WebPages to track the behavior of anyone interested in a product or service to gain a measure of intent. It can record which social media group or thread they followed, which link was clicked on in an email or which search term was used to access a website. Multiple link analysis can then track buyer behavior - following links and multiple threads related to product A but not B will show an interest only in A. This allows more accurately targeted response and the development of a nurturing program specifically targeted towards their interest and vertical market. This allows businesses to more efficiently and effectively reach target consumers who show, through their internet history behavior, that they will be interested in the company's products. Due to its interactive nature this has been described as Marketing Automation 2.0.

Marketing automation

Has a focus on moving leads from the top of the marketing funnel through to becoming sales-ready leads at the bottom of the funnel. Prospects are scored, based on their activities, and receive targeted content and messaging, thus nurturing them from first interest through to sale. Commonly used in business-to-business (B2B), business-to-government (B2G), or longer sales cycle business-to-consumer (B2C) sales cycles, Marketing Automation involves multiple areas of marketing and is really the marriage of email marketing technology coupled with a structured sales process.

Advanced workflow automation

Encompasses automation of internal marketing processes. These include budgeting and planning, workflow and approvals, the marketing calendar, internal collaboration, digital asset creation and management and essentially everything that supports the operational efficiency of the internal marketing function. Typically these systems require a CRM or COM administrator to set up a complex series of rules to trigger action items for internal sales and marketing professionals to manually process (designing files, sending letters, sending email campaigns). This type of system increases marketer's ability to deliver relevant content to relevant individuals at relevant times. Limitations may apply, based on the human resource capacity of an organisation and their level of commitment to the tasks as they are assigned.

Marketing automation is powerful software that helps mechanize marketing processes. Marketing departments use automation software to reduce or even eliminate repetitive tasks including:

➢ Manual email campaign creation

- ➢ Coordination of SMS messaging
- ➢ Dissemination of social media posts
- ➢ Website widget content
- ➢ Online advertisements placement
- ➢ Data management and analysis

Marketing automation involves market segmentation, campaigns management, event-based marketing, and promotions. The campaign modules of Marketing Automation enable the marketing force to access customer-related data for designing, executing and evaluating targeted offers, and communications. Event-based (trigger) marketing is all about messaging and presenting offers at a particular time. For example, a customer calls the customer care number and asks about the rate of interest for credit card payment. This event is read by CRM as the customer is comparing interest rates and can be diverted to another business for a better deal. In such cases, a customized offer is triggered to retain the customer.

10.3.2. Enterprise customer management

Enterprise Customer Management (ECM) at its core is an organizational wide approach to placing the customer at the center of all business decisions.

By harnessing customer behavioral, transactional and social data many organizations are embracing this defined discipline to help inform optimal decision making across all facets of their enterprises. The benefits can be everlasting allowing brands to connect and be relevant with their most valued customers across all dimensions of their value proposition.

Before an organization can implement CRM, the organization should be aware of potential problems and possible to be deal with them when necessary. At the organization level, business should establish a joint operation between different sectors that are associated with the customer to be more effective. The main challenges that an organization may encounter in implementing CRM can be divided into three main cases:

1. Initial start-up costs: It is one of the CRM challenges that the organization may have invested a large amount of customer management tools. There may be some specific applications of these tools, they hardly can be shared in difficult sectors.

2. Integrated practical tools: organizations need tools to integrate applications based on customer life cycles and interactions with the customer is created. The organization need to manage the customer interaction to different languages and currencies can not bring to customer CRM through traditional technologies and this would be very difficult for them.

3. Cooperation various sectors: CRM is an integrated approach and requires the cooperation of the business which had previously operated as autonomous. Data that are gathered in one section should be shared in all other parts. Some of the sectors to share their data with others may be Unsatisfied or reluctant

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To create a customer-centered culture it is necessary to extend the capabilities of knowledge and as well as the necessary tools to meet customer needs with appropriate products and services. One of the reasons the can lead to a successful CRM, the following cases can be mentioned: a) Implementation of CRM as a strategy in organization effective communication with customers should be implemented as a strategy at all levels of an organization and be familiar with their place in the system would integrate all business process and activity around the customer. b) Maturity of software in the organization is one of the major problems in the imp maturation of software in the companies; users who want to work must have experience in working with the simple software. Also, the system that has not efficiency will lead frustration and loss of senior management support and recording structure is hidden obstacles and problems. c) Determine the duties of each person and group in the organization: people should know what their role is and function in the system and what action should do when CRM optimization is a group. Process and for success in it, all individuals should be familiar with group works and tasks.

10.3.3. Customer Relationship Management Areas
There can be multiple definitions of CRM from different perspectives:

From the viewpoint of the Management, CRM can be defined as an organized approach of developing, managing, and maintaining a profitable relationship with customers.

By equating the term with technology, the IT organizations define CRM as software that assists marketing, merchandising, selling, and smooth service operations of a business. The primary goal of CRM is to increase customer loyalty and in turn improve business profitability. It shows the ingredients that work together to form a successful CRM system.
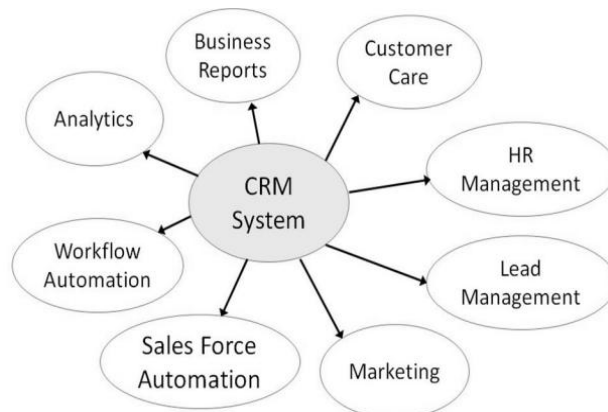
Figure 14: - Covered Areas of CRM

Here are some of the important ingredients of CRM:
➢ Analytics – Analytics is the process of studying, handling, and representing data in various graphical formats such as charts, tables, trends, etc., in order to observe market trends.
➢ Business Reporting – Business Reporting includes accurate reports of sales, customer care, and marketing.

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- Customer Service – Customer Service involves collecting and sending the following customer-related information to the concerned department:
  - ✓ Personal information such as name, address, age, etc.
  - ✓ Previous purchase patterns.
  - ✓ Requirements and preferences.
  - ✓ Complaints and suggestions.
- Human Resource Management – Human Resource Management involves employing and placing the most eligible human resource at a required place in the business.
- Lead Management – Lead Management involves keeping a track of the sales leads and distribution, managing the campaigns, designing customized forms, finalizing the mailing lists, and studying the purchase patterns of the customers.
- Marketing – Marketing involves forming and implementing sales strategies by studying existing and potential customers in order to sell the product.
- Sales Force Automation – Sales Force Automation includes forecasting, recording sales, processing, and keeping a track of the potential interactions.
- Workflow Automation – Workflow Automation involves streamlining and scheduling various processes that run in parallel. It reduces costs and time, and prevents assigning the same task to multiple employees.

  The most prominent objectives of using the methods of Customer Relationship Management are as follows:
- Improve Customer Satisfaction – CRM helps in customer satisfaction as the satisfied customers remain loyal to the business and spread good word-of-mouth. This can be accomplished by fostering customer engagement via social networking sites, surveys, interactive blogs, and various mobile platforms.
- Expand the Customer Base – CRM not only manages the existing customers but also creates knowledge for prospective customers who are yet to convert. It helps creating and managing a huge customer base that fosters profits continuity, even for a seasonal business.
- Enhance Business Sales – CRM methods can be used to close more deals, increase sales, improve forecast accuracy, and suggestion selling. CRM helps to create new sales opportunities and thus helps in increasing business revenue.
- Improve Workforce Productivity – A CRM system can create organized manners of working for sales and sales management staff of a business. The sales staff can view customer's contact information, follow up via email or social media, manage tasks, and track the salesperson's performance.

10.3.4. CRM Processes

The goal of any business is to derive maximum profitability from its customer base. The CRM value chain describes the process that a business must have in place to gain the profitability wanted from customers. Five key steps are necessary for the successful implementation of a CRM strategy, and are commonly referred to as "the five step process for CRM."

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Customer portfolio analysis

This first step involves analysis of your organization's customer base to determine what groups and kinds of customers are the most profitable. This will define your organization's target customer base.

Customer intimacy

Customer intimacy is the process of getting familiar with the individual customers within the organization's target customer base. Relationship building is predicated upon how well you know your customer and that includes everything from buying habits to when their birthday is. Every interaction with a customer is an opportunity to improve customer intimacy and learn more about your target market. This step usually includes building a customer database to store the gathered information.

Network development

Network development refers to the identification and development of strong relationships with organizations, networks and people that are critical to your success in servicing your customers. These relationships will include external partners such as suppliers and investors, as well as internal partners, your employees.

Value proposition development

This step builds on the information gathered while working on customer intimacy. Once you have identified your target customer, you can move forward and create a tailored value proposition for this customer. In creating value for your customer, your value proposition must also create value for your organization.

Customer life cycle management

The customer life cycle refers to the ideal customer journey: from potential client to product/service advocate. It also relates the continuing relationship you maintain with your customer. Managing this cycle requires structure and attention to process. Your organization must determine how it will organize itself to effectively manage customer relationships (structure). As well, thought must be given to determining how your organization will approach customer acquisition and retention, as well as the performance measurement of your CRM strategy (process).

10.4. ARCHITECTURAL COMPONENTS OF A CRM SOLUTION

CRM stands for "Customer Relationship Management" and is a set of methodologies and tools that helps to manage customer relationship in an organized way. Customer Relationship Management is a business strategy for optimizing customer interactions. It helps in understanding your customers, their needs and requirements.

10.4.1. Customer's information repository

Centralizing customer data and ensuring customer information is accurate, up-to-date and easily accessible is vital in delivering consistent marketing strategies. By integrating customer, transaction, and metadata,

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marketers can obtain actionable customer information, allowing them to analyze customer behavior, improve their channel strategies and achieve better campaign ROI.

We can collect customer data from different sources, check for consistency and correctness, eliminate duplicates and integrate seamlessly with your applications. You can also apply multi-dimensional segmentation by using your customers' information, tags and digital behaviors.

Collecting Data

➢ Two-way integration of customer information between next4biz and your applications.

➢ Integration of forms in your websites to record visitors' information.

➢ Bulk import of customer information from spreadsheets and other formats.

➢ Special data entry interfaces for in-house or outsourced users.

Maintain Consistency and Correctness

➢ Define rules to check for consistency and correctness during data entry, data integration, and bulk data imports.

➢ Our "learning engine" automatically reveals missing information, such as email domain, email address, gender, segment, classification of title and other structured information.

➢ Confirm the correctness of email addresses.

➢ Set rules to identify unique customer information (next4biz will list duplicate records based on the rules).

➢ Receive reports of incorrect information, such as obsolete current job information of your leads.

➢ Other next4biz features include:

✓ Suggests gender based on the customer's name

✓ Predicts and confirm email address based on name and company information

✓ Predicts job title category based on title text

10.4.2. Campaign management

Campaign management is the planning, execution, tracking, and analysis of a marketing initiative; sometimes centered on a new product launch or an event. Campaigns normally involve multiple pushes to potential buyers through email, social media, surveys, print materials, giveaways, etc. all focusing on a similar topic or idea.

Campaign management and campaign planning play a central role in marketing, your customers should be sent the the right information adapted to their needs, in the right communications style and via the right communications channel at the right time. Your customers' requirements are the focus of your campaign process. Consequently, campaign management plays a central role in Customer Relationship Management (CRM). The campaign process consists of three central phases: planning, management and analysis.

Campaign management in practice

To plan a campaign process more exactly, all of your existing customer touch points have to be considered and analyzed. This includes

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contacts in sales, service, eCommerce and other relevant channels. And with the help of special CRM software and analysis systems, you can gather customer intelligence centrally and use it derive specific advertising measures or steps such as direct mailings, e-mail, telemarketing and mail merge or form letter campaigns.

Special software solutions for campaign management

Individual software solutions or systems for campaign management help you to plan, manage and evaluate complex campaign processes in your company. All your customer data flows into the software, where it can be quickly evaluated. Thus making campaign planning more effective. The analysis tools help you to manage and control current campaigns, and the reporting features help you to evaluate the campaigns. CRM solutions offer support in all your marketing activities, and the fact that all your data flows into one database where it can also be linked is a massive advantage.

10.4.3. Event Triggers

In most CRM systems, the term trigger designates an action that initiates subsequent actions in sales or marketing workflow. For example, when a prospective customer clicks a link inside an email, this can be a trigger for changing his status from 'cold lead' to 'warm lead'. Or when a prospective customer fills out a website form, this action can trigger a series of marketing emails. Or when a customer pays an invoice, this action can trigger a task creation for an account manager.

Trigger based marketing software allows companies to significantly save on labor costs, avoid human errors and improve customer experience. The term 'event based marketing' is closely related.

The Event Trigger receives events from the Event System and calls registered functions for each event.

The Event Trigger can be used to specify functions you wish to be called for each Event System event. You can assign multiple functions to a single event and whenever the Event Trigger receives that event it will call those functions.

10.4.4. Business logic and rules repository

Business Rules Group (BRG) was one of the first to distinguish between the rules of the business and the business logic in IT Systems. Their goal was to develop an altogether new approach where business rules are not merely artifacts of IT professionals but entities that can be authored, managed, and analyzed by business professionals with little IT background. This approach catalyzed exciting ideas and developments. In today's IT space we can find many products and methodologies that must pay credit to the BRG and its groundbreaking work.

A BRMS or business rule management system is a software system used to define, deploy, execute, monitor and maintain the variety and complexity of decision logic that is used by operational systems within an organization or enterprise. This logic, also referred to as business rules, includes policies, requirements, and conditional

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statements that are used to determine the tactical actions that take place in applications and systems.

Business Rules Management Systems (BRMS) have been on the market for many years, initially conceived as expert systems, then knowledge bases or rule engines, and finally business rules management systems. The major difference between these systems and traditional development environments is that the concept of 'business rule' is separated from other concerns within a software application such as data processing, user interfacing, and control flow. This separation has two major advantages:

➢ Business rules have their own special syntax, often more easily readable than ordinary software code;

➢ A specifically-designed engine is able to process these rules based on the availability of data thus relieving developers from the complexity of writing the business rules in a specific processing order.

This approach has been, and continues to be, successful in many organizations that have to process great amounts of business rules.

A Business Rule Repository is a special kind of structured data storage. A General Rulebook System manages a General Business Rule Repository — a repository used to record and manages business rules for as many purposes as possible.

We consider a repository that is used to manage business rules that are technical artifacts a System Rule Repository — not a bad concept in itself. A Business Rule Management System (BRMS) typically manages such a repository. The applications of a System Rule Repository include:

➢ Traceability between business rules and your systems and automated processes; the ability to perform impact analysis when business rules must change.

➢ Reusability of business rules throughout systems and automated processes.

➢ Homogeneous encoding of business rule statements to improve consistency.

A BRMS includes, at minimum: This needs to be attributed:

➢ A repository, allowing decision logic to be externalized from core application code

➢ Tools, allowing both technical developers and business experts to define and manage decision logic

➢ A runtime environment, allowing applications to invoke decision logic managed within the BRMS and execute it using a business rules engine

The top benefits of a BRMS include:

➢ Reduced or removed reliance on IT departments for changes in live systems. Although, QA and Rules testing would still be needed in any enterprise system.

➢ Increased control over implemented decision logic for compliance and better business management

➢ The ability to express decision logic with increased precision, using a business vocabulary syntax and graphical rule representations (decision tables, trees, scorecards and flows)

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➢ Improved efficiency of processes through increased decision automation.

The purpose of a business rules repository is to support the business rule information needs of all the stakeholders in a business rules-based approach to the initial development of systems and their lifetime enhancement. Specifically, the purpose of a business rules repository is to provide:

➢ Support for the rule-related requirements of all business and IT stakeholders

➢ Query and reporting capability for impact analysis, traceability and business rule reuse including web-based publication

➢ Security for and the integrity of business rule and rule-related information

To derive the requirements of a business rules repository, we are going to look at the roles and responsibilities of business and IT stakeholders and their needs for rule-related information.

10.4.5. Decision support tools

The terms Decision Support Tools or Decision Support Systems (DSS) refer to a wide range of computer-based tools (simulation models, and/or techniques and methods) developed to support decision analysis and participatory processes. A DSS consists of a database, different coupled hydrodynamic and socio-economic models and is provided with a dedicated interface in order to be directly and more easily accessible by non-specialists (e.g. policy and decision makers). DSS have specific simulation and prediction capabilities but are also used as a vehicle of communication, training and experimentation [1]. Principally, DSS can facilitate dialogue and exchange of information thus providing insights to non-experts and support them in the exploration of policy options.

DST Components

➢ A Database Management System (DBMS): a DBMS collects, organizes, and processes data and information.

➢ Models: different hydrodynamic and socio-economic models are integrated in a DSS to perform optimization, forecasting/prediction, statistical functions. The type of models included defines the type of support provided and the area of application of a DSS (i.e. erosion or shoreline management, pollution, etc.).

➢ Users' interface: helps the users to interact with the system and to analyse its results. Important features of a DSS interface should be its user friendliness meaning its simplicity, flexibility, and capability of presenting data and model output. An effective user's interface facilitates the communication and increases the acceptability of the tool by intended users (e.g. Coastal Zone Managers as well as Policy and Decision Makers).

➢ Other components: Geographic Information Systems (GIS) play a significant role in Spatial Decision support systems (SDSS) in which they organise, present and compare data and information on a visualisation map; Web-Based DSS which are computerised systems that deliver decision support information to managers using a Web browser [2], Group Decision Support System (GDSS) are common

computer tools or networks used to enable collaboration between people to solve complex decision making;

DST Classification

➢ Model-driven DSS emphasizes access to and manipulation of a statistical, financial, optimization, or simulation model. Model-driven DSS use data and parameters provided by users to assist decision makers in analyzing a situation; they are not necessarily data intensive.

➢ Communication-driven DSS supports more than one person working on a shared task.

➢ Data-driven DSS or data-oriented DSS emphasizes access to and manipulation of a time series of internal company data and, sometimes, external data.

➢ Document-driven DSS manages, retrieves and manipulates unstructured information in a variety of electronic formats.

➢ Knowledge-driven DSS provides specialized problem solving expertise stored as facts, rules, procedures, or in similar structures.

10.4.6. Higher level statistical analysis

Statistics are mathematical computations used to analyze data. Tools of statistical analysis can describe, summarize and compare data. There are various tools that can analyze statistical data. These range from relatively simple computations to advanced analysis. Basic analyses can be easily computed, while more advanced methods require a solid understanding of advanced statistics as well as specialized computer software.

In statistics, the term higher-order statistics (HOS) refers to functions which use the third or higher power of a sample, as opposed to more conventional techniques of lower-order statistics, which use constant, linear, and quadratic terms (zeroth, first, and second powers). The third and higher moments, as used in the skewness and kurtosis, are examples of HOS, whereas the first and second moments, as used in the arithmetic mean (first), and variance (second) are examples of low-order statistics. HOS are particularly used in estimation of shape parameters, such as skewness and kurtosis, as when measuring the deviation of a distribution from the normal distribution. On the other hand, due to the higher powers, HOS are significantly less robust than lower-order statistics.

Descriptive Analysis

Descriptive analysis uses specific tools to describe data. These are relatively simple calculations that give a basic picture of what the data looks like overall. Descriptive tools include: frequency, percentages and measures of central tendency. Frequency tells how many times something has occurred in a data set. Percentages are calculations that show a proportion. Measures of central tendency are represented by the mean, median and mode. These tools describe the central point (median), the most common (mode) or the average (mean) for a specific variable.

Moderate Analysis

Moderate statistical analysis tools look at the relationships between variables -- what the nature of these relationships is and if

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they are significant. These include correlation and regression. A correlation describes the relationship between two variables as well as the direction and strength of that relationship. Regression can show if a variable predicts another variable. Like correlation, however, regression does not show causation.

Advanced Analysis

Advanced analyses include calculations of variance. These can help a researcher see what variety exists in the data, as well as positive outcomes in the research. In order to calculate variance, a researcher must use the standard deviation. A standard deviation measures the degree that an individual value varies from the mean or average.

10.4.7. Forecasting and planning tools

As the name suggests, production planning is simply a projection of future business--or production--activity. Many companies rely on certain mainstay products to drive company profits. To ensure that those products continue to serve its purpose, the company must rely on effective production planning. The process of production planning contains a number of steps, and forecasting is an essential step, because it requires that the company project its production needs into the future. Forecasting might seem purely hypothetical, but companies can utilize forecasting tools to provide as much accuracy as possible.

➤ Select a method of forecasting for production planning. Available methods include the moving average, exponential smoothing and regression analysis. The moving average takes into account production averages over a period of time and looks specifically at the average of each production period against how that average has changed. Exponential smoothing weighs the average of the most recent forecast against the current demand for the product. Regression analysis uses a chart to view the moving average as a single line of change over time.

➤ Determine a time period to study. Forecasting is most effective over the short term, rather than the long term. This is because long-term forecasting can quickly become inaccurate when customer demand changes or market trends adjust unexpectedly. The best time period will reflect previous company activity and what changes the company has seen over time–quarterly, bi-annually. Bear in mind that the best forecasts for production planning tend to reflect shorter amounts of time.

➤ Choose reports on previous company activity to help with projecting future production. Projecting for the future requires looking into the past, and companies can utilize previous production results to make forecasts for the future. Companies can look at specifics for customer demand over certain periods of time–for instance, if demand drops during some months and rises during others–and apply this information to the forecasting method that has been selected.

➤ Pick market trends to apply to the forecast. Market trends must work alongside expectations of customer demand. The market will play a role in dictating the extent to which customer demand will increase or decrease. If trends indicate that the market for a certain product is about to expand, the company might use this to increase production, but if

trends indicate a decrease in market interest, the company might reconsider production needs.

The Forecasting Tool will produce the following estimates:

➢ Future values of the growth process for a selected period
➢ The maximum value that the data set is expected to reach
➢ The expected life cycle of the growth process i.e. the time that it will take to be completed
➢ The midpoint around which the growth process evolves i.e. the point in time where the growth process is half way to completion

10.4.8. True channel management

The term Channel Management is widely used in sales marketing parlance. It is defined as a process where the company develops various marketing techniques as well as sales strategies to reach the widest possible customer base. The channels are nothing but ways or outlets to market and sell products. The ultimate aim of any organization is to develop a better relationship between the customer and the product.

This channel management process contains five steps.

1. Analyze the consumer.
2. Establish the channel objectives.
3. Specify distribution tasks.
4. Evaluate and select from channel alternatives.
5. Evaluate channel member performance.

Channel management helps in developing a program for selling and servicing customers within a specific channel. The aim is to streamline communication between a business and the customer. To do this, you need to segment your channels according to the characteristics of your customers: their needs, buying patterns, success factors, etc. and then customize a program that includes goals, policies, products, sales, and marketing program. The goal of channel management is to establish direct communication with customers in each channel. If the company is able to effectively achieve this goal, the management will have a better idea which marketing channel best suits that particular customer base. The techniques used in each channel could be different, but the overall strategy must always brand the business consistently throughout the communication.

A business must determine what it wants out of each channel and also clearly define the framework for each of those channels to produce desired results. Identifying the segment of the population linked to each channel also helps to determine the best products to pitch to those channels.

10.4.9. Workflow management

Workflows in CRM allow you to automate simple and complex business processes within CRM. You can either create workflows using CRM out-of-the-box functionalities or write custom workflows with .NET code for implementing complex workflows. Workflow processes run in the background or in real-time and can optionally require a user input.

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Workflows can be triggered based on specific conditions or can even be started manually by the users. Internally, CRM workflows are implemented using Windows Workflow Foundation. In this chapter, we will be learning about configuring workflows.

Configuring a workflow has the following major parts (in sequence) −

➢ Configure the entity on which the workflow will run
➢ Configure whether the workflow will run synchronously or asynchronously
➢ Configure the message (event) on which the workflow will run
➢ Configure the scope in which the workflow will run
➢ Configure the stages and steps (actions) of the workflow

Synchronous/Asynchronous Workflow

When you create a workflow, you will see the option of Run this workflow in the background (recommended) which determines whether the workflow will run in real-time (synchronously) or in background (asynchronously).

Generally, the recommended approach is to run the workflows in the background since they use system resources as and when available. However, you can always switch back from a real-time workflow to background workflow and vice versa.

Workflow Messages

Workflows can be registered on specific events as follows −

➢ When a record is created
➢ When a record status changes
➢ When a record is assigned
➢ When a record field value changes
➢ When a record is deleted

Workflow Scope

Workflows allow you to set the scope in which the workflow will run. Following are the supported workflow scopes −

Table 5: - Workflow

User	Workflow will run only on the records owned by the same user as the workflow user.
Business Unit	Workflow will run on the records owned by the users of the business unit same as the workflow user.
Parent Child Business Units	Workflow will run on the records owned by the users of the business unit same as the workflow user as well as any child business units.
Organization	Workflow will run on records owned by any user in

CRM.

10.4.10. Collateral management

Borrowing funds often requires the designation of collateral on the part of the recipient of the loan.

Collateral is legally watertight, valuable liquid property that is pledged by the recipient as security on the value of the loan.

The main reason of taking collateral is credit risk reduction, especially during the time of the debt defaults, the currency crisis and the failure of major hedge funds. But there are many other motivations why parties take collateral from each other:

➢ Reduction of exposure in order to do more business with each other when credit limits are under pressure.

➢ Possibility to achieve regulatory capital savings by transferring or pledging eligible assets.

➢ Offer of keener pricing of credit risk.

➢ Improved access to market liquidity by collateralization of interbank derivatives exposures.

➢ Access to more exotic businesses.

➢ Possibility of doing risky exotic trades.

Collateral management is the method of granting, verifying, and giving advice on collateral transactions in order to reduce credit risk in unsecured financial transactions. The fundamental idea of collateral management is very simple, that is cash or securities are passed from one counterparty to another as security for a credit exposure. In a swap transaction between parties A and B, party A makes a mark-to-market (MtM) profit whilst party B makes a corresponding MtM loss. Party B then presents some form of collateral to party A to mitigate the credit exposure that arises due to positive MtM. The form of collateral is agreed before initiation of the contract. Collateral agreements are often bilateral. Collateral has to be returned or posted in the opposite direction when exposure decreases. In the case of a positive MtM, an institution calls for collateral and in the case of a negative MtM they have to post collateral.

Collateral management has many different functions. One of these functions is credit enhancement, in which a borrower is able to receive more affordable borrowing rates. Aspects of portfolio risk, risk management, capital adequacy, regulatory compliance and operational risk and asset liability management are also included in many collateral management situations. A balance sheet technique is another commonly utilized facet of collateral management, which is used to maximize bank's resources, ensure asset liability coverage rules are honored, and seek out further capital from lending excess assets. Several sub-categories such as collateral arbitrage, collateral outsourcing, tri-party repurchase agreements, and credit risk assessment are just a few of the functions addressed in collateral management.

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Collateral management operations process

The responsibility of the Collateral Management department is a large and complex task. Daily actions include:

➢ Managing Collateral Movements: to record details of the collateralized relationship in the collateral management system, to monitor customer exposure and collateral received or posted on the agreed mark-to-market, to call for margin as required, to transfer collateral to its counterparty once a valid call has been made, to check collateral to be received for the eligibility, to reuse collateral in accordance with policy guidelines, to deal with disagreements and disputes over exposure calculations and collateral valuations, to reconcile portfolio of transactions.

➢ Custody, Clearing and Settlement.

➢ Valuations: to evaluate all securities and cash positions held and posted as collateral. Valuations may be done on an end-of-day or intraday basis.

➢ Margin Calls: to notify, track, and resolve margin calls.

➢ Substitutions: to deal with requests for collateral substitutions both ways. For example, one party would like to substitute one form of collateral for another.

➢ Processing: to pay over coupons on securities promptly after receipt to collateral providers, to pay over interest on cash collateral and to monitor its receipt.

10.5. ELECTRONIC CUSTOMER RELATIONSHIP MANAGEMENT

Electronic customer relationship management (E-CRM) is the application of Internet-based technologies such as emails, websites, chat rooms, forums and other channels to achieve CRM objectives. It is a well-structured and coordinated process of CRM that automates the processes in marketing, sales and customer service.

An effective E-CRM increases the efficiency of the processes as well as improves the interactions with customers and enables businesses to customize products and services that meet the customers' individual needs.

Electronic customer relationship management provides an avenue for interactions between a business, its customers and its employees through Web-based technologies. The process combines software, hardware, processes and management's commitments geared toward supporting enterprise-wide CRM business strategies.

Electronic customer relationship management is motivated by easy Internet access through various platforms and devices such as laptops, mobile devices, desktop PCs and TV sets. It is not software, however, but rather the utilization of Web-based technologies to interact, understand and ensure customer satisfaction.

10.5.1. Need

E-CRM provides companies with a means to conduct interactive, personalized and relevant communication with customers across both

electronic and traditional channels. It utilizes a complete view of the customer to make decisions about messaging, offers, and channel delivery. It thus synchronizes communication across disjointed customer-facing systems.

E-CRM also focuses on understanding how the economics of customer relationships affect the business. Advocates of E-CRM recognize that a comprehensive understanding of customer activities, personalization, relevance, permission, time lines, and metrics is the means to an end for optimizing the value of the company's most important asset: its customers.

Need to Adopt E-CRM

It is important for companies to adopt CRM as it helps them:

➤ Optimize the value of interactive relationships.
➤ The business to extend its personalized messaging to the Web and email.
➤ The company co-ordinate marketing initiatives across all customer channels.
➤ Leverage customer information for more effective e-marketing and eBusiness.

E-CRM must address customer optimization in the following three dimensions:

➤ Acquisition (increasing number of new customers)
➤ Expansion (increasing profitability by encouraging customers to purchase more products and services)
➤ Retention (increasing the amount of time customers stay as customers).

The need for E-CRM is dictated primarily by the new global, electronic economy, as against the old offline business mode, through which the company earlier reached out to its customers. In the new Net economy, the customer is reaching out to the company in the same way that a business house would have to find ways to service its brick and mortar storefront. In other words, the company has to find a way to face outwards and automate its marketing, sales and service functions, so that it is easy to be able to serve the customer and offer him a high degree of satisfaction. The solution is a highly integrated E-CRM solution that provides a simple view of the customer for the enterprise and conversely, a single view of the enterprise for the customer.

The need for CRM has always been there because there can be no business without customers and customers of value can only be acquired and retained through relationships. But E-CRM has added many new opportunities and challenges to this axiom. The 'e' in E-CRM creates an 'anytime, anywhere, through any medium of communications' paradigm that offers challenge. The next challenge is the increasing realization that E-CRM is a high velocity and real-time process. Hence, it succeeds only when it is part of an overall business process. Supply chain management and other business processes must therefore be integrated seamlessly into the customer-facing process. Thus, E-CRM is part of the comprehensive relationship management strategy of an enterprise.

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10.5.2. Architecture and Applications of Electronic CRM

The following is a set of technical e-CRM capabilities and applications that collectively and ideally comprise a full e-CRM solution. They are,

➢ Customer analytic software.
➢ Data mining software.
➢ Campaign management software
➢ Business simulation software.
➢ Real time decision engine.

Customer analytic software

Customer analytic software predicts, measures, and interprets customer behaviours, allowing companies to understand the effectiveness of e-CRM efforts across both inbound outbound channels. Most importantly, customer analytic should integrate with customer-communications software to enable companies to transform customer findings into ROI-producing initiatives.

Data mining software

Data mining software builds predictive models to identify customers most likely to perform a particular behaviour such as purchase an upgrade or churn from the company. Modeling must be tightly integrated with campaign management software to keep pace with multiple campaigns running daily or weekly.

Campaign management software

Campaign management software leverages the data warehouse to plan and execute multiple, highly targeted campaigns overtime, using triggers that respond timed events and customer behaviour. Campaign management software tests various offers against control groups, capture promotion history for each customer and prospect, and produces output for virtually any on-line or off-line customer touch point channel.

Business simulation

Business simulation used in conjunction with campaign management software optirnises offer; messaging and channel delivery prior to the execution of campaigns, and compares planned costs and ROI projections with actual results. A Real time decision engine co-ordinates and synchronises communications across disparate customer touch point systems. It contains business intelligence to determine and communicate the most appropriate message, offer, and channel delivery in real time, and support two-way dialogue with the customer.

E-CRM architecture would comprise:

➢ Sales force automation.
➢ E mail management system.
➢ Interactive voice response
➢ Knowledge management.
➢ Call centers, and
➢ Instant online querying through chat.

10.6. LET US SUM UP

In this unit, you have learnt about the basics of electronic CRM and its processes, architectural components of a CRM solution and electronic CRM management. This knowledge would make you understand the various CRM areas, CRM processes and marketing automation used to develop the electronic based CRM for real time customer issues. Thus, the e-customer relationship management unit would have brought you to closer to know the concept of customer relationship management.

10.7. UNIT – END QUESTIONS

1. Write short notes on CRM processes.
2. Illustrate the Architecture and Applications of Electronic CRM and its steps.

10.8. ANSWER TO CHECK YOUR PROGRESS

1. The goal of any business is to derive maximum profitability from its customer base. The CRM value chain describes the process that a business must have in place to gain the profitability wanted from customers. Five key steps are necessary for the successful implementation of a CRM strategy, and are commonly referred to as "the five step process for CRM."

➢ Customer portfolio analysis
➢ Customer intimacy
➢ Network development
➢ Value proposition development
➢ Customer life cycle management

2. The following is a set of technical e-CRM capabilities and applications that collectively and ideally comprise a full e-CRM solution. They are,

➢ Customer analytic software.
➢ Data mining software.
➢ Campaign management software
➢ Business simulation software.
➢ Real time decision engine.

Customer analytic software - Customer analytic software predicts, measures, and interprets customer behaviours, allowing companies to understand the effectiveness of e-CRM efforts across both inbound outbound channels.

Data mining software - Data mining software builds predictive models to identify customers most likely to perform a particular behaviour such as purchase an upgrade or churn from the company.

Campaign management software - Campaign management software leverages the data warehouse to plan and execute multiple,

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highly targeted campaigns overtime, using triggers that respond timed events and customer behaviour.

Business simulation - Business simulation used in conjunction with campaign management software optirnises offer; messaging and channel delivery prior to the execution of campaigns, and compares planned costs and ROI projections with actual results.

10.9. SUGGESTED READINGS

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UNIT XI – SUPPLY CHAIN MANAGEMENT

Structure

11.1. Introduction
11.2. Objective
11.3. Supply Chain Management
      11.3.1. Goals of SCM
      11.3.2. Functions of SCM
      11.3.3. Strategies of SCM
      11.3.4. Electronic SCM and its benefits
      11.3.5. Components of Electronic SCM
      11.3.6. Electronic Logistics and its implementation
11.4. Let Us Sum Up.
11.5. Unit – End Exercises.
11.6. Answer to Check Your Progress.
11.7. Suggested Readings.

11.1. INTRODUCTION

In this lesson you will be aware the supply chain management. The SCM is the oversight of materials, information, and finances distributed from supplier to consumer. The supply chain also includes all the necessary stops between the supplier and the consumer. Supply chain management involves coordinating this flow of materials within a company and to the end consumer. We shall study the goals, functions, and strategies of SCM in this lesson.

11.2. OBJECTIVES

After going through this lesson you will be able to
➢ Explain the goals and functions of supply chain management.
➢ Recognize the components of SCM.
➢ Explain the SCM advantages and electronic logistics.

11.3. SUPPLY CHAIN MANAGEMENT

Supply chain management (SCM) is the oversight of materials, information, and finances distributed from supplier to consumer. The supply chain also includes all the necessary stops between the supplier and the consumer. Supply chain management involves coordinating this flow of materials within a company and to the end consumer.

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The Council of Supply Chain Management Professionals defines supply chain management as follows: "Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities". Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.

Supply chain management is an integrating function with primary responsibility for linking major business functions and business processes within and across companies into a cohesive and high-performing business model. It includes all of the logistics management activities noted above, as well as manufacturing operations, and it drives coordination of processes and activities with and across marketing, sales, product design, and finance and information technology.

SCM is also called the art of management of providing the right product, at the right time, right place and at the right cost to the customer. Supply chain management can be divided into three main flows: ,

➢ The **Product** flow includes moving goods from supplier to consumer, as well as dealing with customer service needs. ,

➢ The **Information** flow includes order information and delivery status. ,

➢ The **Financial** flow includes payment schedules, credit terms, and additional arrangements.

Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system-wide costs while satisfying service level requirements.

11.3.1. Goals of SCM

Every firm strives to match supply with demand in a timely fashion with the most efficient use of resources. Here are some of the important goals of supply chain management:

➢ Supply chain partners work collaboratively at different levels to maximize resource productivity, construct standardized processes, remove duplicate efforts and minimize inventory levels.

➢ Minimization of supply chain expenses is very essential, especially when there are economic uncertainties in companies regarding their wish to conserve capital.

➢ Cost efficient and cheap products are necessary, but supply chain managers need to concentrate on value creation for their customers.

➢ Exceeding the customers' expectations on a regular basis is the best way to satisfy them.

➢ Increased expectations of clients for higher product variety, customized goods, off-season availability of inventory and rapid fulfillment at a cost comparable to in-store offerings should be matched.

➢ To meet consumer expectations, merchants need to leverage inventory as a shared resource and utilize the distributed order management

technology to complete orders from the optimal node in the supply chain.

Lastly, supply chain management aims at contributing to the financial success of an enterprise. In addition to all the points highlighted above, it aims at leading enterprises using the supply chain to improve differentiation, increase sales, and penetrate new markets. The objective is to drive competitive benefit and shareholder value.

11.3.2. Functions of SCM

Supply chain management is a cross-function approach including managing the movement of raw materials into an organization, certain aspects of the internal processing of materials into finished goods, and the movement of finished goods out of the organization and toward the end-consumer. As organizations strive to focus on core competencies and becoming more flexible, they reduce their ownership of raw materials sources and distribution channels. These functions are increasingly being outsourced to other entities that can perform the activities better or more cost effectively. The effect is to increase the number of organizations involved in satisfying customer demand, while reducing management control of daily logistics operations. Less control and more supply chain partners led to the creation of supply chain management concepts. The purpose of supply chain management is to improve trust and collaboration among supply chain partners, thus improving inventory visibility and the velocity of inventory movement.

While discussing an eCommerce or online business, we commonly come across the term supply chain management. It is an integral part of an online business and if you are an online entrepreneur you need to have some idea of the whole process. In simple terms, supply chain management or commonly known as SCM deals with the management related to the flow of goods and services at various stages. It may start from the manufacturer to the retailer, and ultimately to the customer. At each level, proper management is required in order to ensure seamless flow of the products.

The main goal of supply chain management involves management of a wide range of components and processes, such as storage of raw materials, managing the inventory, warehousing, and movement of finished from the point of manufacture to the point of consumption. In economic terms, it can be referred to as the design, planning, management, and execution of supply chain activities from the point of production to the point of sale.

Supply Chain Management Functions

On a broader level, supply chain management consists of these four major functions and key element components, such as:

Integration: This forms the crux of the supply chain and is meant to coordinate communications to produce effective and timely results. It can include innovation of new software or advanced technological processes to improve communications.

Operations: This involves management of the day to day operations in the eCommerce business. For example, it may deal with keeping an eye on the inventory or coming up with marketing approaches.

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Purchasing: This deals with the purchasing decisions and management, such as purchasing raw materials, source materials and so on.

Distribution: This deals with the management of logistics across wholesalers, retailers, and customers. This may mean keeping an eye on the shipment, and other details.

In addition to these, there are also some subsidiary functions that an effective supply chain management process fulfills, such as:

➢ Aligning distribution flows
➢ Integrating the functions from manufacture to delivery
➢ Designing complex and advanced systems
➢ Managing an coordinating resources

11.3.3. Strategies of SCM

Supply chain management is a process used by companies to ensure that their supply chain is efficient and cost-effective. A supply chain is the collection of steps that a company takes to transform raw materials into a final product. The five basic strategies of supply chain management are discussed below:

Plan:

The initial stage of the supply chain process is the planning stage. We need to develop a plan or strategy in order to address how the products and services will satisfy the demands and necessities of the customers. In this stage, the planning should mainly focus on designing a strategy that yields maximum profit.

Develop:

After planning, the next step involves developing or sourcing. In this stage, we mainly concentrate on building a strong relationship with suppliers of the raw materials required for production. This involves not only identifying dependable suppliers but also determining different planning methods for shipping, delivery, and payment of the product.

Make:

The third step in the supply chain management process is the manufacturing or making of products that were demanded by the customer. In this stage, the products are designed, produced, tested, packaged, and synchronized for delivery. Here, the task of the supply chain manager is to schedule all the activities required for manufacturing, testing, packaging and preparation for delivery. This stage is considered as the most metric-intensive unit of the supply chain, where firms can gauge the quality levels, production output and worker productivity.

Deliver:

The fourth stage is the delivery stage. Here the products are delivered to the customer at the destined location by the supplier. This stage is basically the logistics phase, where customer orders are accepted and delivery of the goods is planned. The delivery stage is often referred as logistics, where firms collaborate for the receipt of orders from customers, establish a network of warehouses, pick carriers to deliver products to customers and set up an invoicing system to receive payments.

Return:

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The last and final stage of supply chain management is referred as the return. In the stage, defective or damaged goods are returned to the supplier by the customer. Here, the companies need to deal with customer queries and respond to their complaints etc.

11.3.4. Electronic SCM and its benefits

The fundamental challenge for supply chain management is how to efficiently integrate and optimize supply chain operations with dispersed marketplaces and characteristic demands using the latest advances in information technology. eBusiness using Internet technology to facilitate information exchange and communication in business networks has emerged as an innovative approach further exploring value-adding opportunities in supply chains. The e-business approach plans and executes front-end and back-end operations in a supply chain using Web-based applications. Incorporating e-business approach in supply chain management has been proved as a competitive method for increasing values to be added and improving process visibility, agility, speed, efficiency, and customer satisfaction.

"Electronic supply chain management (e-SCM) is the collaborative use of technology to enhance business-to-business processes and improve speed, agility, real-time control, and customer satisfaction. Not about technology change alone, e-SCM is about culture change and changes in management policy, performance metrics, business processes, and organizational structures across the supply chain." A key feature of e-business equipped supply chain management is network centric. This focuses on connectivity, co-operation, co-ordination and information transparency. Networked supply chain partners share information, knowledge and other resources in real time. The networked relationships change the traditional supply chain information flows from linear transmission to end-toend connections, i.e. information can be transferred directly from any partner of the supply chain to another partner without distortion and delay.

The activities of E-SCM include the following:

➢ Supply Chain Replenishment. Supply chain replenishment encompasses the integrated production and distribution processes. Companies can use replenishment information to reduce inventories, eliminate stocking points, and increase the velocity of replenishment by synchronizing supply and demand information across the extended enterprise.

➢ E-Procurement. It is the use of web-based technology to support the key procurement processes, including requisitioning, sourcing, contracting, ordering, and payment. E-procurement supports the purchase of both direct and indirect materials and employs several web-based functions, such as online catalogs, contracts, purchase orders, and shipping notices.

➢ Supply Chain Monitoring and Control Using RFID. This is one of the most promising applications of RFID (Radio-Frequency Identification).

➢ Inventory Management Using Wireless Devices. Many organizations are now achieving improvements in inventory management by using

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combinations of bar-coding technologies (or RFID) and wireless devices.

➢ Collaborative Planning. It is a business practice that combines the business knowledge and forecasts of multiple players along a supply chain to improve the planning and fulfillment of customer demand. Collaborative planning requires buyers and sellers to develop shared demand forecasts and supply plans for how to support demand.

➢ Collaborative Design and Product Development. It involves the use of product design and development techniques across multiple companies to improve product launch success and reduce time to market. During product development, engineering and design drawings can be shared over a secure network among the contracting firm, testing facility, marketing firm, and downstream manufacturing and service companies.

➢ E-Logistics. It is the use of web-based technologies to support the material acquisition, warehousing, and transportation processes. E-logistics enables distribution to couple routing optimization with inventory-tracking information. For example, Internet-based freight auctions enable spot buying of trucking capacity.

When implementing E-SCM can have the following benefits:

▪ It improves efficiency
▪ It reduces inventory
▪ It reduces cost
▪ It helps to take competitive advantage over competitors.
▪ It increases ability to implement just-in-time delivery, increases on-time deliveries, which enhances customer satisfaction.
▪ It reduces cycle time, increases revenue, by providing improved customer service.
▪ It improves order fulfillment, order management, decision making, forecasting, demand planning, and warehouse/distribution activities.
▪ It reduces paperwork, administrative overheads, inventory build-up, and the number of hands that handle goods on their way to the end-user i.e., the customer.

11.3.5. Components of Electronic SCM

Electronic supply chain management (e-SCM) has six significant components. An effective e-SCM policy has a few separate parts that work in congress with each other. The first of these is e-procurement.

E-procurement is any business-to-business, business-to-consumer and business-to-government method to purchase and sell supplies, services and other goods through the internet. Depending on how you must source your product, this can also include information networking.

Business-to-business e-procurement describes the process of your business buying from another business. For example, if you buy widgets that go into your final product from A Corporation, you are engaged in a business-to-business relationship. Using an online supply management system will allow you to order parts more effectively and would be considered an e-procurement system.

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Inventory Replenishment Systems

The next of the six steps in E-SCM are replenishment systems. The idea of replenishment is more commonly understood than various types of e-procurement are. When you are ordering to replenish stock online, you are typically engaging in a replenishment process.

The inventory will explain the movement from upstream (warehouses) to downstream (main store or shipping locations). A successful replenishment system will keep stock flowing through your supply chain and help maintain standard amounts of product.

Supply Chain Collaborative Planning

Collaborative planning is an easy term to understand. The basic concept is planning in collaboration with others, which is essential to successful SCM of all kinds. In e-SCM, the cooperative players in planning sessions should represent every area of your supply chain. That includes people representing the software and hardware you need, sourcing for raw materials (if applicable) and any departments that have a hand in supply.

Collaborative Product Design/Development

Collaborative design is more critical now than it has ever been in the past. Cooperation tells potential customers that your business is friendlier and more comfortable to work with. This business strategy of collaborative product design/development (CPD) is the process of collecting applications that allows multiple organizations the ability to work together during your product's design and developmental stages.

E-Logistics Basics

E-logistics is not much different than traditional logistics, at least on the surface. Your logistics specialists will plan, implement and control the flow of product and storage that will be needed for the business. They will have a complete understanding of the trail that products must travel from their point of origin to the point of consumption (the customer).

Supply Trades and Exchanges

Supply exchanges allow users to trade and exchange supplies. Online, this means that a user can trade items with other users on an individual level. On a business level, it ensures that there will be enough stock and raw materials on hand. If there are not, it will have a suitable replacement for whatever raw materials or stocks are missing. It's another form of resource management that is open to people who may not work together.

11.3.6. Electronic Logistics and its implementation

It is within this context that the concept of 'e-logistics' emerges. The terms electronic logistics, e-logistics, internet-enabled logistics or e-business (e-commerce) logistics have been loosely used in both academia and practice. Some consider e-logistics as a supportive delivery process for fulfilling online e-commerce orders. Others believe that e-logistics implies the use of information and communication technology to support the provision and execution of a broad range of logistics activities.

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E-logistic is the logistical process that governs everything related to the online marketplace. It is a relatively novel concept. It is a dynamic set of communication computing and collaborative technologies that transform key logistical processes to be customer-centric by sharing data, knowledge and information with supply chain partners. It helps in coping with newly arising logistics challenges. The key elements of e-logistics are multi channel operation, cross border functionality, warehouse layout and inventory, planning and forecasting and performance management. Success in e-logistics depends on the focus selected for the online shop. Proper collaboration, transparent communication with customers for delivery and returns are the other key factor that determines the success of e-logistic.

Process involved in e-logistics: -

➢ Method of payment
➢ Check product availability
➢ Arrange shipments
➢ Insurance
➢ Replenishment
➢ Contact with customers
➢ Returns

The difference between logistics and e-logistics are as follows: -

➢ Logistics refers to planning, execution of transport and handling of goods. E-logistics is basically automating the logistic process.

➢ Logistics plans, implements and controls the efficient, effective flow and storage of goods, services, and related information from the point-of-origin to the point-of-consumption in order to meet customers. E-logistics can be defined as the application of Internet based technologies to traditional logistics processes.

The structure of traditional supply chains transforms significantly at the effect of e-logistics. One of the possible effects is *disintermediation* meaning that certain members of the chain are eliminated or disappear altogether; the end user may come in direct contact with the wholesaler or even with the manufacturer. The second group of changes is *re-intermediation* whereby the situation of the existing actors is re-interpreted, and they start playing a centralizing role stronger or weaker than before. A relevant example is if the manufacturer, the retailer or the supplier assumes the role of the wholesaler. The third group of changes is *intermediation* whereby completely new types of mediators may appear called the *cyber mediators*. Cyber mediators may appear at several points of the logistics chain, and interface between certain members. Cyber mediators are all the service providers who contribute to realizing the electronic exchange of products, e.g. transport, or warehousing firms helping the physical movement of goods, e-marketplace providers participating in IT communication, Internet providers, advertising agencies.

11.4. LET US SUM UP

In this unit, you have learnt about the goals, functions, and strategies of supply chain management. This knowledge would make you understand the various goals, functions and components of SCM used to develop the e-commerce for real time needs. Thus, the supply chain management unit would have brought you to closer to know the concept of basics of supply chain management.

11.5. UNIT – END QUESTIONS

1. List out the various goals of SCM.
2. Identify the various components of electronic SCM.
3. State the various functions of SCM.

11.6. ANSWER TO CHECK YOUR PROGRESS

1. Every firm strives to match supply with demand in a timely fashion with the most efficient use of resources. Here are some of the important goals of supply chain management:

➢ Supply chain partners work collaboratively at different levels to maximize resource productivity, construct standardized processes, remove duplicate efforts and minimize inventory levels.

➢ Minimization of supply chain expenses is very essential, especially when there are economic uncertainties in companies regarding their wish to conserve capital.

➢ Cost efficient and cheap products are necessary, but supply chain managers need to concentrate on value creation for their customers.

➢ Exceeding the customers' expectations on a regular basis is the best way to satisfy them.

➢ Increased expectations of clients for higher product variety, customized goods, off-season availability of inventory and rapid fulfillment at a cost comparable to in-store offerings should be matched.

➢ To meet consumer expectations, merchants need to leverage inventory as a shared resource and utilize the distributed order management technology to complete orders from the optimal node in the supply chain.

Lastly, supply chain management aims at contributing to the financial success of an enterprise. In addition to all the points highlighted above, it aims at leading enterprises using the supply chain to improve differentiation, increase sales, and penetrate new markets. The objective is to drive competitive benefit and shareholder value.

2. Supply chain management is a cross-function approach including managing the movement of raw materials into an organization, certain aspects of the internal processing of materials into finished goods, and the movement of finished goods out of the organization and toward the end-consumer.

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Supply Chain Management Functions

      On a broader level, supply chain management consists of these four major functions and key element components, such as:

a. Integration.   b. Operations. c. Purchasing.

  d.   Distribution.

3. Electronic supply chain management (e-SCM) has six significant components. An effective e-SCM policy has a few separate parts that work in congress with each other. The first of these is e-procurement.

      E-procurement is any business-to-business, business-to-consumer and business-to-government method to purchase and sell supplies, services and other goods through the internet. Depending on how you must source your product, this can also include information networking.

      Business-to-business e-procurement describes the process of your business buying from another business. For example, if you buy widgets that go into your final product from A Corporation, you are engaged in a business-to-business relationship. Using an online supply management system will allow you to order parts more effectively and would be considered an e-procurement system.

11.7. SUGGESTED READINGS

1. Selling Online: How to Become a Successful E-commerce Merchant, Jim Carroll, and Rick Broadhead, Dearborn Trade,U.S. 2001.
2. E-Commerce: The Cutting Edge of Business, by K.K. Bajaj, and Debjani Nag, McGraw Hill Education; 2 edition, 2017.
3. E-Business and E-Commerce Management, Dave Chaffey, Financial Times/ Prentice Hall; 3 edition, 2006.
4. E-Commerce, Jeffrey F. Rayport and Bernard J. Jaworski, McGraw-Hill Higher Education; International student ed edition, 2001.

UNIT XII – WIRELESS APPLICATION PROTOCOL

Structure

12.1. INTRODUCTION

As an end in itself, understanding programming language concepts and terms is important to enable you learn more about programming and programming languages after the course is over. Without understanding these concepts and terms, you will have difficulty discussing programming language ideas with others, and will have difficulty in reading the technical literature. Since computer science is rapidly evolving new programming languages and since language issues are important in many areas of computer science the ability to learn more quickly is important to maintaining your technical edge.

12.2. OBJECTIVES

After going through this lesson you will be able to
➢ Define the architecture and working principle of WAP.
➢ Recognize the wireless technologies and generations of wireless communication.
➢ Explain the security issues and dimensions of mobile computing.

12.3. WIRELESS APPLICATION PROTOCOL

WAP stands for Wireless Application Protocol. The dictionary definition of these terms is as follows:

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➢ **Wireless:** Lacking or not requiring wires for radio transmission.
➢ **Application:** A computer program or piece of computer software that is designed to do a specific task.
➢ **Protocol:** A set of technical rules about how information should be transmitted and received using computers.

WAP is the set of rules governing the transmission and reception of data by computer applications on or via wireless devices like mobile phones. WAP allows wireless devices to view specifically designed pages from the Internet using only plain text and very simple black-and-white pictures.

WAP is a standardized technology for cross-platform, distributed computing very similar to the Internet's combination of Hypertext Markup Language (HTML) and Hypertext Transfer Protocol (HTTP), except that it is optimized for:

➢ Low-display capability
➢ Low-memory
➢ Low-bandwidth devices, such as personal digital assistants (PDAs), wireless phones, and pagers.

WAP is designed to scale across a broad range of wireless networks like GSM, IS-95, IS136, and PDC.

12.3.1. Architecture of WAP

The basic WAP architecture is given below. There are three participating entities: the WAP browser, the WAP gateway (also called WAP proxy) and a server on the Internet.
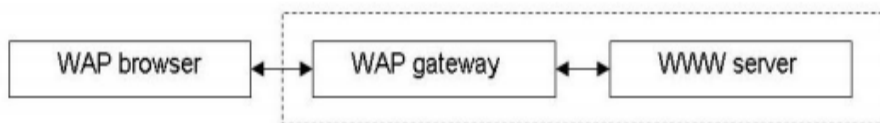
Figure 15: - WAP Architecture

When the mobile device wants to connect to the Internet, all the communication passes through the WAP gateway. This WAP gateway translates all the protocols used in WAP to the protocols used on the Internet. For example, the WAP proxy encodes (and decodes) the content to reduce the size of the data that has been sent over the wireless link. Another example is the WTLS protocol. The communication between the mobile device and the WAP gateway is secured with WTLS. WTLS is only used between the mobile device and the WAP gateway, while SSL/TLS can be used between the gateway and the Internet. This means that the WAP gateway first has to decrypt the encrypted WTLS-traffic and then has to encrypt it again

WAP is designed in a layered fashion, so that it can be extensible, flexible, and scalable. As a result, the WAP protocol stack is divided into five layers −

Layers of WAP Protocol
Application Layer

Wireless Application Environment (WAE). This layer is of most interest to content developers because it contains among other things,

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device specifications, and the content development programming languages, WML, and WMLScript.

Session Layer

Wireless Session Protocol (WSP). Unlike HTTP, WSP has been designed by the WAP Forum to provide fast connection suspension and reconnection.

Transaction Layer

Wireless Transaction Protocol (WTP). The WTP runs on top of a datagram service, such as User Datagram Protocol (UDP) and is part of the standard suite of TCP/IP protocols used to provide a simplified protocol suitable for low bandwidth wireless stations.

Security Layer

Wireless Transport Layer Security (WTLS). WTLS incorporates security features that are based upon the established Transport Layer Security (TLS) protocol standard. It includes data integrity checks, privacy, service denial, and authentication services.

Transport Layer

Wireless Datagram Protocol (WDP). The WDP allows WAP to be bearer-independent by adapting the transport layer of the underlying bearer. The WDP presents a consistent data format to the higher layers of the WAP protocol stack, thereby offering the advantage of bearer independence to application developers.

Each of these layers provides a well-defined interface to the layer above it. This means that the internal workings of any layer are transparent or invisible to the layers above it. The layered architecture allows other applications and services to utilize the features provided by the WAP-stack as well. This makes it possible to use the WAP-stack for services and applications that currently are not specified by WAP.

12.3.2. Working of WAP

When it comes to actual use, WAP works as follows:

➢ The users select an option on their mobile devices, which have a URL with Wireless Markup language (WML) content assigned to it.

➢ The phone sends the URL request via the phone network to a WAP gateway using the binary encoded WAP protocol.

➢ The gateway translates this WAP request into a conventional HTTP request for the specified URL and places it on to the Internet.

➢ The appropriate Web server picks up the HTTP request.

➢ The server processes the request just as it would any other request. If the URL refers to a static WML file, the server delivers it. If a CGI script is requested, it is processed and the content returned as usual.

➢ The Web server adds the HTTP header to the WML content and returns it to the gateway.

➢ The WAP gateway compiles the WML into binary form (as shown in the image given below). The gateway then sends the WML response back to the phone.

➢ The phone receives the WML via the WAP protocol.

➢ The micro-browser processes the WML and displays the content on the screen.
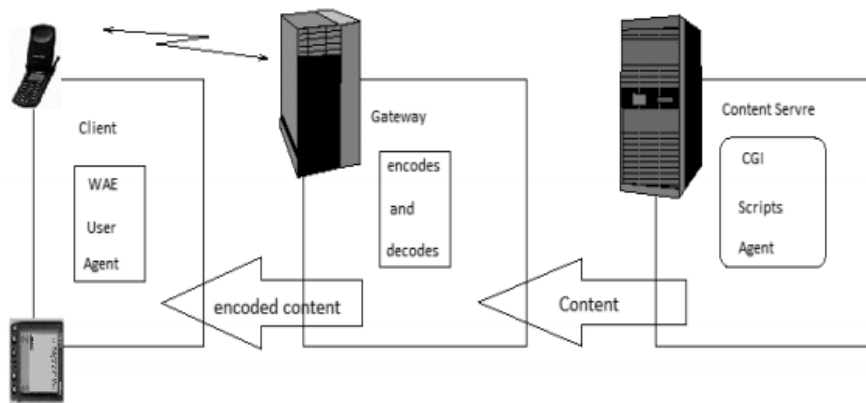
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Figure 16: - WAP Working Procedure

In the current Internet model, the client runs a copy of the Web browser, which uses the underlying Internet protocols to access useful content residing in a server in the network. Such interactions occur through using HTTP request and reply messages. WAP is based on an Internet technology that has been optimized to address the constraints of wireless links and wireless devices. Services created by HTML do not usually fit well on small handheld wireless devices due to their display limitations. In addition, such devices do have limited storage and computing capability, and this implies that excessive or redundant information is not welcome. Hence, WML is used instead HTML. WML pages can be also be encoded in binary format to reduce the amount of data to be transmitted over the wireless interface.

The WAP service model reveals the presence of a WAP proxy, which is responsible for protocol conversion and data formatting. It acts as the interface between the wired and wireless worlds. These two environments have extreme differences, such as available bandwidth, bit error rates, and storage and processing capabilities. When a mobile device requests information via the WAP, it is intercepted and interpreted by the WAP proxy, which then forwards the request via HTTP on behalf of the mobile device to the appropriate HTTP server in the network. When the proxy receives the information in response to its earliest request, the information is stored and converted (formatting) to a suitable form for processing and display on the mobile device using the WAP protocol.

12.3.3. Wireless Technologies

The term wireless refers to the communication or transmission of information over a distance without requiring wires, cables or any other electrical conductors. Wireless communication is one of the important mediums of transmission of data or information to other devices. The Communication is set and the information is transmitted through the air, without requiring any cables, by using electromagnetic waves like radio frequencies, infrared, satellite, etc., in a wireless communication technology network.

In recent days, the wireless communication technology has become an integral part of several types of communication devices as it

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allows users to communicate even from remote areas. The devices used for wireless communication are cordless telephones, mobiles, GPS units, ZigBee technology, wireless computer parts, and satellite television, etc.

Satellite

Satellite communication is one of the wireless technologies, which is widely spread all over the world allowing users to stay connected virtually anywhere on the Earth. The Satellites used in this mode of communication, communicate directly with the orbiting satellites via radio signals. Portable satellite phones and modems have more powerful broadcasting abilities than the cellular devices as they have high range, apart from being more expensive in terms of cost, than their counterparts.

Wireless Networking

Wireless Networking technologies connect multiple computers, systems and devices together without requiring wires or cables: a wireless local area network or WLAN comes under Wi-Fi.

WiMAX

There are wireless broadband systems that offer fast Web surfing without being getting connected through cable or DSL (Example of wireless broadband is WiMAX). Although WiMAX can potentially deliver data rates of more than 30 Megabits per second, yet the providers offer average 0 data rates of 6 Mbps and often deliver less, making the service significantly slower than the hard-wired broadband. The actual cost of the data available using WiMAX widely varies with the distance from the transmitter. WiMAX is also one of the versions of 4G wireless available in phones as Sprint's 4G technologies.

Wi-Fi

Wi-Fi is a form of low-power wireless communication used by many electronic devices such as laptops, systems, smart phones, etc. In a Wi-Fi setup, a wireless router serves as the communication hub. These networks are extremely limited in range due to low power of transmissions allowing users to connect only within close proximity to a router or signal repeater. Wi-Fi is common in home networking applications which provides portability without any need of cables. Wi-Fi networks need to be secured with passwords for security purposes in order not to be accessed by others.

Bluetooth Technology

Bluetooth technology allows you to connect a variety of different electronic devices wirelessly to a system for the transfer and sharing of data and this is the main function of Bluetooth. Cell phones are connected to hands-free earpieces, wireless keyboard, mouse and mike to laptops with the help of Bluetooth as it transmits information from one device to other device. Bluetooth technology has many functions, and it is used most commonly in wireless communications' market.

ZigBee

ZigBee is a wireless communication standard designed to address the unique needs of low-power, low-cost wireless sensor, and control networks. ZigBee can be used almost anywhere, as it is easy to implement and requires little power to operate. Zigbee has been

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developed looking into the needs of the communication of data with a simple structure like the data from the sensors.

12.3.4. Generations in Wireless communications

Wireless communication is the transfer of information over a distance without the use of enhanced electrical conductors or "wires". The distances involved may be short (a few meters as in television remote control) or long (thousands or millions of kilometers for radio communications). When the context is clear, the term is often shortened to "wireless". It encompasses various types of fixed, mobile, and portable two-way radios, cellular telephones, Personal Digital Assistants (PDAs), and wireless networking.

The term is used to describe modern wireless connections such as those in cellular networks and wireless broadband internet, mainly using radio waves. The Mobile wireless industry has started its technology creation, revolution & evolution since early 1970s. In the past few decades, mobile wireless technologies have been classified according to their generation, which largely specifies the type of services and the data transfer speeds of each class of technologies.

0G Wireless technology

0G refers to pre-cell phone mobile telephony technology, such as radio telephones that some had in cars before the advent of cell phones. Mobile radio telephone systems preceded modern cellular mobile telephony technology. Since they were the predecessors of the first generation of cellular telephones, these systems are called 0G (zero generation) systems.

1G: Analog Cellular Networks

The main technological development that distinguished the First Generation mobile phones from the previous generation was the use of multiple cell sites, and the ability to transfer calls from one site to the next as the user travelled between cells during a conversation. The first commercially automated cellular network (the 1G generations) was launched in Japan by NTT in 1979.

In 1984, Bell Labs developed modern commercial cellular technology, which employed multiple, centrally controlled base stations (cell sites), each providing service to a small area (a cell). The cell sites would be set up such that cells partially overlapped. In a cellular system, a signal between a base station (cell site) and a terminal (phone) only need be strong enough to reach between the two, so the same channel can be used simultaneously for separate conversations in different cells. As the system expanded and neared capacity, the ability to reduce transmission power allowed new cells to be added, resulting in more, smaller cells and thus more capacity.

2G: Digital Networks

In the 1990s, the 'second generation' (2G) mobile phone systems emerged, primarily using the GSM standard. These 2G phone systems differed from the previous generation in their use of digital transmission instead of analog transmission, and also by the introduction of advanced and fast phone-to-network signaling. The rise in mobile phone usage as

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a result of 2G was explosive and this era also saw the advent of prepaid mobile phones.

The second generation introduced a new variant to communication, as SMS text messaging became possible, initially on GSM networks and eventually on all digital networks. Soon SMS became the communication method of preference for the youth. Today in many advanced markets the general public prefers sending text messages to placing voice calls.

Some benefits of 2G were Digital signals require consume less battery power, so it helps mobile batteries to last long. Digital coding improves the voice clarity and reduces noise in the line. Digital signals are considered environment friendly. Digital encryption has provided secrecy and safety to the data and voice calls. The use of 2G technology requires strong digital signals to help mobile phones work properly.

"2.5G" using GPRS (General Packet Radio Service) technology is a cellular wireless technology developed in between its predecessor, 2G, and its successor, 3G. GPRS could provide data rates from 56 kbit/s up to 115 kbit/s. It can be used for services such as Wireless Application Protocol (WAP) access, Multimedia Messaging Service (MMS), and for Internet communication services such as email and World Wide Web access.

2.75 – EDGE is an abbreviation for Enhanced Data rates for GSM Evolution. EDGE technology is an extended version of GSM. It allows the clear and fast transmission of data and information up to 384kbit/s speed.

3G: High speed IP data networks

As the use of 2G phones became more widespread and people began to use mobile phones in their daily lives, it became clear that demand for data services (such as access to the internet) was growing. Furthermore, if the experience from fixed broadband services was anything to go by, there would also be a demand for ever greater data speeds. The 2G technology was nowhere near up to the job, so the industry began to work on the next generation of technology known as 3G. The main technological difference that distinguishes 3G technology from 2G technology is the use of packet switching rather than circuit switching for data transmission.

The high connection speeds of 3G technology enabled a transformation in the industry: for the first time, media streaming of radio and even television content to 3G handsets became possible.

In the mid 2000s an evolution of 3G technology begun to be implemented, namely High-Speed Downlink Packet Access (HSDPA). It is an enhanced 3Gmobile telephony communications protocol in the High-Speed Packet Access (HSPA) family, also coined 3.5G, 3G+ or turbo 3G, which allows networks based on Universal Mobile Telecommunications System (UMTS) to have higher data transfer speeds and capacity. Current HSDPA deployments support down-link speeds of 1.8, 3.6, 7.2 and 14.0 Mbit/s. Further speed increases are available with HSPA+, which provides speeds of up to 42 Mbit/s downlink and 84 Mbit/s with Release 9 of the 3GPP standards.

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4G: Growth of mobile broadband

Consequently, the industry began looking to data-optimized 4th-generation technologies, with the promise of speed improvements up to 10-fold over existing 3G technologies. It is basically the extension in the 3G technology with more bandwidth and services offers in the 3G. The expectation for the 4G technology is basically the high quality audio/video streaming over end to end Internet Protocol. The first two commercially available technologies billed as 4G were the WiMAX standard and the LTE standard, first offered in Scandinavia by TeliaSonera.

One of the main ways in which 4G differed technologically from 3G was in its elimination of circuit switching, instead employing an all-IP network. Thus, 4G ushered in a treatment of voice calls just like any other type of streaming audio media, utilizing packet switching over internet, LAN or WAN networks via VoIP.

4G LTE data transfer speed can reach peak download 100 Mbit/s, peak upload 50 Mbit/s, WiMAX offers peak data rates of 128 Mbit/s downlink and 56 Mbit/s uplink.

12.3.5. Security Issues related to Wireless communication

Wireless communication provides a lot of advantages due to increased accessibility. But, at the same time, it is sensible to many security risks. If a message is not encrypted with a strong algorithm or security protocol, one can easily access it since all the communication takes place in air. In wired networks, the physical transmission medium can be secured, but the wireless networks uses air as a transmission medium. This enables easy access to transmitted data. The mobility of the wireless networks also causes problems. The transmission of signal through air and the mobility of users bring the era of wireless network. Thus, issue of privacy and security concern becomes most important with the wireless networks.

Some areas of wireless system security are discussed below:

- **Anonymity:** It is the state of being not identifiable within a set of principles. The information about a particular person or an organization is private and is restricted only to the owner or the person who has rights to access it. Retaining anonymity is of high concern in wireless communication system for various reasons. Wireless system is more sensible to interfering and taping as compared to a wired network. Now a day's user stores a number of information in mobiles that are related to user itself. This leads the user information more widespread and highly available. It is also uncertain that whether the data stored is safe or not.

- **Authentication:** The main objective of authentication scheme is to prevent unauthorized users from accessing to a protected system. The authentication process is necessary for verifying both an entities' identity and authority. Authentication protects the service provider from unauthorized intrusions. By mutual authentication mobile station also authenticates the server. Authentication is important for two reasons first, it prevents a malicious station from pretending to be a base station and then it permits the mobile station to choose the service of a particular base station in the presence of collocated networks.

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- **Availability:** When denial of service (DoS) attack takes place, the availability ensures the survivability of network services. In DoS, all the nodes in the network can be targeted and some selfish nodes make some of the network services unavailable. A DoS attack can be done at any layer of the network.
- **Integrity:** It ensures that a message being transferred will never corrupt. It can be described in the following ways:
- ➢ Malicious altering - In Malicious altering, the attacker alters an account number in a bank transaction.
- ➢ Accidental altering –In Accidental altering, transmission error may occur.

  In Malicious altering, a message could be replayed, removed, or revised by an adversary with malicious attack goals on the network. In Accidental altering, the message is lost or if its content is changed due to some failures, which may be transmission errors in communication.
- **Confidentiality:** Some information is only accessible to the person who owes it. Confidentiality ensures that certain information is never disclosed to unauthorized entities. It must be keep secret from all entities that do not have the validity to access them, in order to maintain the confidentiality of some classified information.

12.3.6. Mobile Computing in Four Dimensions

It is necessary to understand the dimensions of mobile computing and to apply these into design and implementation of the mobile application.

The dimensions of mobility are as follows:

- ➢ **Location Awareness:**
- ➢ The first dimension of the mobile computing is the location. As the mobile devices won't be work in particular location. The location of the mobile device may changes in the every moment of time so the primary design issue is the location management in the development of mobile devices.
- ➢ **Network Connectivity QoS:**
- ➢ The company focuses that our device is easily compatible for any type of network. The QoS is defined as "The collective effort of service performances, which determine the degree of satisfaction of a user of this service". The services can have qualitative and quantitative.
- ➢ **Limited Device Capability:**
- ➢ The importance issue is the storage related issues. The company's concern should be regarding the storage capacity of our device to improve the storage capacity of a mobile.
- ➢ **Limited Power Supply:**
- ➢ The mobile devices are totally based on battery power which provides less power supply.

  The secondary dimension of mobile computing is Platform Proliferation. Which means to design such type of device which would support any platform and any network?

12.3.7. Wireless Millennium

At the start of the new millennium, an exciting perspective is emerging in the field of the wireless channel modeling. In the past, the

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wireless multipath channel was thought to be a harsh, unavoidable consequence of wireless communications.

In recent years, new technology in hardware and channel coding have not just overcome the difficulties of communicating in a multipath channel algorithms such as, space-time coding actually use the unpredictable nature of the multipath channel to enhance the communication link.

Wireless millennium provides the most effective communication methods to user.

12.4. LET US SUM UP

In this unit, you have learnt about the architecture of WAP, working procedure of WAP, wireless technologies and various generations of wireless communication. This knowledge would make you understand the concept of wireless application protocol and security issues used to develop the WAP for real time problems. Thus, the wireless application protocol unit would have brought you to closer to know the concept of WAP and wireless communication.

12.5. UNIT – END QUESTIONS

1. Explain about the architecture of WAP.
2. List out the working principle of WAP.
3. Define the various wireless technologies in detail.

12.6. ANSWER TO CHECK YOUR PROGRESS

1. The basic WAP architecture is given below. There are three participating entities: the WAP browser, the WAP gateway (also called WAP proxy) and a server on the Internet.
   WAP is designed in a layered fashion, so that it can be extensible, flexible, and scalable. As a result, the WAP protocol stack is divided into five layers −
   Layers of WAP Protocol
   a. Application Layer
   b. Session Layer
   c. Transaction Layer
   d. Security Layer
   e. Transport Layer

2. When it comes to actual use, WAP works as follows:
   ➢ The users select an option on their mobile devices, which have a URL with Wireless Markup language (WML) content assigned to it.
   ➢ The phone sends the URL request via the phone network to a WAP gateway using the binary encoded WAP protocol.
   ➢ The gateway translates this WAP request into a conventional HTTP request for the specified URL and places it on to the Internet.
   ➢ The appropriate Web server picks up the HTTP request.

➢ The server processes the request just as it would any other request. If the URL refers to a static WML file, the server delivers it. If a CGI script is requested, it is processed and the content returned as usual.

➢ The Web server adds the HTTP header to the WML content and returns it to the gateway.

➢ The WAP gateway compiles the WML into binary form (as shown in the image given below). The gateway then sends the WML response back to the phone.

➢ The phone receives the WML via the WAP protocol.

➢ The micro-browser processes the WML and displays the content on the screen.

3. The term wireless refers to the communication or transmission of information over a distance without requiring wires, cables or any other electrical conductors. Wireless communication is one of the important mediums of transmission of data or information to other devices. The Communication is set and the information is transmitted through the air, without requiring any cables, by using electromagnetic waves like radio frequencies, infrared, satellite, etc., in a wireless communication technology network.

In recent days, the wireless communication technology has become an integral part of several types of communication devices as it allows users to communicate even from remote areas. The devices used for wireless communication are cordless telephones, mobiles, GPS units, ZigBee technology, wireless computer parts, and satellite television, etc.

a. Satellite
b. Wireless Networking
c. WiMAX
d. Wi-Fi
e. Bluetooth Technology
f. ZigBee
.

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UNIT XIII – KNOWLEDGE MANAGEMENT

Structure

13.1. INTRODUCTION

In this lesson you will be aware with the Knowledge management. It is the process of capturing, developing, sharing, and effectively using organizational knowledge. It refers to a multi-disciplinary approach to achieving organizational objectives by making the best use of knowledge. It consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge. The purpose of this to introduce certain basic concepts and to provide some necessary definitions for the topics that follows in next few lessons.

13.2. OBJECTIVES

After going through this lesson you will be able to
➢ Understand the Knowledgement management and its goals.
➢ Recognize the knowledge management tools and strategies.
➢ Define the knowledge creating process.

13.3. KNOWLEDGE MANAGEMENT

Knowledge management (KM) is the process of capturing, developing, sharing, and effectively using organizational knowledge. It

refers to a multi-disciplinary approach to achieving organizational objectives by making the best use of knowledge.

Knowledge management is essentially about getting the right knowledge to the right person at the right time. This in itself may not seem so complex, but it implies a strong tie to corporate strategy, understanding of where and in what forms knowledge exists, creating processes that span organizational functions, and ensuring that initiatives are accepted and supported by organizational members. Knowledge management may also include new knowledge creation, or it may solely focus on knowledge sharing, storage, and refinement.

13.3.1. Knowledge management and its goals

Knowledge management is the systematic management of an organization's knowledge assets for creating value and meeting tactical & strategic requirements. It consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge. Each enterprise should define knowledge management in terms of its own business objectives. Knowledge management is all about applying knowledge in new, previously overburdened or novel situations.

Knowledge management expresses a deliberate, systematic and synchronized approach to ensure the full utilization of the company's knowledge base, paired with the potential of individual skills, competencies, thoughts, innovations, and ideas to create a more efficient and effective company. In simple words, knowledge management incorporates both holding and storing of the knowledge perspective, with respect to the intellectual assets. It is the deliberate and systematic collaboration of an organization's people, technology, processes, style and structure in order to add value through reuse and innovation.

Implementing knowledge management thus has several dimensions including:

➢ **Strategy:** Knowledge management strategy must be dependent on corporate strategy. The objective is to manage, share, and create relevant knowledge assets that will help meet tactical and strategic requirements.

➢ **Organizational Culture:** The organizational culture influences the way people interact, the context within which knowledge is created, the resistance they will have towards certain changes, and ultimately the way they share.

➢ **Knowledge.** Organizational Processes: The right processes, environments, and systems that enable KM to be implemented in the organization.

➢ **Management & Leadership:** KM requires competent and experienced leadership at all levels. There are a wide variety of KM-related roles that an organization may or may not need to implement, including a CKO, knowledge managers, knowledge brokers and so on.

➢ **Technology:** The systems, tools, and technologies that fit the organization's requirements - properly designed and implemented.

➢ **Politics:** The long-term support to implement and sustain initiatives that involve virtually all organizational functions, which may be costly to

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implement (both from the perspective of time and money), and which often do not have a directly visible return on investment.

Figure 17: - Knowledge Management

The primary goal of KM is to connect to "knowledge nodes" both the knowledge providers and the knowledge seekers. The knowledge of the mind of one provider may thus be ultimately transferred to the mind of someone who seeks that knowledge, so that a new decision can be made or situation handled. KM provides a means of capturing and storing knowledge and brokering it to the appropriate individual.

Here, we identified four business goals that fulfill this primary role:

1. To Capture Knowledge - This goal can be achieved by creating KM repositories. Those will consist of structured documents with Knowledge embedded in them — memos, reports, presentations, and articles — stored in a way that they may be easily retrieved.

2. To Improve Knowledge Access — To facilitate the processes of knowledge transfer between individuals and between organizations.

3. To Enhance the Knowledge Environment — by proactively facilitating and rewarding knowledge creation, transfer and use.

4. To Manage Knowledge as an Asset — some companies are including their intellectual capital in the balance sheet, others are leveraging their knowledge assets to generate new income from or to reduce costs with their patent base.

13.3.2. Collaborative Computing and Knowledge Management

Collaborative Knowledge Management is an approach to enabling organizational intelligence in the enterprise. CKM is based on a software environment where people work on-line; as they do what they

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already need to do for individual and team goals, they continuously contribute to the collective knowledge, which is then made available to everyone. The key idea is to motivate participation in a collective knowledge creation process by supporting online environments for collaborative work, and to harvest the value of collaborative work using high precision search, alerting, and related KM technologies. CKM is now sold as commercial products in several public companies (VIGN, OTEX, IWOV). At Intraspect, Tom invented the basic idea of CKM, designed the Intraspect product, worried about the user experience, and evangelized the idea to investors, analysts, and customers.
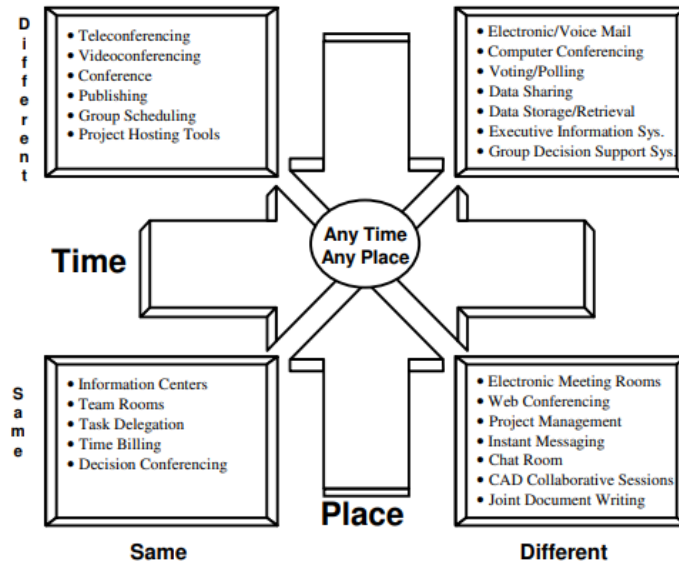
Figure 18: - Collaborative Computing in KM

The term "collaborative computing" refers to products and services that foster collaboration and solve collaboration-oriented business problems. Collaboration can happen synchronously where all participants view information and/or meet at the same time or asynchronously where participants view information and provide feedback at different points in time. There are a variety of tools and technologies to facilitate communication and collaboration ranging from e-mail, group conferencing, task delegation, project management, data sharing, data storage/retrieval and time billing.

Collaborative computing software provides the following capabilities:

➢ Facilitates interactions among and between individuals and work groups.
➢ Enables synchronous communication in real time using chat rooms, videoconferencing, whiteboards, etc.
➢ Enables asynchronous communication in different time using calendaring and scheduling, e-mail, newsgroups, etc.
➢ Facilitates real time teamwork such as brainstorming, project management, and voting/polling between users located in different places.

Collaborative Computing Technology enhances nearly every type of inter and intra organizational communication. It can improve internal communication among different departments, work groups, branches and individuals. External communication contact to customers, vendors,

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suppliers, government agencies and even competitors, can also be greatly improved by the technology.

Following are some of the benefits of Collaborative Computing Technology to consider:

- Increased Efficiency.
- Improved Productivity.
- Reduced Costs.
- Improved Quality.
- Improved Team Relationships.

13.3.3. Knowledge Management Tools

Most of the business content of any organization is unstructured, which includes information in files, messages, memos, reports, and proposals created in different formats and stored at many locations. The vast amounts of information can be collected, filtered and organized and be made available to those who need it in a format in which they need. This is done with the help of knowledge management tools.

Knowledge management tools enable organizations tackle all the problems related to knowledge management more effectively at reduced costs. Also, these tools help to leverage the collective knowledge and experience of an organization to accelerate innovation and sharpen competitive advantage. Knowledge management tools have changed over the years. However, they still address the same basic needs.

Customer relationship systems

These systems help marketing, sales, and customer service teams track prospect and customer information over the course of the customer relationship. By using a CRM, you can track first contact with a prospect to understand how they came to you, and what information they've consumed on your website. You can then track the interactions that your sales team has with them over the course of the buying cycle, and continue to track interactions such as repeated purchases. Storing all of this customer data in a knowledge management tool enables your entire team to understand the context of the customer relationship,

Learning management systems

Many enterprise companies use LMS tools as a way to manage the employee training and education process. Companies can use LMS technology to share online training modules and job-related educational resources that will help their teams optimize processes and improve performance. LMS courses are also frequently used to address compliance issues, ensuring that employees are aware of new regulations that may impact the way they do their jobs.

Knowledge base

An online knowledge base is a searchable directory of content about your products and how they are used. This knowledge management tool might include technical content about how to troubleshoot your software, answers to commonly asked questions, and other information that will provide your customers with a better experience using your software or product.

13.3.4. Features of Knowledge Management Tools

Knowledge management is a set of processes and tools to address this organizational need. There are no standard features for all organizations to develop KM software or an IT (Information Technology) based Knowledge Management tool. The requirements are accessed by keeping an objective and matching to the organizational culture. However accessing all the requirements at the beginning is not always goes well so a developmental process has to be initiated to take care of all the users' feedbacks and act accordingly. So it is always better to have a cross functional team with members from Information Technology department in a KM cell or KM team of the organization. IT features and particularly the design requirements have to be upgraded over a period of time to give a fresh look and feel to the users for a better acceptability.

1. Content Repository
2. Knowledge Search
3. Communication Tool
4. Social Software
5. Knowledge Visualization
6. Decision Support
7. Big Data

13.3.5. Knowledge creating Process

Knowledge creating process is a continuous, self-transcending process. As knowledge is created between individuals or between individuals and the environment, individuals transcend the boundary between self and others.

Knowledge creation is one of the three general processes of KM which include knowledge sharing and knowledge utilization. It emphasizes on the creation of new knowledge in organizations. Knowledge can be created through social interactions between individuals or through the use of knowledge codified and shared through knowledge management systems.

Knowledge serves as the fundamental resource in the innovation process. While the availability of existing knowledge helps to reduce complexity in the innovation process, the creation of new knowledge is important to ensure organizations produce more new innovations. Organizations are able to innovate faster and more successfully through creating and using knowledge rapidly and effectively [5]. Hence, knowledge creation is an important initiative for organizations to deploy if they aim to succeed and sustain growth in the long run through continually innovating new products or services.

There are four types of knowledge creating process.

➢ Socialization.
➢ Externalization.
➢ Combination.
➢ Internalization.

Socialization

This process focuses on tacit to tacit knowledge linking. Tacit knowledge goes beyond the boundary and new knowledge is created by

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using the process of interactions, observing, discussing, analyzing, spending time together or living in same environment. The socialization is also known as converting new knowledge through shared experiences. Organizations gain new knowledge from outside its boundary also like interacting with customers, suppliers and stack holders. This occurs in traditional environments where son learns the technique of wood craft from his father by working with him

Externalization

This process focuses on tacit to explicit knowledge linking. It helps in creating new knowledge as tacit knowledge comes out of its boundary and became collective group knowledge. This process we can say that knowledge is crystallized. The process of externalization is often driven by metaphor analogy and models. Quality circles are formed in manufacturing sectors where workman put their learning and experience they have to improve or solve the process related problems.

Combination

Combination is a process where knowledge transforms from explicit knowledge to explicit knowledge. The finance department collects all financial reports from each departments and publics a consolidated annual financial performance report. Creative use of database to get business report, sorting, adding , categorizing are some examples of combination process.

Internalization

By internalization explicit knowledge is created using tacit knowledge and is shared across the organization. When this tacit knowledge is read or practiced by individuals then it broadens the learning spiral of knowledge creation. Organization tries to innovate or learn when this new knowledge is shared in Socialization process. Organizations provide training programs for its employees at different stages of their working with the company.

The Ways to Enhance Knowledge Creation in Organizations

1. Using the Right KM Strategy to Support Business Strategy.
2. Practicing the Relevant Leadership Behaviours.
3. Cultivating Organizational Learning Culture.

13.3.6. Knowledge Management Strategies for Different Organizations

Knowledge is developed from data, which is primarily processed into information. This information can form knowledge when it becomes an input to a system and when it is confirmed as an applicable, appropriate and functional part of knowledge. Knowledge management is the recognition, optimization and effective handling of intellectual assets to build value, enhance productivity, and achieve and maintain competitive advantage. This comprises of the summarization, combination, dissemination and utilization of knowledge in an organization. Thus the management of knowledge comprises of various tasks and functions. The generation of a knowledge management strategy includes an inspection of a range of interconnected notions and aspects.

Knowledge management is the process of delivering

➢ the right knowledge,

➢ to right people,

➢ at the right time,

➢ with the right composition and

➢ the right degree of abstractness, and the collection of activities to achieve this.

The key elements of the process are:

➢ integrating data, information and experience and

➢ The different levels of the organization.

The phases of the process that identify, develop, distribute and keep up-to-date the strategically significant knowledge of the enterprise are of outstanding importance. This collection of activities cannot be operational, cannot be restricted only to the information needed at the very time but has to ensure the knowledge base for the stable functioning of a company.

The preparation of these actions demands to create knowledge management strategy of the company. As it is a special functional sub-strategy, it can be deduced from innovation and performance strategies. The possible issues orienting the creation of knowledge management strategies are as follows:

➢ The standard or individual character of the product or service

o Codified knowledge has a limited meaning in cases, when the company's products or services are adjusted to customer's individual expectations to a great extent.

➢ The innovative or mature character of the product or service

o Mature products or services provide a great number of opportunities for validating the codification strategy. In these cases know-how level knowledge can be obtained by means of explicit knowledge, which can also lead to developing a technological knowledge transfer business.

➢ Applied controlling system

o It can range from classical linear controlling system through matrix organizations, to project-network systems.

➢ Novelty protection of products or services

o Protection can vary on a scale from open knowledge handling to strong protective systems.

➢ Classification of applied knowledge: the ratio of open and tacit knowledge

o Open knowledge is easy to code and store. Tacit knowledge is attached to a person, therefore storing is difficult and its transfer cannot be automated.

There are ten basic categories of KM strategy: motivate, network, supply, analyze, codify, disseminate, demand, act, invent, and augment.

13.3.7. Knowledge Management Research and Development Organizations

"KM [Knowledge Management] involves blending a company's internal and external information and turning it into actionable knowledge via a technology platform".

For management of knowledge, one must identify the two types of knowledge first:

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➢ Explicit: Knowledge which has been encoded into some media external to a person.

➢ Tacit: Knowledge which is stored within an individual and as such is personal and context specific.

Knowledge Management and R&D: The relationship between KM and R&D management is intrinsically close, because R&D processes can primarily be seen as KM processes, transforming information on technological advancements and market demands into the knowledge needed for new product concepts and process designs.

Knowledge assets in R&D oriented organizations: Knowledge for R&D work exists in various forms and sources as indicated in the table below. The ability to manipulate R&D knowledge highly depends on the type of knowledge source and form. When an organization wishes to incorporate KM, the first step is to implement knowledge audit to identify the sources of R&D knowledge and decide the management priority.

Research Objectives

1. To identify the hurdles and barriers in effective KM in R&D Organizations.

2. To propose a framework for designing KM System (KMS) for R&D Organizations.

3. To study the attitude of top management towards Knowledge Management.

13.4. LET US SUM UP

In this unit, you have learnt about the basics of knowledge management goals, tools, strategies, knowledge creating process and knowledge management research. This knowledge would make you understand the Collaborative Computing and Knowledge Management. Thus, the wireless application and knowledge management unit would have brought you to closer to know the concept of basics of knowledge management.

13.5. UNIT – END QUESTIONS

1. List out the various knowledge management goals.
2. Explain about the categories of Knowledgement management tools.
3. Briefly explain about the knowledge creating process.

13.6. ANSWER TO CHECK YOUR PROGRESS

1. Knowledge management is the systematic management of an organization's knowledge assets for creating value and meeting tactical & strategic requirements. It consists of the initiatives, processes, strategies, and systems that sustain and enhance the storage, assessment, sharing, refinement, and creation of knowledge. Each enterprise should define knowledge management in terms of its own business objectives.

Knowledge management is all about applying knowledge in new, previously overburdened or novel situations.

Knowledge management expresses a deliberate, systematic and synchronized approach to ensure the full utilization of the company's knowledge base, paired with the potential of individual skills, competencies, thoughts, innovations, and ideas to create a more efficient and effective company. In simple words, knowledge management incorporates both holding and storing of the knowledge perspective, with respect to the intellectual assets. It is the deliberate and systematic collaboration of an organization's people, technology, processes, style and structure in order to add value through reuse and innovation.

Implementing knowledge management thus has several dimensions including:

a. Strategy.
b. Organizational Culture.
c. Knowledge.
d. Management & Leadership.
e. Technology.
f. Politics.

2. Most of the business content of any organization is unstructured, which includes information in files, messages, memos, reports, and proposals created in different formats and stored at many locations. The vast amounts of information can be collected, filtered and organized and be made available to those who need it in a format in which they need. This is done with the help of knowledge management tools.

Knowledge management tools enable organizations tackle all the problems related to knowledge management more effectively at reduced costs. Also, these tools help to leverage the collective knowledge and experience of an organization to accelerate innovation and sharpen competitive advantage. Knowledge management tools have changed over the years. However, they still address the same basic needs.

a. Customer relationship systems.
b. Learning management systems.
c. Knowledge base.

3. Knowledge creating process is a continuous, self-transcending process. As knowledge is created between individuals or between individuals and the environment, individuals transcend the boundary between self and others.

Knowledge creation is one of the three general processes of KM which include knowledge sharing and knowledge utilization. It emphasizes on the creation of new knowledge in organizations. Knowledge can be created through social interactions between individuals or through the use of knowledge codified and shared through knowledge management systems.

There are four types of knowledge creating process.

a. Socialization.
b. Externalization.
c. Combination.

d. Internalization.

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UNIT XIV – IMPLEMENTATION OF E-COMMERCE

Structure

14.1. INTRODUCTION

In this lesson you will be aware with the implementing of e-commerce shopping cart gives your business the ability to sell your products online day and night, reach new clients, target your ideal market, establish a strong brand, and build closer relationships with your customers by improving their purchasing experience.

14.2. OBJECTIVES

After going through this lesson you will be able to
➢ Recognize how to implement the e-commerce.
➢ Define the PayPal and made the payments online.
➢ Explain the national electronic fund transfer.

14.3. IMPLEMENTATION OF E-COMMERCE

Implementing an e-commerce shopping cart gives your business the ability to sell your products online day and night, reach new clients, target your ideal market, establish a strong brand, and build closer relationships with your customers by improving their purchasing experience.

Advantages of eCommerce implementation:
➢ Allows you to sell products 365 days a year, 24 hours a day.

- Lowers your costs and raises your sales margins.
- Creates cost-saving efficiencies.
- Creates an automated cycle of repeat business.
- Connects you to new customers previously unavailable to you due to distance and operating hours.
- Collects customer data, demographics, and produces marketing leads.
- Gives your customers control over how and when they'd like to shop.

Successful implementation of any ecommerce business is dependent on implementing or adopting these seven key steps:
- Planning for eCommerce Business
- Technology Selection/Website Audit & Analysis
- Customer Acquisition
- Customer Engagement
- Customer Retention
- Optimizing Key Metrics, and
- Business Analysis & Customer Insights

Each of these steps has a positive and cascading effect on the other steps and hence implementing each of them in the right priority and in a phased manner is of utmost importance.

14.3.1. WWW.EBAY.COM

eBay is an online shopping site that's best known for its auctions and consumer to consumer sales. It's also extremely popular for online merchants to use as a sales channel. eBay's available in many different countries. However, you can search for products available in your local area by entering the zip code.

An e-commerce eBay shop enables sellers to display all their merchandise in one place. They look way more like traditional online stores than in comparison to single eBay listings.

With eBay shops, businesses can communicate their brand better via the web pages they've customized themselves. If you see a red door-style icon, next to a seller's user ID, click on it. This will take you directly to their eBay Shop.

If you want to kickstart an e-commerce business using eBay, an eBay Shop is the best to go about it. Sellers can make the most of eBay's easy-to-use tools to build a storefront just how they want.

Shopify vs. eBay

Selling on Shopify is incredibly different to selling on eBay. They're two distinct businesses models- so if you're new to the world of e-commerce, you'll want to weigh up your options.

1. Accumulating Traffic.

2. Building a Fan Base.

3. Costs.

Any company that facilitates the online transaction between a seller and customer can be called an eCommerce platform. Yes, eBay is an eCommerce platform that even offers multi-vendor functionality as well. The online marketplace has marked it presence worldwide and provides opportunity to the e-merchants to list their product and sell them to a larger customer base. This may be considered as a virtual marketplace

that brings multiple sellers and vendors along with the customers on the same platform.

In other words, marketplaces like eBay do not necessarily sell through their seller panel only. If you own an eCommerce site, then, you can even sell your products on eBay. However, it could be a tedious task to manage your site and marketplace store separately. To overcome the situation, Knowband offers some solutions for easy eBay integration extension for the various CMS platforms like Prestashop eBay integration addon, Magento eBay Integrator, OpenCart eBay Integration plug-in that allows a seamless multi-channel trade. You can choose the modules for the respective platforms.

Here are some of the admin features that you get along with Knowband's eBay integrators:

➢ Easy store integration: The integration between the store and the marketplace is setup just by entering a few details in the back-end.

➢ Profile-based Stock Upload: The inventory of the eCommerce site can be listed on the marketplace in bulk with the help of the profile-based approach.

➢ Category and Attribute Mapping: The module offers one-to-many category mapping option and easy attribute mapping. The admin can map the category of the store with the marketplace via the profiles.

➢ Inventory Management: A user-friendly interface to manage to inventory from a single interface. The incorporated crons allows the admin to keep things up-to-date at a few button clicks.

➢ Promotions: The store admin can create promotions for discount and clearance sale and sync the same with the marketplace by executing cron in the back-end.

➢ Order Management: The bi-directional integration offered by the integrators enables the admin to process the orders from the admin panel itself. It creates the orders in the admin panel of the site as per the orders received from the marketplace.

➢ Error Tracking: Offers a complete error report to the admin. They can easily track the error occurred and manage them with great ease.

14.3.2. B2C Website

The term business-to-consumer (B2C) refers to the process of selling products and services directly between consumers who are the end-users of its products or services. Most companies that sell directly to consumers can be referred to as B2C companies.

B2C became immensely popular during the dotcom boom of the late 1990s when it was mainly used to refer to online retailers who sold products and services to consumers through the Internet.

As a business model, business-to-consumer differs significantly from the business-to-business model, which refers to commerce between two or more businesses.

Understanding Business-to-Consumer

Business-to-consumer (B2C) is among the most popular and widely known of sales models.

B2C traditionally referred to mall shopping, eating out at restaurants, pay-per-view movies, and infomercials. However, the rise of the Internet

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created a whole new B2C business channel in the form of e-commerce or selling of goods and services over the Internet. Any business that relies on B2C sales must maintain good relations with their customers to ensure they return. Unlike business-to-business (B2B), whose marketing campaigns are geared to demonstrate the value of a product or service, companies that rely on B2C must elicit an emotional response to their marketing in their customers.

- Business-to-consumer refers to the process of selling products and services directly between to consumers.
- B2C was mainly used to refer to online retailers who sold products and services to consumers through the Internet.
- Online B2C became a threat to traditional retailers, who profited from adding a markup to the price.

B2C Web Portal is one of the maximum creative tendencies of web communication technology that offers sources and facilities along with communique, eCommerce, forums, information sharing, market platform that help the shoppers to connect to every other.B2C method selling merchandise/offerings from agencies to clients.

Why B2C Portals

➢ Wider Reach.
➢ Encourage and persuade purchasers.
➢ Reduces purchaser acquisition value.
➢ Increase Revenue.

14.3.3. Registration

According to the different registration places, seller accounts are divided into overseas accounts and domestic accounts. eBay has more restrictions on Chinese sellers, and overseas accounts have obvious competitive advantages compared with domestic accounts. If the seller's office is in China, you need to use vpn software to protect the account security when using the overseas account. Otherwise, ebay will detect that the IP used by the seller is different from the registered IP, and will ask the seller to provide the information at the time of registration. In severe cases, it will limit normal sales.

In addition, according to the different registration subjects, the seller account can be divided into ordinary accounts and enterprise merchants. The ordinary accounts are divided into personal accounts and commercial accounts. The difference between personal and commercial accounts is that if you want to sell in ebay European stations such as Germany, the seller account must be a business account, if the registered business account can be applied through the green channel provided by eBay.

You can browse eBay all you want without registering, but before you transact any sort of business on eBay, you must register. The only hard-and-fast rule is that you have to be 18 or older. Don't worry; the Police won't come to your house to card you — they have other ways to discreetly ensure that you're at least 18 years old.

Before you can sign up, you have to be connected to the web, so now's the time to fire up your computer. After you open your Internet browser, you're ready to sign up. In the address box of your browser, navigate to eBay.

Your next stop is the eBay home page. Right there, where you can't miss it, is the Hi! Sign In or Register set of links. Click the word register and let the sign-up process begin.

The first step, registering an eBay trading account.

➢ Open www.ebay.com.hk or www.ebay.cn and click the "Register" button at the top left.

➢ After entering the eBay registration page, set your eBay member account and password.

➢ Fill in the registration information for each column as required by the registration form.

➢ eBay has sent a registration confirmation to your registered email address at this time, click "Please check your email address".

➢ After entering the mailbox, find and open the registration confirmation letter sent to you by eBay, and click the button in the email "Complete the member registration".

The Second Step, Register the paypal Fund Account.

➢ Open www.paypal.com and click the registration button.

➢ It is recommended to register the paypal "advanced account" type for individuals who shop and sell online.

➢ Fill in the registration information as required, and click "I am willing, please create my account" at the bottom of the page.

➢ PayPal certification: dual currency credit or debit card certification.

The Third Step is to Bind your eBay Account to your PayPal Account.

➢ Log in to your eBay account and click on my eBay in the top right corner.

➢ Click on the account - PayPal account - connect to my PayPal account - enter the PayPal account and password.

14.3.4. Time Factor

Electronic commerce or e-commerce refers to a wide range of online business activities for products and services. It also pertains to "any form of business transaction in which the parties interact electronically rather than by physical exchanges or direct physical contact".

E-commerce is usually associated with buying and selling over the Internet, or conducting any transaction involving the transfer of ownership or rights to use goods or services through a computer-mediated network. Though popular, this definition is not comprehensive enough to capture recent developments in this new and revolutionary business phenomenon. A more complete definition is: E-commerce is the use of electronic communications and digital information processing technology in business transactions to create, transform, and redefine relationships for value creation between or among organizations, and between organizations and individuals.

Three primary processes are enhanced in e-business:

➢ **Production processes**, which include procurement, ordering and replenishment of stocks; processing of payments; electronic links with suppliers; and production control processes, among others;

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- ➤ **Customer-focused processes**, which include promotional and marketing efforts, selling over the Internet, processing of customers' purchase orders and payments, and customer support, among others; and
- ➤ **Internal management processes**, which include employee services, training, internal information-sharing, video-conferencing, and recruiting. Electronic applications enhance information flow between production and sales forces to improve sales force productivity. Workgroup communications and electronic publishing of internal business information are likewise made more efficient.

The Time Factor is about incorporating market cycles into your analysis so that you can better time your investment decisions. We teach you how to identify long term trends, but more importantly how you can stay invested with them.

14.3.5. Bidding Process

Many small businesses seek to expand their market by bidding on larger or more long-term projects. Contracts might include governmental Requests for Proposals (RFPs) or companies seeking to be the primary provider of a particular product or service for a large conglomerate deal. When bidding for a contract, follow five basic steps to improve your chances of being awarded the contract.

If your businesses make use of eBay, it's important you understand how to win auctions at the lowest possible price. eBay items sold in the auction format are sold to the highest bidder. There's a lot to consider when embarking on eBay bidding. For example, you may not have to pay your maximum bid, but you could lose out to someone who did place an identical maximum bid earlier than you did. Knowing how the bidding process works will keep you from overspending or from losing a bid unnecessarily.

Entering your Maximum Bid

To place a bid on an item on eBay, click the "Place Bid" item on the auction listing and enter the maximum amount you're prepared to pay. This places you in a binding contract to pay up to this amount for the item. eBay automatically bids the correct amount on your behalf to make you the new highest bidder, up to the maximum figure you specified. If other bidders haven't matched your maximum bid by the end of the bidding period, you may get the item for a lower price.

How eBay Bidding Works

The maximum bid you enter is not shown to other bidders. All they can see is the current highest bid. If the current bid is $12, and you enter $20 as your maximum bid, you will be the new highest bidder at $12.50. If you are subsequently outbid, eBay continues to make new bids on your behalf until your $20 limit is reached. If the original highest bidder also had a maximum bid of $20, once you bid above $12 the price will jump straight to $20 as eBay automatically bids for both you and the other bidder. Therefore the highest bid you see on the item depends on both your maximum bid and the maximum bids of other users.

Making Further Bids

You do not have to enter your maximum bid the first time around. If you want to keep the price low for most of the auction, you

can enter a lower figure with your first bid. To revise your maximum bid, click the "Place Bid" item again. As the price increases, so do the incremental bids, and eBay shows you the minimum bid that must be made. To view items you are currently bidding on, click the "Bids/Offers" link on the My eBay page. Unless you are unable to contact the seller, or the item listing changes significantly, you cannot retract a bid. If you've entered an incorrect maximum bid amount you can modify it, but only if you make the adjustment immediately.

Reserve Prices

Some items have a reserve price set by the seller, and this reserve price is not shown to the bidders during the eBay bidding process. This is the minimum price the seller wants for the item, and if the highest bid does not pass this mark, the item is not sold. If your maximum bid is above the reserve price, eBay automatically raises the highest bid to the reserve price, rather than bidding incrementally as normal.

14.3.6. Growth of eBay

eBay reported earnings for Q1 2019, revealing that it brought in $2.6 billion in net revenue, up 2.4% year-over-year (YoY). During the quarter its marketplace's gross merchandise volume (GMV) totaled nearly $21.6 billion, decreasing 4% YoY and marking the fourth consecutive quarter of GMV growth deceleration for the marketplace.

eBay's marketplace GMV growth going negative indicates that the e-tailer is behind its competitors and the industry overall.

eBay won't be able to compete with the likes of Amazon if its GMV growth is negative and its net revenue growth is lower than that of the US e-commerce industry. E-commerce sales in the US rose 12% YoY in Q4 2018, and while estimates for Q1 2019 haven't been released yet, they will surely be significantly higher than the marketplace's 5% YoY growth in net revenue for the quarter.

eBay will continue to lose share to Amazon, Walmart, Target, and a bevy of other e-tailers that are posting better growth numbers, and eBay may find it even more difficult to turn its performance around if consumers shift more of their spend elsewhere.

While eBay's negative GMV growth is bad for the company, there are reasons to believe it may be able to improve its overall performance going forward.

➢ eBay has posted consistent active buyer growth. The marketplace now boasts 180 million active buyers after growing 4% YoY in Q1 2019 — the fifth consecutive quarter where the metric has grown 4% YoY. CEO Devin Wenig suggested that eBay's number of buyers and its base's growth are good indicators of its future GMV and revenue on the company's earnings call; if that proves correct, the marketplace's GMV may rebound in the near future.

➢ The marketplace still saw its revenue grow despite its negative GMV, which is partially due to Promoted Listings. Its revenue was up 5% YoY, and the growth of Promoted Listings, which sees merchants pay to increase their items' visibility on eBay, helps explain the difference in GMV and revenue, according to Wenig. In Q1, 800,000 merchants promoted more than 200 million listings, earning eBay $65 million, up

almost 110%. If eBay can continue to grow revenue through advertising on its marketplace, its GMV performance may hurt its bottom line less.

14.4. PAYPAL

PayPal has become a widely accepted method of payment both online and off. The idea is simple: Give people the ability to accept payment online quickly and securely without having to use a credit card. Although PayPal has occasionally had trouble with fraud, lawsuits and zealous government regulators, the company now boasts over 277 million active accounts.

PayPal's core business is an online payment service that allows individuals and businesses to transfer funds electronically. Here are some of the things you might use PayPal for:

➢ Send or receive payments for online auctions at eBay and other Websites.
➢ Purchase or sell goods and services.
➢ Make or receive donations.
➢ Exchange cash with someone.

You can send funds to anyone with an e-mail address, whether or not your recipient has a PayPal account. To receive the funds, though, the recipient must have a PayPal account associated with that e-mail address. Basic PayPal accounts are free, and all purchases made in the United States with the service are also free [source: PayPal]. The company charges fees for sellers, international transactions, and sending money with a credit or debit card.

If you have a PayPal account, you can add and withdraw funds in many different ways. You can associate your account with bank accounts or credit cards for more direct transactions, including adding and withdrawing money. Other withdrawal options include using a PayPal debit card to make purchases or get cash from an ATM or requesting a check in the mail.

Benefits of Using PayPal

PayPal is a fast and easy way to buy things online. PayPal is the preferred method of payment on many shopping websites, besides just eBay. PayPal offers these seven benefits:

➢ Flexibility for Sellers: With a PayPal membership, even very small volume sellers can quickly and easily accept payments that originate from buyers' credit or debit cards.
➢ Speed: PayPal transfers between sellers are instant, and transfers from PayPal accounts to bank accounts can take as little as 24 hours.
➢ Affordability: The fee to use PayPal is 30 cents per transaction, plus 3% of the total amount of the transaction.
➢ Safe Buying: Because PayPal offers buyer guarantees and a specific process for disputing transactions, so users always have recourse whether they are a buyer who didn't get what they ordered or a seller who may worry she will be stiffed on payment.
➢ Account Privacy: PayPal is secure. For buyers, this means a level of account protection not offered by brick-and-mortar stores, where

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retailers commonly have buyers' account information in-hand after purchases.

➢ Ease of Record Keeping: PayPal history goes back to the day the account was opened. Users also have the ability to pull reports and users are provided with a 1099 if they have more than 200 transactions and $20,000 in sales.

➢ Acceptance Online: PayPal is now a common method of payment on many shopping websites, as well as websites that take payment for any other reason.

PayPal is a well known and trusted name in payments. When a customer is new to your business and does not fully trust your brand yet, it's a good idea to have a PayPal option at checkout. It decreases friction in the checkout process as well creating a easy and secure way to accept credit and debit cards.

14.5. NEW TREND IN MAKING PAYMENT ONLINE

Payment service providers embrace numerous innovations to keep up with the rising consumer demands. In result, many digital payment trends emerge, redesigning the value chain. Payment services and products are being created, deployed, and used in line with the trends reshaping the payments ecosystem.

As the eCommerce trend shifts from online shopping to mobile shopping, however, the need for better credit card and mobile payment options is rising. Top brands are taking advantage of newer mobile payment methods to make shopping even more pleasant.

1. Mobile commerce

If mobile wallets take off in the way the analysts expect, they could become the biggest shift in the fintech world. This is particularly ripe for retailers. Using mobile wallets, they can enhance transactions and improve the overall shopping experience.

2. Blockchain

Yet another segment we can keep a close watch on is Blockchain. This technology is one of the most promising trends in payments for 2018. With Blockchain included in all types of financial operations, bit coins could be used to pay for any product or service.

The Blockchain is to watch out this year. In 2018, it's all set to make financial reporting much more transparent and secure. That's why the latest trends in payments industry fuel the growth of BTC and other crypto currencies.

3. Voice Commerce

Voice commerce represents one of the top trends in payments. It opens a serious discussion on how businesses should use the voice commerce. Chat bots, in-home, and connected devices are already out there. Thus, voice-enabled commerce is a new major interface. It takes the latest trends in payments to a whole new level.

4. Card-to-cloud transition

Today's world moves toward seamless digital transactions, letting you pay via whatever device you pick up. As trends in payments continue to evolve, so does the consumer technology.

Nowadays, an average customer spends 11 hours online daily, taking the most out of 'instantism' put right at his fingertips. Since technologies always move forward, credit cards are no longer enough for an average user. That's the reason card-to-cloud transition may happen in the nearest future.

14.6. NATIONAL ELECTRONIC FUNDS TRANSFER

National Electronic Fund Transfer (NEFT) is a nation-wide payments system that allows transfer of funds from one bank's account to another. With an increased focus on online banking, NEFT has become one of the most popular ways of transferring funds. Since it can electronically transfer funds from any bank branch to any individual, it has eliminated the need to visit a bank branch for transfer of funds. Let us learn about the how NEFT operates in India and what benefits it offers. Let us find out what is NEFT.

If an individual wishes to transfer a sum of money from his bank account to another person's bank account, he can do so through the process of NEFT, instead of withdrawing money and then paying it in cash or by writing out a cheque. The main benefit offered by NEFT is that it can transfer funds from any account of any branch to any other bank account located at any given place. The only condition is that both the sender and receiver branches should be NEFT-enabled. You can check the list of NEFT-enabled bank branches on RBI's website or just call your bank's customer service to confirm the same. The NEFT system also facilitates one-way cross-border transfer of funds from India to Nepal under the Indo-Nepal Remittance Facility Scheme.

Detailed process of NEFT is as follows:

1. The customer fills an application form providing details of the beneficiary (like name, bank, branch name, IFSC, account type and account number) and the amount to be remitted. The remitter authorizes his/her bank branch to debit his account and remit the specified amount to the beneficiary. This facility is also available through online banking, and some banks also offer the NEFT facility through ATMs.

2. The originating bank branch prepares a message and sends the message to its pooling centre (also called the NEFT Service Centre).

3. The pooling centre forwards the message to the NEFT Clearing Centre (operated by National Clearing Cell, Reserve Bank of India, Mumbai) to be included for the next available batch.

4. The Clearing Centre sorts the funds transfer transactions destination bank-wise and prepares accounting entries to receive funds from the originating banks (debit) and give the funds to the destination banks (credit). Thereafter, bank-wise remittance messages are forwarded to the destination banks through their pooling centre (NEFT Service Centre).

5. The destination banks receive the inward remittance messages from the Clearing Centre and pass on the credit to the beneficiary customers' accounts.

How to Transfer Funds through NEFT

One needs to follow the procedure given below to transfer funds using NEFT-

Step 1- Login to your online banking account using your login ID and password.

Step 2- Go to the NEFT Fund Transfer Section.

Step 3- Add beneficiary by entering his/her name, bank account number and IFSC Code.

Step 4- Once the beneficiary is successfully added, you can initiate a NEFT transfer. Just enter the amount to be remitted and send.

NEFT works on a deferred settlement basis which means the transactions are carried out in batches. There are 23 half-hourly batches starting from 8 am to 7 pm on every working day.

Benefits of using NEFT

In the process of NEFT, you just have to enter the details of the beneficiary for the first time after which you can just select the beneficiary from the list, enter the amount and send. Take a look at some of the benefits of NEFT transactions that could make your daily transactions simpler:

➢ No physical presence of either party is required to conduct a transaction. Also, no physical instrument needs to be transferred at any point of time, between the conducting parties, to conclude the transaction.

➢ No visit to the bank is required, as long as a person holds a valid bank account.

➢ Shortcomings of a physical instrument are easily overcome. This means that NEFT has completely omitted instances of physical damage of any monetary instruments, its theft or forging.

➢ NEFT is simple and efficient. It can be done in under a minute's time and hardly involves any major formality.

➢ Confirmation of a successful transaction can be easily received and viewed through email and SMS notifications.

➢ Internet banking can be initiated and conducted from any place. This means that a person does not need to be present at a particular location to make NEFT transactions.

➢ Real time transactions provide assurance to both the parties.

14.7. LET US SUM UP

In this unit, you have learnt about the implementation of e-commerce. The implementation includes e-commerce website, registration, time factor and bidding process. This knowledge would make you understand the various payment methods like PayPal, new trends of payments online and national fund transfer used to develop the e-commerce for real time problems. Thus, the implementation of e-commerce unit would have brought you to closer to know the concept of e-commerce.

14.8. UNIT – END QUESTIONS

1. List out the new trend in making payment online.
2. Explain about the national electronic fund transfer.

14.9. ANSWER TO CHECK YOUR PROGRESS

1. Payment service providers embrace numerous innovations to keep up with the rising consumer demands. In result, many digital payment trends emerge, redesigning the value chain. Payment services and products are being created, deployed, and used in line with the trends reshaping the payments ecosystem.

   As the eCommerce trend shifts from online shopping to mobile shopping, however, the need for better credit card and mobile payment options is rising. Top brands are taking advantage of newer mobile payment methods to make shopping even more pleasant.
   1. Mobile commerce
   2. Blockchain
   3. Voice Commerce
   4. Card-to-cloud transition
   .
2. National Electronic Fund Transfer (NEFT) is a nation-wide payments system that allows transfer of funds from one bank's account to another. With an increased focus on online banking, NEFT has become one of the most popular ways of transferring funds. Since it can electronically transfer funds from any bank branch to any individual, it has eliminated the need to visit a bank branch for transfer of funds. Let us learn about the how NEFT operates in India and what benefits it offers. Let us find out what is NEFT.

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   - ➢ The originating bank branch prepares a message and sends the message to its pooling centre (also called the NEFT Service Centre).
   - ➢ The pooling centre forwards the message to the NEFT Clearing Centre (operated by National Clearing Cell, Reserve Bank of India, Mumbai) to be included for the next available batch.
   - ➢ The Clearing Centre sorts the funds transfer transactions destination bank-wise and prepares accounting entries to receive funds from the originating banks (debit) and give the funds to the destination banks (credit). Thereafter, bank-wise remittance messages are forwarded to the destination banks through their pooling centre (NEFT Service Centre).
   - ➢ The destination banks receive the inward remittance messages from the Clearing Centre and pass on the credit to the beneficiary customers' accounts.

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