**Unit-1**

E-Commerce or Electronics Commerce is a methodology of modern business, which addresses the need of business organizations, vendors and customers to reduce cost and improve the quality of goods and services while increasing the speed of delivery. E-commerce refers to the paperless exchange of business information using the following ways:

• Electronic Data Exchange (EDI)

 • Electronic Mail (e-mail)

• Electronic Bulletin Boards

 • Electronic Fund Transfer (EFT)

• Other Network-based technologies
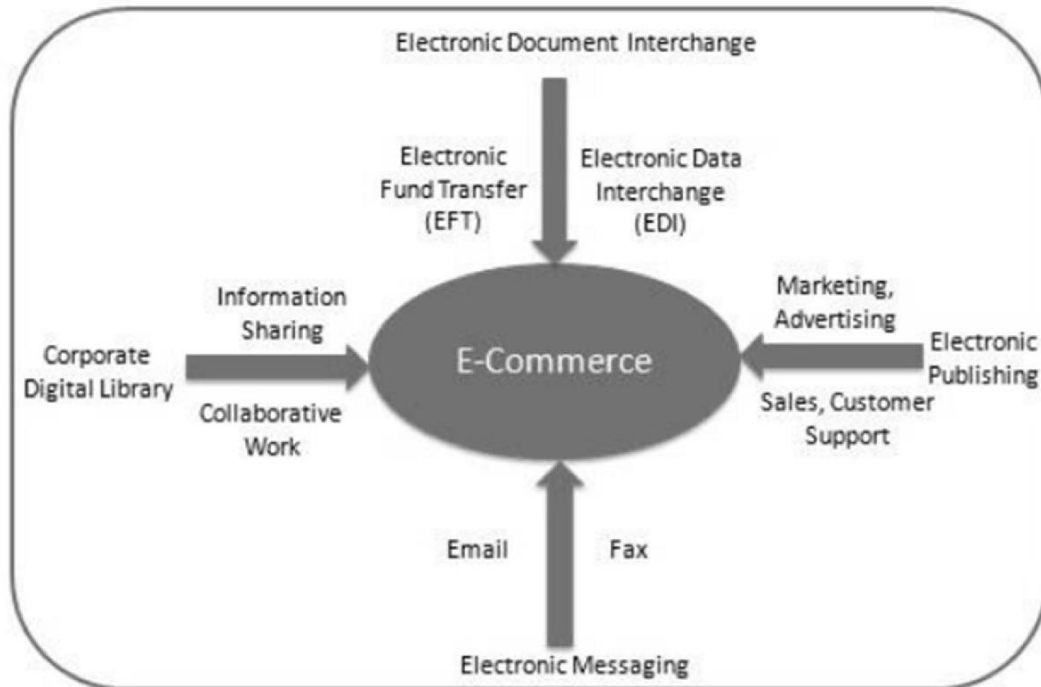
Features

 E-Commerce provides the following features:

 • Non-Cash Payment: E-Commerce enables the use of credit cards, debit cards, smart cards, electronic fund transfer via bank's website, and other modes of electronics payment.

• 24x7 Service availability: E-commerce automates the business of enterprises and the way they provide services to their customers. It is available anytime, anywhere.

• Advertising/Marketing: E-commerce increases the reach of advertising of products and services of businesses. It helps in better marketing management of products/services.

• Improved Sales: Using e-commerce, orders for the products can be generated anytime, anywhere without any human intervention. It gives a big boost to existing sales volumes.

• Support: E-commerce provides various ways to provide pre-sales and post-sales assistance to provide better services to customers.

• Inventory Management: E-commerce automates inventory management. Reports get generated instantly when required. Product inventory management becomes very efficient and easy to maintain.

• Communication improvement: E-commerce provides ways for faster, efficient, reliable communication with customers and partners.

Traditional Commerce v/s E-Commerce

Traditional Commerce	E-Commerce
Heavy dependency on information exchange from person to person.	Information sharing is made easy via electronic communication channels making a little dependency on person to person information exchange.
Communication/transactions are done in synchronous way. Manual intervention is required for each communication or transaction.	Communication or transactions can be done in asynchronous way. The whole process is completely automated.
It is difficult to establish and maintain standard practices in traditional commerce.	A uniform strategy can be easily established and maintained in e-commerce.
Communications of business depends upon individual skills.	In e-commerce, there is no human intervention.
Unavailability of a uniform platform, as traditional commerce depends heavily on personal communication.	E-commerce websites provide the user a platform where all the information is available at one place.

No uniform platform for information sharing, as it depends heavily on personal communication.	E-commerce provides a universal platform to support commercial/business activities across the globe.

E-Commerce ─ Advantages

The advantages of e-commerce can be broadly classified into three major categories:

- Advantages to Organizations

- Advantages to Customers

- Advantages to Society

Advantages 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 organizations to provide better customer service.

• 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.

Advantages to Customers

• It provides 24x7 support. 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 provides substantial discounts to customers.

Advantages 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.

E-Commerce ─ Disadvantages

The disadvantages of e-commerce can be broadly classified into two major categories:

- Technical disadvantages

- Non-technical disadvantages

Technical Disadvantages

- There can be lack of system security, reliability or standards owing to poor implementation of e-commerce.

- The software development industry is still evolving and keeps changing rapidly.

- In many countries, network bandwidth might cause an issue.

- Special types of web servers or other software might be required by the vendor, setting the e-commerce environment apart from network servers.

- Sometimes, it becomes difficult to integrate an e-commerce software or website with existing applications or databases.

- There could be software/hardware compatibility issues, as some e-commerce software may be incompatible with some operating system or any other component.

Non-Technical Disadvantages

- Initial cost: The cost of creating/building an e-commerce application in-house may be very high. There could be delays in launching an e-Commerce application due to mistakes, and lack of experience.

- User resistance: Users may not trust the site being an unknown faceless seller. Such mistrust makes it difficult to convince traditional users to switch from physical stores to online/virtual stores. • Security/ Privacy: It is difficult to ensure the security or privacy on online transactions.

- Lack of touch or feel of products during online shopping is a drawback.

- E-commerce applications are still evolving and changing rapidly.

- Internet access is still not cheaper and is inconvenient to use for many potential customers, for example, those living in remote villages.

Proxy Services :

A proxy service is an intermediary role played by software or a dedicated computer system between an endpoint device and a client which is requesting the service. The proxy service may exist on the same machine or on a separate server. The proxy service enables the client to connect to a different server and provides easy access to services like Web pages, connections or files.

The main purpose of a proxy service is to filter requests to ensure that no dangerous traffic creeps in by applying strict routing rules and to boost the performance of the system. A proxy service works simply – when a proxy service receives a request, for example, to open a Web page, it looks for the already cached pages. If it finds the requested page in the already cached page, it returns it to the user. If the page is not yet cached, proxy service uses its own IP address to fetch the page from the server for the client.

Proxy services are mainly of two types – forward proxy and reverse proxy. Forward proxy is an Internet-facing proxy that is used to retrieve a range of sources. A reverse proxy is particularly used for protection and security of the server. It includes tasks like caching, authentication and decryption.

Other types of proxies include transparent proxies, anonymous proxies, DNS proxies and highly anonymous proxies.

Question and Answer on Unit-1

Q-1 What is E-commerce? Explain advantages and disadvantages of E-Commerce.

Answer- Electronic commerce, better known as E-commerce, refers to the commercial activities—such as on-line shopping and payment transactions—carried out using computers and the Internet.

Advantages and disadvantages of E-Commerce:

E-commerce covers the global information economy, which includes electronic trading goods and services, electronic fund transfer, online procurement, direct marketing and electronic Billing. E-commerce provides the procedures or the ways for generating profits by increasing the number of transactions. Some of the main advantages of E-commerce are as follows:

Increased access:

E-commerce has made it easier for businesses to reach people around the world and run their operation without approaching their suppliers directly. E-commerce businesses provide access to the consumers and the other businesses all over the world

Reduces competitive gap:

E-commerce reduces marketing and advertising expenses. So, smaller companies can also compete on quality, price and availability of goods with the bigger companies.

Reduced sale cycle:

The customers access the product listing and the pricing directly from the Internet without any phone calls and e-mails.

Reduced cost of business:

E-commerce reduces the effort required to do business. It reduces the amount of manpower required, inventory costs, purchasing costs and order processing costs associated with faxing, phone calls and data entry.

Easy business administration:

With the use of efficient software, most of the business-related tasks can be done automatically. Business processes like storing of inventory levels, shipping and receiving logs and other business administration processes are automatically stored.

Better payment system:

With the advancement in payment technologies, E-commerce allows encrypted and secure payment facilities on-line.

Reduced burden on staff:

E-commerce simplifies the customer service and sales support tasks , thus relieving the staff from one of their job responsibilities.

Medium to grow business:

E-commerce serves as a medium for start-up, small- and medium-sized companies to reach the global market.

Network production:

E-commerce allows parceling of the production process to the contractors who are geographically separated but are connected through the Internet. This helps in selling of add-on products, services and new systems.

Disadvantages:

E-commerce has helped customers to find the required product in an easy way. But, there are some difficulties that exist in the use of E-commerce. Some of the most common difficulties are as follows:

1. It is difficult to decide the criteria on which taxes should be charged on the selling of goods over the Internet in case the business and the customer are in different states. It would be unfair to collect taxes from businesses whose products are not marketed over the Internet and to allow businesses selling their products over the Internet not to pay any tax

2. The issue of security is another major area of concern on E-Commerce. The security issues concerning personal and financial information about a customer still exists even with the improvement of data encryption techniques.

3. The cost that is involved in the development and deployment of the E-commerce application is very high.

4. Some protocols are required to develop some specific E-commerce applications that are not standardized around the world. The deployment of such applications over the Internet required that these protocols should be available on the client side.

5. The integration of E-commerce infrastructure with the present organizational Information technology system is difficult. The technologies used in the development of an E-commerce application in an organization may be different from that of the presently existing application used in -the organization.

6. There are no common rules and regulations agreed to by all the parties involved in the development and usage of Web resources and applications.

7. On the business side, higher employee training is required for proper management of the process involved in the transactions.

Q-2 Explain the Architecture of E-Commerce.

Answer - E-commerce is based on the client-server architecture.

A client can be an application, which uses a Graphical User Interface (GUI) that sends request to a server for certain services.

The server is the provider of the services requested by the client.

In E-commerce, a client refers to a customer who requests for certain services and the server refers to the business application through which the services are provided.

The business application that provides services is deployed on a Web' server.

The E - Commerce Web server is a computer program that provides services to "other computer programs and serves requested Hyper Text Mark-up Language (HTML) pages or files.

In client-server architecture, a machine can be both a client as well as a server.

There are two types of client server architecture that E-commerce follows: two-tier and three-tier.

E- Commerce System Architecture: Two-tier architecture:

In two-tier client-server architecture the user interface runs on the client and the database is stored on the server. The business application logic can either run on the client or the server. The user application logic can either run on the client or the server. It allows the client processes to run separately from the server processes on different computers.

The client processes provide an interface for the customer that gather and present the data on the computer of the customer. This part of the application is known as presentation layer. The server processes provide an interface with the data store of the business.

This part of the application is known as data layer. The business logic, which validates data, monitors security and permissions and performs other business rules, can be kept either on the client or the server. The following Figure shows the e commerce system two-tier architecture diagram.
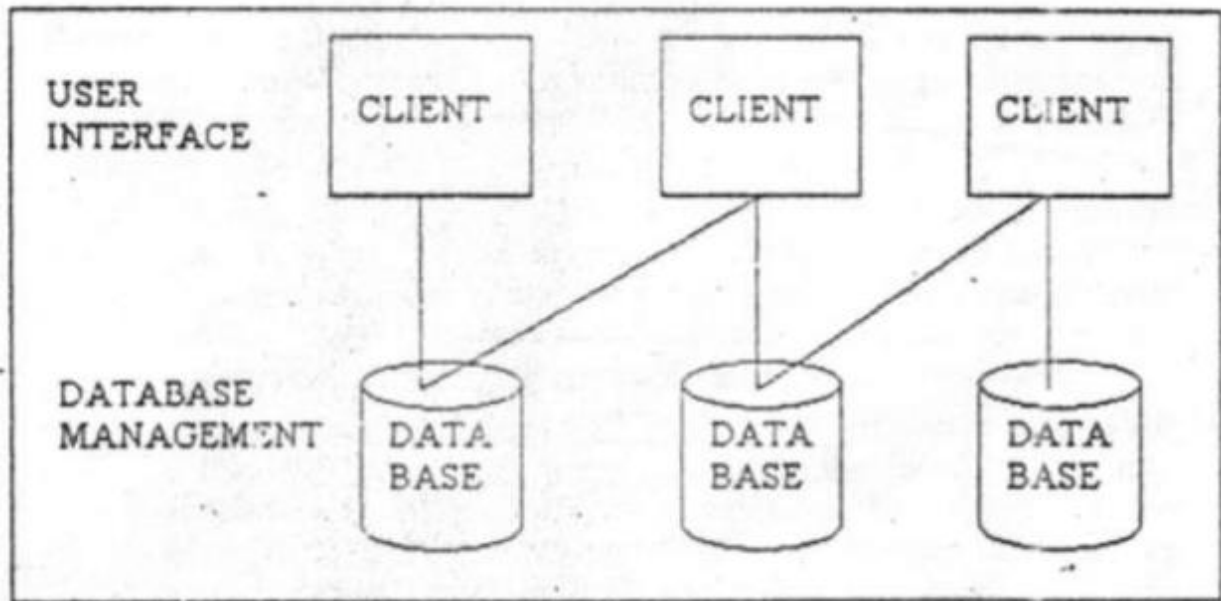
E- Commerce System Architecture: Three-tier architecture:
The three-tier architecture emerged in the 1990s to overcome the limitations of the two-tier architecture. In three-tier architecture, the user interface and the business application logic, also known as business rules and data storage and access, are developed and maintained as independent modules.

The three-tier architecture includes three tiers: top tier, middle tier and third tier.

The top tier includes a user interface where user services such as session, text input, and dialog and display management reside.

The middle tier provides process management services such as process development, process monitoring and process resourcing that are shared by the multiple applications.

The third tier provides database management functionality. The data management component ensures that the data is consistent throughout the distributed environment, the centralized process logic in this architecture, which makes administration easier by localizing the system functionality, is placed on the middle tier.

The following Figure shows the outline of the e commerce system Three - tier architecture diagram.
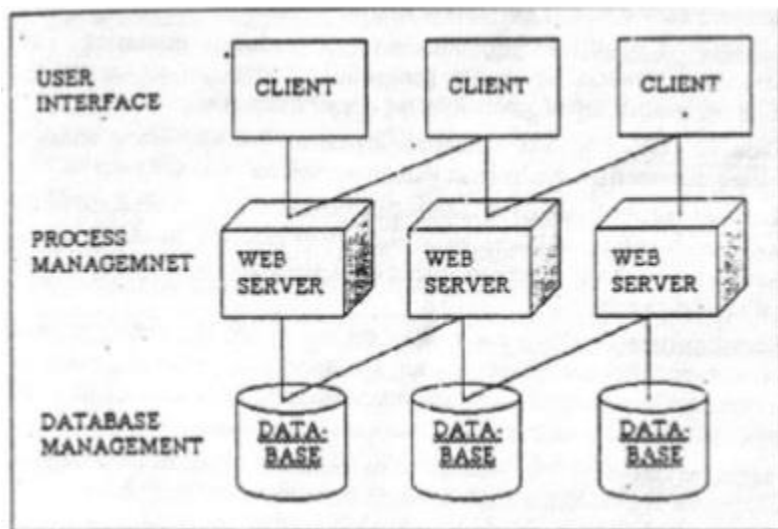
The client server architecture advantages:
The client-server architecture provides standardized, abstract interfaces to establish communication between multiple modules. When these modules are combined, they become an integrated business application. Each module is a shareable and reusable object that can be included in another business application.

In the client-server architecture, the functions of a business application are isolated within the smaller business application objects and so application logic can be modified easily.

In "the client-server architecture, each business application object works with its own encapsulated data structures that correspond to a specific database. When business application objects communicate, they send the data parameters as specified in the abstract interface rather than the entire database records.

This reduces the network traffic. In the client-server architecture, a programmer can develop presentation components without knowing the business application logic.

this architecture also helps a database analyst in accessing the data from the database without being concerned how the data is presented to an end user.

Q-3 Explain the components of E-Commerce.

Answer - 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.
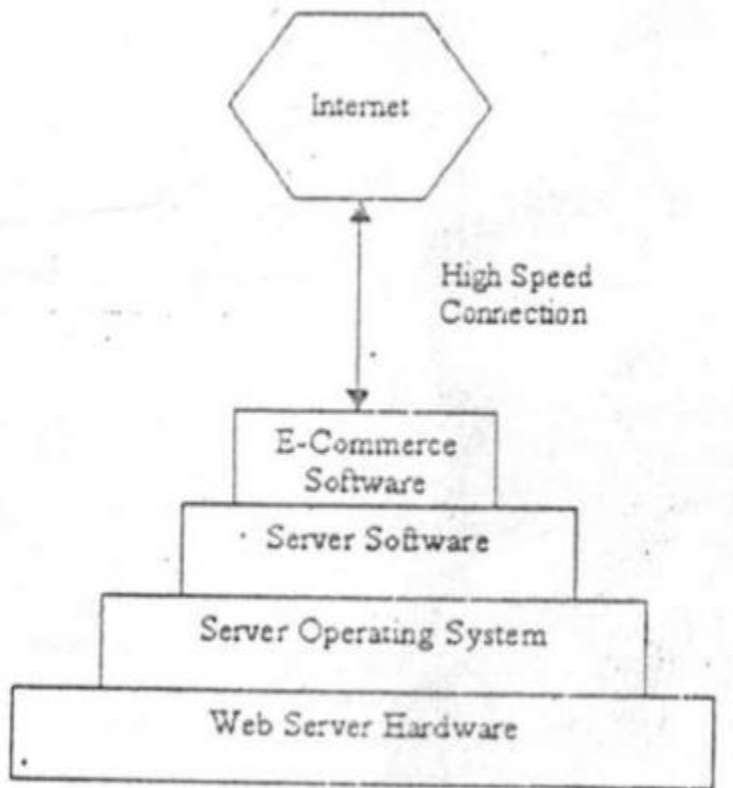
1. Hardware:

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.

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 Softwares

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 softwares:

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.

A 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.

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.

Q-4 What are the different types of issues to be considered in E-commerce?

Answer - Before designing an Internet-based E-commerce application, a developer must consider the various issues that will arise if the problems are not handled on time. Security is a very important aspect of any Web application; therefore, if a developer does not consider points of security, the application might fail to deliver the desired services to its full potential. On the Internet, buyers are always concerned about their social security number and credit card details. Other than E-commerce security, there are some other issues, which are as follows:

1. Security issues

2. General issues

3. Legal issues

Security Issues:

Security on the Internet means protection of unauthorized access of different users using the common E-commerce applications. Extra efforts must be made to develop an application that is designed in such a way that the users can perform only those actions that are allowed to them. The various aspects of security

that must be given special importance are as follows:

• Privacy is the most important feature required by a Web-based ""E-commerce system and is handled by encryption of data. In Public Key Infrastructure (PKI), a message is encrypted by a public key that is widely distributed and decrypted by a private key that is only held by the recipient for the identification of the sender. Banks and governments generally use such procedures to encrypt mails.

• Digital signatures and certificates are used to verify buyers and E-merchants. The certification authority issues some digital documents to E-merchants and Web servers for their unique identification. A hash function is used to generate a value, which is known as message digest and sent to the recipient along with encrypted plain text and public key. The private key of the recipient is used to decrypt the information.

• Secure Socket Layers (SSL) uses the above two methods to ensure privacy and authentication. For this purpose, WWW uses different protocols to transfer the data in the form of packets by different routes. In this procedure, the client sends a message to die server that replies with a digital certificate using different methods such as create session keys for client negotiation and transmission of data for maintaining the security of the data.

• Peripheral Component Interconnect (PCI), Secure Electronic Transaction TSET), firewalls and Kerberos protocols are used to protect the information

from hackers and outsiders. Some credit cards use SET for providing privacy of information to the users of Web-based E-commerce. Firewalls are used to protect the information stored in a Website from viruses and malices. The kerberos protocol is used as a symmetric secret key for the cryptography of information to restrict unauthorized access.

• Transactions are also used to maintain Lie privacy of sensitive information. In transactions, the credit card details of the buyer must be handled with digital certification of the SSL server on the E-merchant end using complex security gateway for the payment process in the bank. After that, the details of the order and the buyer are supplied to the buyer.

General issues

There are some general issues that should be considered for Web-based E-commerce systems. These issues are as follows:

• Inventory control is used to track the quantity of items in the stock and maintain the files of the stock.

• Payment process should be done using special services such as PayPal and 2CheckOut. These services provide the whole information except the payment information to the buyer.

• Shipping cost can also affect WWW/Internet-based E-commerce, so there should be effective policies for delivering goods. If a company can afford the shipping cost of the item, then it must be paid by the company as it helps impress the buyers. If there are no possibilities of paying the shipping cost by the company itself, then the sellers must tell the buyers about the extra amount needed for delivering the item.

Legal issues:

For the Web-based E-commerce system, the legal issues must be considered while taking decisions to handle risks. The legal issues are as follows:

• Trademark is used to identify a corporation or a company. Any word, sentence, symbol or design is used as a trademark. According to common law of business, the "®" symbol indicates a registered mark. Use of this mark as a trademark is illegal. In Web-based E-commerce, a unique domain name must be registered as a trademark or service mark of a company to avoid confusion in the mind of the buyer.

• Copyright is used to protect the content published on Websites. Copyright includes some special rights of the copyright owner such as the exclusive right to modify a copy of the published content , to distribution the contents of the Websites and perform or display the work publicly. A Website owner must give warranty or license with the item or the service to the buyer.

Unit-2

What is EDI? Electronic Data Interchange (EDI) is the computer-to-computer exchange of business documents in a standard electronic format between business partners.

By moving from a paper-based exchange of business document to one that is electronic, businesses enjoy major benefits such as reduced cost, increased processing speed, reduced errors and improved relationships with business partners.

Computer-to-computer– EDI replaces postal mail, fax and email. While email is also an electronic approach, the documents exchanged via email must still be handled by people rather than computers. Having people involved slows down the processing of the documents and also introduces errors. Instead, EDI documents can flow straight through to the appropriate application on the receiver's computer (e.g., the Order Management System) and processing can begin immediately. A typical manual process looks like this, with lots of paper and people involvement:
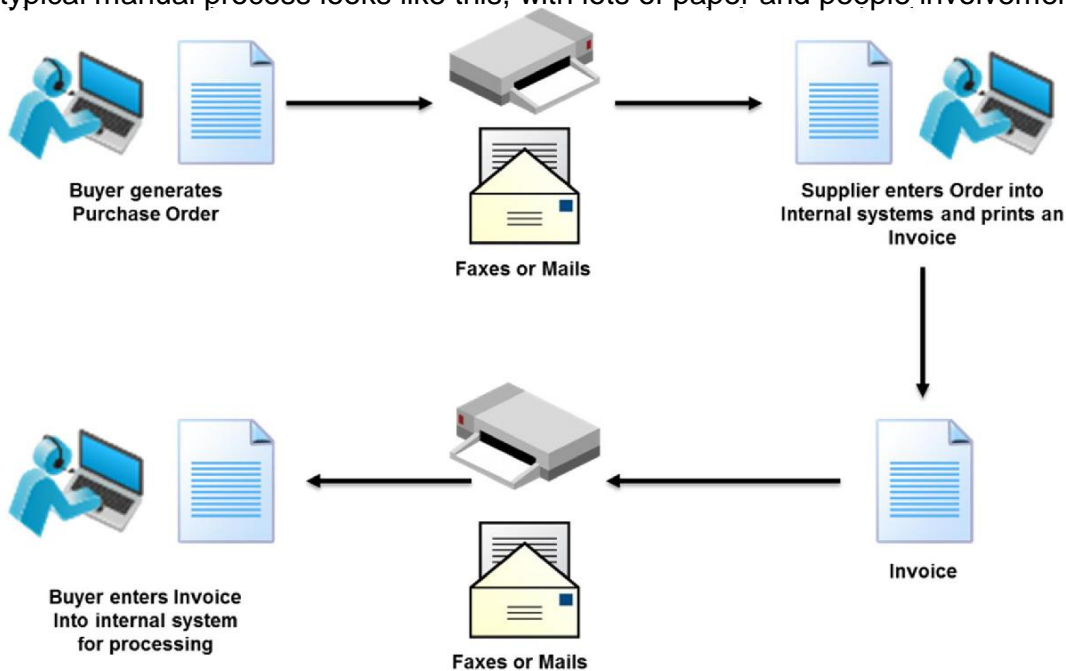
- The EDI process looks like this — no paper, no people involved:
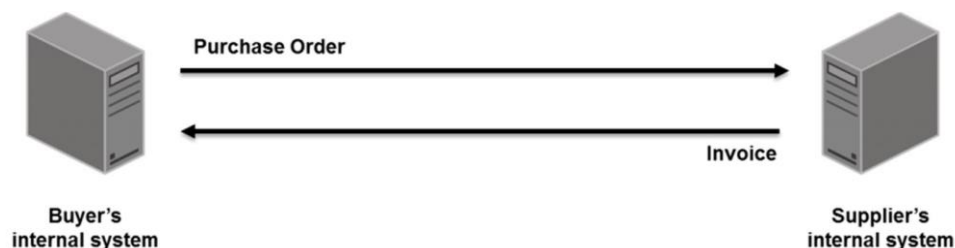
- **Business documents** – These are any of the documents that are typically exchanged between businesses. The most common documents exchanged via EDI are purchase orders, invoices and advance ship notices. But there are many, many others such as bill of lading, customs documents, inventory documents, shipping status documents and payment documents.

- **Standard format**– Because EDI documents must be processed by computers rather than humans, a standard format must be used so that the computer will be able to read and understand the documents. A standard format describes what each piece of information is and in what format (e.g., integer, decimal, mmddyy). Without a standard format, each company would send documents using its company-specific format and, much as an English-speaking person probably doesn't understand Japanese, the receiver's computer system doesn't understand the company-specific format of the sender's format.

  - There are several EDI standards in use today, including ANSI, EDIFACT, TRADACOMS and XML. And, for each standard there are many different versions, e.g., ANSI 5010 or EDIFACT version D12, Release A. When two businesses decide to exchange EDI documents, they must agree on the specific EDI standard and version.
  - Businesses typically use an EDI translator – either as in-house software or via an EDI service provider – to translate the EDI format so the data can be used by their internal applications and thus enable straight through processing of documents.

- **Business partners** – The exchange of EDI documents is typically between two different companies, referred to as business partners or trading partners. For example, Company A may buy goods from Company B. Company A sends orders to Company B. Company A and Company B are business partners.

There are 3 steps to sending EDI documents – Prepare the documents, Translate the documents into EDI format, Transmit the EDI documents to your partner.

Step 1: Prepare the documents to be sent

The first step is to collect and organize the data. For example, instead of printing a purchase order, your system creates an electronic file with the necessary information to build an EDI document. The sources of data and the methods available to generate the electronic documents can include:

- Human data entry via screens
- Exporting PC-based data from spreadsheets or databases
- Reformatted electronic reports into data files
- Enhancing existing applications to automatically create output files that are ready for translation into an EDI standard

- Purchasing application software that has built-in interfaces for EDI files

## Step 2: Translate the documents into EDI format

The next step is to feed your electronic data through translator software to convert your internal data format into the EDI standard format using the appropriate segments and data elements. You can purchase EDI translation software that you manage and maintain on your premises. This requires specialized mapping expertise in order to define how your internal data is to be mapped (i.e. correlated) to the EDI data. Translation software is available to suit just about any computing environment and budget, from large systems that handle thousands of transactions daily to PC-based software that need only process a few hundred transactions per week.

Alternatively, you can use the translation services of an EDI service provider. In that case, you send your data to the provider, who handles translation to and from the EDI format on your behalf.

Step 3: Connect and Transmit your EDI documents to your business partner

Once your business documents are translated to the appropriate EDI format they are ready to be transmitted to your business partner. You must decide how you will connect to each of your partners to perform that transmission. There are several ways, the most common of which include

1) to connect directly using AS2 or another secure internet protocol,

2) connect to an EDI Network provider (to as a VAN (Value Added Network provider) using your preferred communications protocol and rely on the network provider to connect to your business partners using whatever communications protocol your partners prefer, or

3) a combination of both, depending on the particular partner and the volume of transactions you expect to exchange. To learn more about the various options,
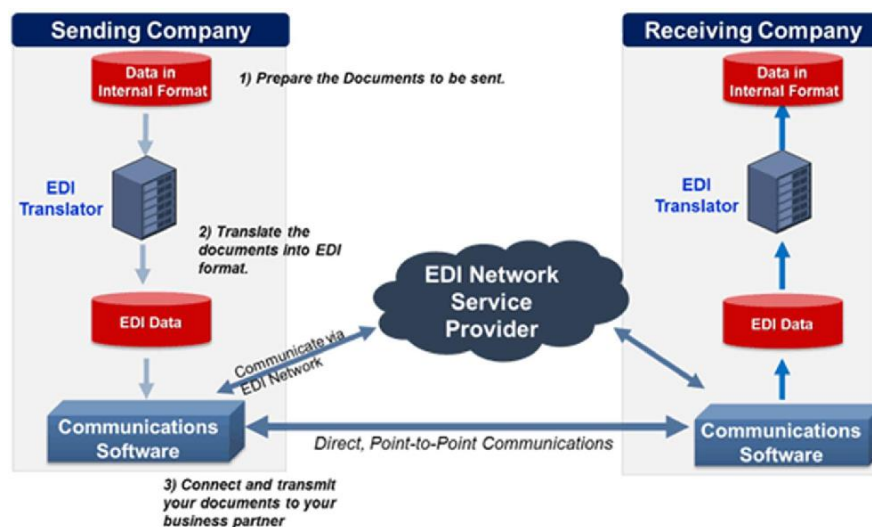
What Comprises an EDI Document?

An EDI document is comprised of data elements, segments and envelopes that are formatted according to the rules of a particular EDI standard.

When you create an EDI document, such as a purchase order, you must adhere to the strict formatting rules of the standard you are using. These rules define exactly where and how each piece of information in the document will be found. That way, when the EDI translator on the receiving computer reads an incoming EDI purchase order, it will immediately understand where to find the buyer's company name, the purchase order number, the items being ordered, the price for each item, etc. Then, that data will be fed into the receiver's order entry system in the proper internal format without requiring any manual order entry.

The graphic below shows a sample purchase order in printed form and how it would look once it's translated into the ANSI and EDIFACT EDI formats.

```
ST*850*540001
BEG*00*SA*4768*65*20120930
N1*SO*XYZ Company
N3*123 Main Street
N4*Fairview*CA*94168
PO1*1*100*EA*27.65**VN*331896-42
CTT*1*100
SE*8*54001
```

ANSI EDI Purchase Order

Paper Purchase Order

Purchase Order

XYZ Company	PO Number:	4768
123 Main Street		
Fairview, CA 94168	PO Date:	9/30/2012

Item No.	Quantity	Unit of Measure	Price	Product ID
1	100	EA	27.65	331896-42

| Total Items: 1 | Total Quality: | 100 |

```
UNH+SSDD1+ORDERS:D:03B:UN:EAN008'
BGM+220+4768+9'
DTM+137:20120930:102'
NAD+BY+5412345000176::9++XYZ
Company+123 Main
Street+Fairview+CA+94168+US'
LIN+1+1+331896-42:VN'
QTY+1:100:EA'
PRI+AAA:27.65'
UNS+S'
CNT+2:1'
UNT+10+SSDD1'
```

EDIFACT EDI Purchase Order

In the EDI language, a single business document, such as a purchase order, invoice or advance ship notice, is called a "transaction set" or "message." And, a transaction set is comprised of data elements, segments and envelopes.

What is a Data Elements ?

The data elements in an EDI Transaction Set are the individual items of information within the document.

For example, within many documents, such as the purchase order and invoice, you will find data elements such as city, state, country, item number, quantity and price.

Each data element in a transaction set is defined in the EDI Standard by the type of data it represents. For example, it would be important to distinguish numeric data from text data or calendar dates. The data element definition will describe:

- Data type of numeric, alphanumeric, date or time
- Minimum and maximum length
- Code values, if applicable, that must be observed with a particular type of data. For example, if the data element is unit cost, you would use a currency code element as well to allow you to indicate what currency (e.g., US dollars or euros) is being used in the unit cost field.

Elements are combined into segments.

What is a Segment ?

A segment in an EDI transaction set is a group of like data elements.

If you were filling out information on a purchase order, you would expect to see groups of related data. For example, look at the diagram below of a paper purchase order in which only one item is being ordered. Note that there are four sections, each providing a different set of information:
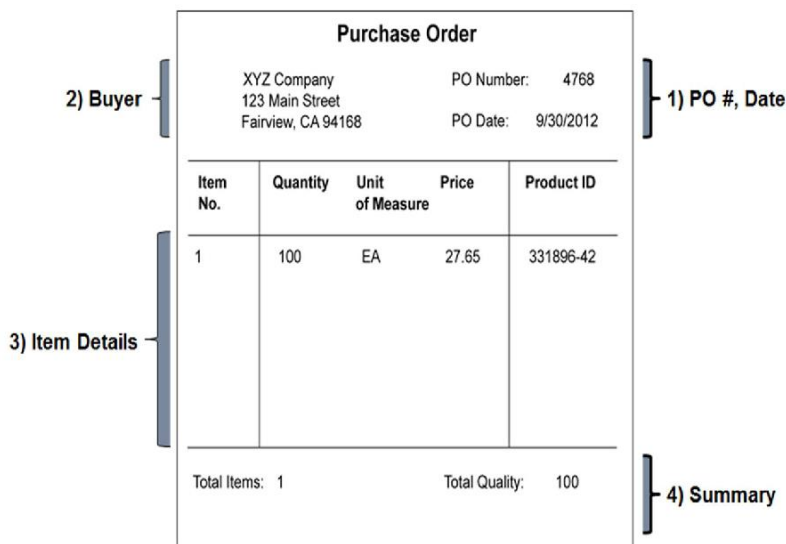
In an EDI document, each section is described by a particular segment. Below is the set of EDI segments that would describe the purchase order above when using the ANSI standard. Each segment begins with a segment ID (e.g., ST, BEG, N1) that

describes the type of data elements that follows. The elements within each segment are separated by a data element separator, in this case the '*'.

ST*850*1001	ST, to indicate start of a transaction set – in this case the 850 purchase order	
BEG*00*SA*4768*65*20120930	BEG, to indicate the beginning of the PO, specifically	(1)
N1*SO*XYZ Company	N1, a name segment	(2)
N3*123 Main Street	N3, to provide street address	
N4*Fairview*CA*94168	N4, to provide city/state/zip	
PO1*1*100*EA*27.65VN*331896-42**	PO1, to provide line item detail	(3)
CTT*1*100	CTT, to provide summary data for the PO	(4)
SE*8*1001	SE, to indicate the end of the PO	

For each type of business document, the EDI standard documentation defines:

- The segments that may be included and which ones are mandatory, optional and/or conditional (i.e. must be included only if another segment or element is included)
- For each segment, the elements that may be included – for every piece of information in a paper document there is a corresponding EDI element. These elements are defined in the standards dictionary and each standard has its own dictionary
- The required sequence of the segments and elements
- How many times a segment may be repeated

Now, once all the segments are collected into a prescribed sequence, they form a complete electronic document, or transaction set. Next, the transaction sets must be put into envelopes in preparation for transmission to your partners

What is EDI Envelopes ?

EDI document transmission uses a system of three "envelopes" to house your transaction sets – Message envelope, Group envelope and Interchange envelope.

Just as paper business documents are sent in envelopes and it's possible to mail many documents in a single envelope, EDI documents are exchanged using several envelopes.

- Each transaction set is placed in its individual envelope
- A group of transaction sets – e.g., a group of purchase orders – is placed in a group envelope. (The group envelope is mandatory in ANSI and optional in EDIFACT.)
- All group envelopes being sent from one sender to one receiver are placed in an Interchange envelope
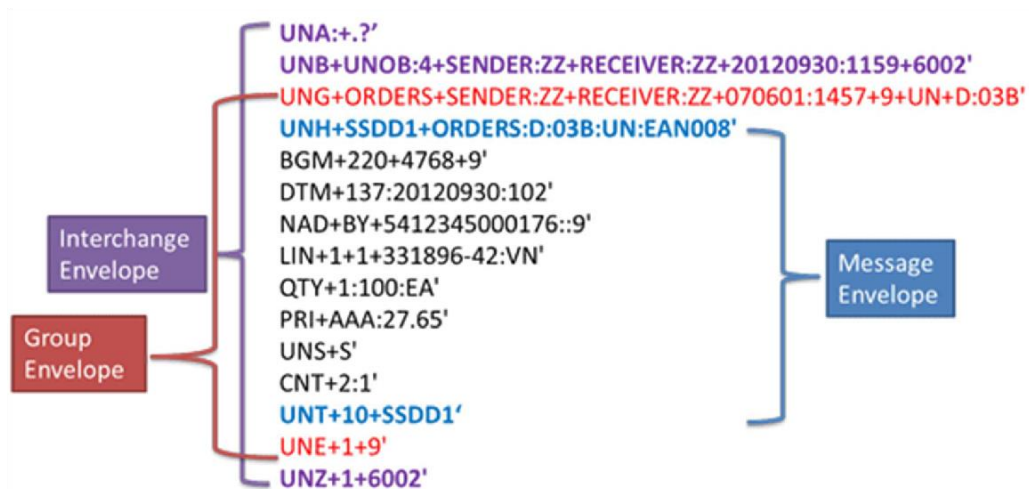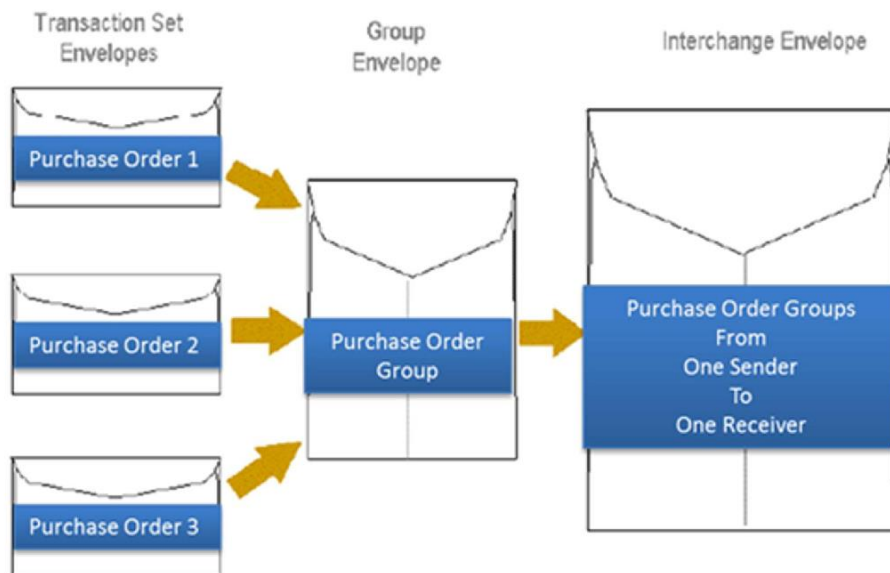
An envelope is formed by a pair of segments that define the beginning and end of the appropriate section. Using the EDIFACT standard as the example, the Transaction Set Envelope uses the UNH and UNT segments, the Group Envelope uses the UNG and UNE segments and the Interchange Envelope uses the UNA/UNB and UNZ segments. In each case, the "S" indicates the "start" of the envelope and the "E" indicates the "end" of the envelope. The diagram below illustrates the three levels of envelopes that would surround a single EDI purchase order.

Paper-based vs EDI Transaction Process

A common business process is the exchange of purchase orders and invoices. So, let's compare how this is done using paper or EDI.

In the paper-based method, the following process typically occurs:

- The inventory system automatically notifies the buyer to place an order, or, after querying the inventory system, the buyer determines that an order needs to be created.
- The buyer enters data onto the screen of a purchasing system to create the PO, prints and mails it.
- After several days, the vendor receives the PO and manually enters it into the sales order system.
- The vendor prints an invoice and encloses it with the shipment and/or sends it separately by mail.
- The buyer manually enters the invoice into the Accounts Payable system.

The exchange of paper documents can add a week to the process. If there are errors caused by manual data entry, the time can be greatly increased.

Now compare that with the EDI process:

- The buyer's procurement system, which utilizes EDI software, automatically generates and sends an EDI-formatted PO when inventory reaches the critical level

- Within minutes the vendor's sales order system, utilizing EDI software, receives the EDI PO, notifies the shipping department to ship the goods and generates an EDI invoice to be transmitted directly to the buyer's accounts payable system

Benefits of EDI

EDI continues to prove its major business value by lowering costs, improving speed, accuracy and business efficiency. The greatest EDI benefits often come at the *strategic* business level.

According to a recent research study from Forrester, EDI continues to prove its worth as an electronic message data format. This research states that "the annual volume of global EDI transactions exceeds 20 billion per year and is still growing."[1] For buyers that handle numerous transactions, using EDI can result in millions of dollars of annual savings due to early payment discounts. From a financial perspective alone, there are impressive benefits from implementing EDI. Exchanging documents electronically improves transaction speed and visibility while decreasing the amount of money you spend on manual processes. But cost savings is far from the only benefit of using EDI.

But let's start with *cost savings* anyway:
- Expenses associated with paper, printing, reproduction, storage, filing, postage and document retrieval are all reduced or eliminated when you switch to EDI transactions, lowering your transaction costs by at least 35%
- A major electronics manufacturer calculates the cost of processing an order manually at $38 compared to just $1.35 for an order processed using EDI
- Errors due to illegible faxes, lost orders or incorrectly taken phone orders are eliminated, saving your staff valuable time from handling data disputes

The major benefits of EDI are often stated as *speed and accuracy*:
- EDI can speed up your business cycles by 61%. Exchange transactions in minutes instead of the days or weeks of wait time from the postal service
- Improves data quality, delivering at least a 30—40% reduction in transactions with errors—eliminating errors from illegible handwriting, lost faxes/mail and keying and re-keying errors
- Using EDI can reduce the order-to-cash cycle time by more than 20%, improving business partner transactions and relationships

However, the increase in business *efficiency* is also a major factor:
- Automating paper-based tasks allows your staff to concentrate on higher-value tasks and provides them with the tools to be more productive
- Quick processing of accurate business documents leads to less re-working of orders, fewer stock outs and fewer cancelled orders
- Automating the exchange of data between applications across a supply chain can ensure that business-critical data is sent on time and can be tracked in real time. Sellers benefit from improved cash flow and reduced order-to-cash cycles
- Shortening the order processing and delivery times means that organizations can reduce their inventory levels

In many cases, the greatest EDI benefits come at the *strategic* business level:
- Enables real-time visibility into transaction status. This in turn enables faster decision-making and improved responsiveness to changing customer and market demands, and allows businesses to adopt a demand-driven business model rather than a supply-driven one

- Shortens the lead times for product enhancements and new product delivery
- Streamlines your ability to enter new territories and markets. EDI provides a common business language that facilitates business partner on-boarding anywhere in the world

- Promotes corporate social responsibility and sustainability by replacing paper-based processes with electronic alternatives. This will both save you money and reduce your emissions.

Unit-3

E-commerce business models can generally be categorized into the following categories.

- Business - to - Business (B2B)
- Business - to - Consumer (B2C)
- Consumer - to - Consumer (C2C)
- Consumer - to - Business (C2B)
- Business - to - Government (B2G)
- Government - to - Business (G2B)
- Government - to - Citizen (G2C)

Business - to - Business

- A website following the B2B business model sells its products to an intermediate buyer who then sells the product to the final customer. As an example, a wholesaler places an order from a company's website and after receiving the consignment, sells the endproduct to the final customer who comes to buy the product at one of its retail outlets.
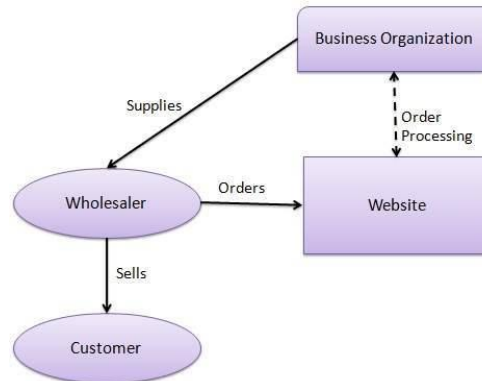
- **Following are the leading items in B2B eCommerce.**

  · Electronics
  · Shipping and Warehousing
  · Motor Vehicles
  · Petrochemicals
  · Paper
 · Office products
  · Food
  · Agriculture

- **Key Technologies**

- **Following are the key technologies used in B2B e-commerce −**
- **Electronic Data Interchange (EDI)** − EDI is an inter-organizational exchange of business documents in a structured and machine processable format.
- **Internet** − Internet represents the World Wide Web or the network of networks connecting computers across the world.

- Intranet − Intranet represents a dedicated network of computers within a single organization.
- **Extranet** − Extranet represents a network where the outside business partners, suppliers, or customers can have a limited access to a portion of enterprise intranet/network.
- **Back-End Information System Integration** − Back-end information systems are database management systems used to manage the business data.
- Architectural Models
-
- **Following are the architectural models in B2B e-commerce** −
-
- **Supplier Oriented marketplace** − In this type of model, a common marketplace provided by supplier is used by both individual customers as well as business users. A supplier offers an e-stores for sales promotion.
-
- **Buyer Oriented marketplace** − In this type of model, buyer has his/her own market place or e-market. He invites suppliers to bid on product's catalog. A Buyer company opens a bidding site.
-
- **Intermediary Oriented marketplace** − In this type of model, an intermediary company runs a market place where business buyers and sellers can transact with each other.
-
- **Architectural Models**
-
- **Following are the architectural models in B2B e-commerce** −
-
- **Supplier Oriented marketplace** − In this type of model, a common marketplace provided by supplier is used by both individual customers as well as business users. A supplier offers an e-stores for sales promotion.
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- **Intermediary Oriented marketplace** − In this type of model, an intermediary company runs a market place where business buyers and sellers can transact with each other.

Business - to – Consumer

A website following the B2C business model sells its products directly to a customer. A customer can view the products shown on the website. The customer can choose a product and order the same. The website will then send a notification to the business organization via email and the organization will dispatch the product/goods to the customer.
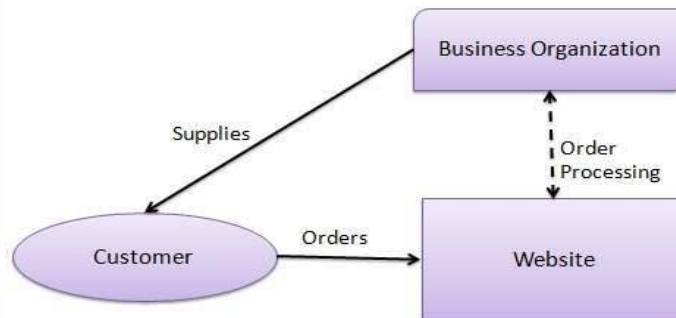
Following are the key features of the B2C model −

- Heavy advertising required to attract customers.
- High investments in terms of hardware/software.
- Support or good customer care service.

Consumer Shopping Procedure

Following are the steps used in B2C e-commerce −

A consumer −

- determines the requirement.
- searches available items on the website meeting the requirment.
- compares similar items for price, delivery date or any other terms.
- places the order.
- pays the bill.
- receives the delivered item and review/inspect them.
- consults the vendor to get after service support or returns the product if not satisfied with the delivered product.

Disintermediation and Re-intermediation

In traditional commerce, there are intermediating agents like wholesalers, distributors, and retailers between the manufacturer and the consumer. In B2C websites, a manufacturer can sell its products

directly to potential consumers. This process of removal of business layers responsible for intermediary functions is called **disintermediation**.
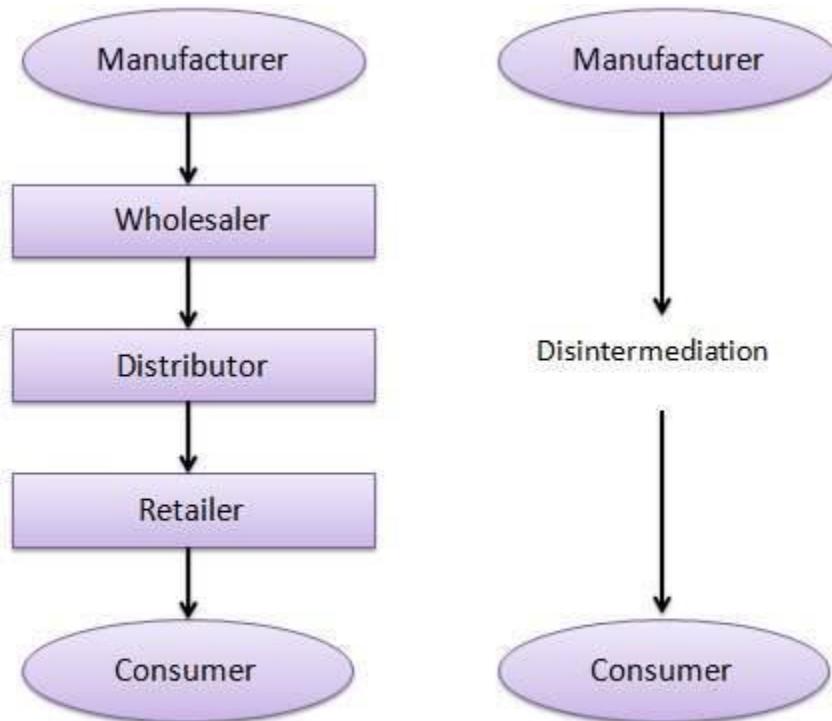
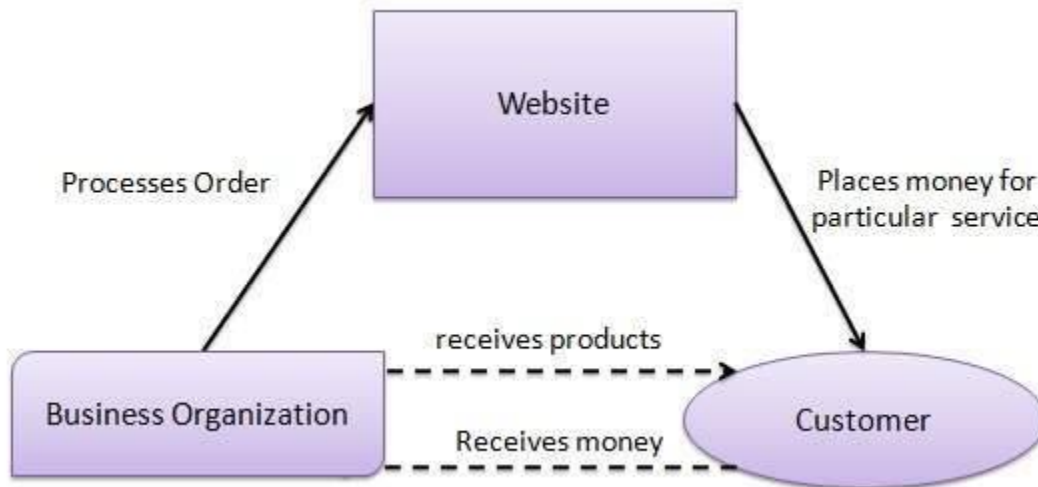Traditional Distribution System   Direct Marketing System

Nowadays, new electronic intermediary breeds such as e-mall and product selection agents are emerging. This process of shifting of business layers responsible for intermediary functions from traditional to electronic mediums is called **re-intermediation**.
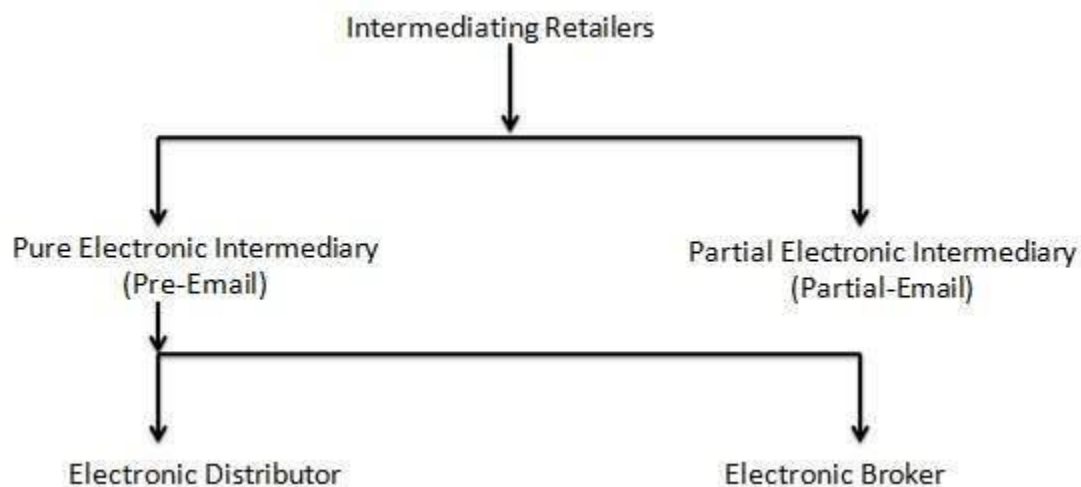
Consumer - to - Business

In this model, a consumer approaches a website showing multiple business organizations for a particular service. The consumer places an estimate of amount he/she wants to spend for a particular service. For example, the comparison of interest rates of personal loan/car loan provided by various banks via websites. A business organization who fulfills the consumer's requirement within the specified budget, approaches the customer and provides its services.
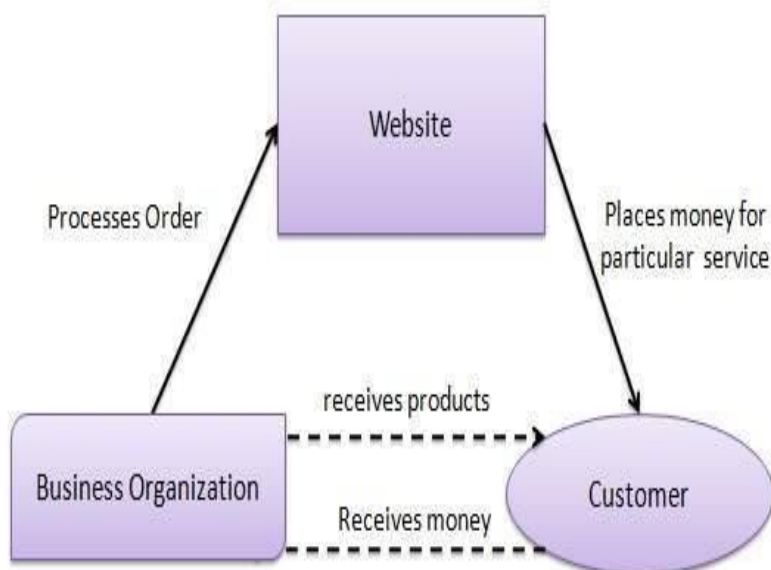
Business - to - Government

B2G model is a variant of B2B model. Such websites are used by governments to trade and exchange information with various business organizations. Such websites are accredited by the government and provide a medium to businesses to submit application forms to the government.
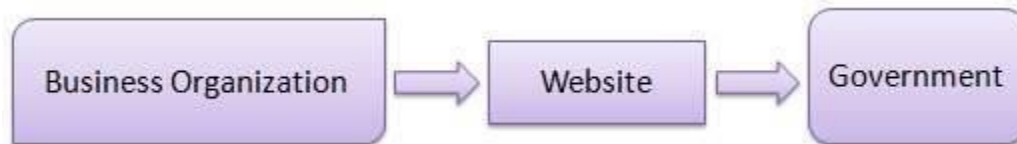
Government - to - Business

Governments use B2G model websites to approach business organizations. Such websites support auctions, tenders, and application submission functionalities.

Government - to - Citizen

Governments use G2C model websites to approach citizen in general. Such websites support auctions of vehicles, machinery, or any other material. Such website also provides services like registration for birth, marriage or death certificates. The main objective of G2C websites is to reduce the average time for fulfilling citizen's requests for various government services.

Peer-to-Peer (P2P)

The E-Commerce facilitates not only consumer-to-company interaction, but also consumer-to-consumer interactions. In the earlier years, the text-based message boards characterized the community nature of these consumer gatherings. Now, the advanced technology and higher bandwidth allows images and video as integral part of the sites, such as facebook.com or youtube.com. Unlike the earlier era of dotcom bubbles, the high valuation of these sites is reflected in their capacity to generate revenue – not only they boast high visitor numbers, but higher extent of much desired "stickiness", too. Organizations look at these new water cooler places with interest as they may have some implications for the E-Commerce strategy of a firm. Since social networking is an emergent phenomenon, much of the research is at an exploratory

stage. A case study was conducted to examine how a firm, Rivals.com, which provides social networking platform to football fans, integrates virtual community in its business model.

Peer-to-peer (P2P) electronic commerce (eCommerce) communities can be seen as truly distributed computing applications in which peers (members) communicate directly with one another to exchange information, distribute tasks, or execute transactions. Such communities can be implemented either on top of a P2P network or using a conventional client-server platform. Gnutella is a example of P2P eCommerce communities that are built on top of a P2P computing platform. Person-to-person online auction sites such as eBay and many business-to-business (B2B) services such as supply-chain-management networks are examples of P2P communities built on top of a client server computing architecture. In eCommerce settings P2P communities are often established dynamically with peers that are unrelated and unknown to each other. Peers of such communities have to manage the risk involved with the transactions without prior experience and knowledge about each other's reputation. One way to address this uncertainty is to develop strategies for establishing community-based trust through reputations. In a buyer-seller market, buyers are vulnerable to risks because of potential incomplete or distorted information provided by sellers. Trust is critical in such electronic markets as it can provide buyers with high expectations of satisfying exchange relationships. A recent study reported results from both an online experiment and an online auction market, which confirmed that trust can mitigate information asymmetry (the difference between the amounts of information the two transacting parties possess) by reducing transaction-specific risks, therefore generating price premiums for reputable sellers.

BREAKING DOWN Peer-to-Peer (P2P) Service

Some peer-to-peer services don't involve an economic transaction, such as buying and selling, but they do bring together individuals to work on joint projects, share information or communicate without intermediation.

When a third party is removed from the transaction, there is a greater risk that the provider of the service may fail to deliver, that the service will not be of the quality expected, or that the buyer may not pay. This extra risk is often defrayed by reduced transaction costs and lower prices. Often, businesses are created with the intent of facilitating P2P transactions and reducing risk for both buyer and seller. The majority of P2P services today are offered online.

Some popular examples of P2P services are:

Open-source Software – anybody can view and/or modify code for the software

BitTorrent – a popular anonymous file-sharing platform where uploaders and downloaders meet to swap media and software files.

Air BnB – allows property owners to lease all or part of their property to short-term renters.

Uber – a platform for car owners to offer livery service to people seeking a taxi ride

Spotify – uses P2P networking to efficiently stream real-time audio content on-demand

eBay – a marketplace for private sellers of goods to find interested buyers.

Etsy – producers of crafts and other homespun goods can sell them directly to the public.

Unit-4

Internet

Alternatively referred to as the **net** or **web**, the **Internet** was initially developed to aid in the progress of computing technology by linking all the best academic computer centers. The Internet as we know it today first started being developed in the late 1960's with the start of ARPANET and transmitted its first message on Friday, October 29, 1969. In 1993, the Internet experienced one of its largest growths to date and today is accessible by people all over the world.

The Internet contains billions of web pages created by People and companies from around the world, making it a limitless place to locate information and entertainment. The Internet also has thousands of services that help make life more convenient. For example, many financial institutions offer online banking that enables a user to manage and view their account from different locations. The picture is a representation and map of the Internet done by The Opte Project.

Internet basics

- The Internet and the WWW are not the same.
- The Internet utilizes the TCP/IP protocol and is accessed using a computer modem, broadband, 3G, 4G, or network that is connected through an ISP.
- In the case of broadband, many computers and devices use Wi-Fi to connect to a routerthat is connected to the ISP.
- The Internet is explored, which is more commonly referred to as surfing, using a browser.
- Finding information on the Internet is achieved by using a search engine.
- Users browse websites and web pages by following hyperlinks that point to an address more commonly referred to as a URL.
- Files, pictures, songs, and video can be shared by downloading (receiving) and uploading(sending).

- The Internet is also used for communicating with others through social networks, online games, forums, chat, e-mails, IM, and VoIP.

Why do people use the Internet?

Today, the Internet is the best place to communicate and share information with people from around the world and gives a person an endless supply of knowledge and entertainment. See the links below for a more comprehensive breakdown of what can be done on the Internet.

Why is the Internet considered a network?

The Internet is the world's largest network because it is a collection of computers and servers that are connected to each other using routers and switches around the world. The Internet works the same way a network would in a home or office just with millions of more computers and other routers and switches.

Browser

Alternatively referred to as a **web browser** or **Internet browser**, a **browser** is a software program created as a simplified means to present and explore content on the World Wide Web. These pieces of content, including pictures, videos, and web pages, are connected using hyperlinks and classified with URIs (Uniform Resource Identifiers).

There have been many different web browsers that have come and gone over the years. The first, named **WorldWideWeb** (later changed to **Nexus**), was invented by Tim Berners-Lee in 1990. However, the first graphical browser and widely used browser that help bring popularity to the Internet was NCSA Mosaic.

Different types of internet service providers

There are over 100 **internet service providers (ISPs)** in the UK. It is a very competitive market with lots of different offerings and deals. Even household names, such as banks and retailers, provide ISP services.

What is the role of ISPs and what do they do?

Internet service providers connect your personal or business computer, laptop, mobile device etc to the internet. ISPs may be commercial, non-profit, privately owned or community owned companies

Most providers offer the same **types of internet services** to customers, including:

1. **internet access**
2. **email access**
3. **domain name registration**
4. **web hosting**
5. **co-location (or data centre services)**

Some ISPs also provide services such as website design or development of e-commerce facilities.

Different types of ISP connections

ISPs use a range of technologies to enable customers' connection to their network. The most common **types of internet connections** include:

1. dial-up or analogue
2. DSL (digital subscriber line)
3. cable broadband
4. fibre optic broadband
5. wireless or Wi-Fi broadband
6. satellite and mobile broadband
7. dedicated leased line

TCP/IP (Transmission Control Protocol/Internet Protocol)

TCP/IP, or the Transmission Control Protocol/Internet Protocol, is a suite of communication protocols used to interconnect network devices on the internet. TCP/IP can also be used as a communications protocol in a private network (an intranet or an extranet).

The entire internet protocol suite -- a set of rules and procedures -- is commonly referred to as TCP/IP, though others are included in the suite.

TCP/IP specifies how data is exchanged over the internet by providing end-to-end communications that identify how it should be broken into packets, addressed, transmitted, routed and received at the destination. TCP/IP requires little central management, and it is designed to make networks reliable, with the ability to recover automatically from the failure of any device on the network.

The two main protocols in the internet protocol suite serve specific functions. TCP defines how applications can create channels of communication across a network. It also manages how a message is assembled into smaller packets before they are then transmitted over the internet and reassembled in the right order at the destination address.

IP defines how to address and route each packet to make sure it reaches the right destination. Each gateway computer on the network checks this IP address to determine where to forward the message.

The history of TCP/IP

The Defense Advanced Research Projects Agency (DARPA), the research branch of the U.S. Department of Defense, created the TCP/IP model in the 1970s for use in ARPANET, a wide area network that preceded the internet. TCP/IP was originally designed for the Unixoperating system, and it has been built into all of the operating systems that came after it.

The TCP/IP model and its related protocols are now maintained by the Internet Engineering Task Force.

How TCP/IP works

TCP/IP uses the client/server model of communication in which a user or machine (a client) is provided a service (like sending a webpage) by another computer (a server) in the network.

Collectively, the TCP/IP suite of protocols is classified as stateless, which means each client request is considered new because it is unrelated to previous requests. Being stateless frees up network paths so they can be used continuously.

The transport layer itself, however, is stateful. It transmits a single message, and its connection remains in place until all the packets in a message have been received and reassembled at the destination.
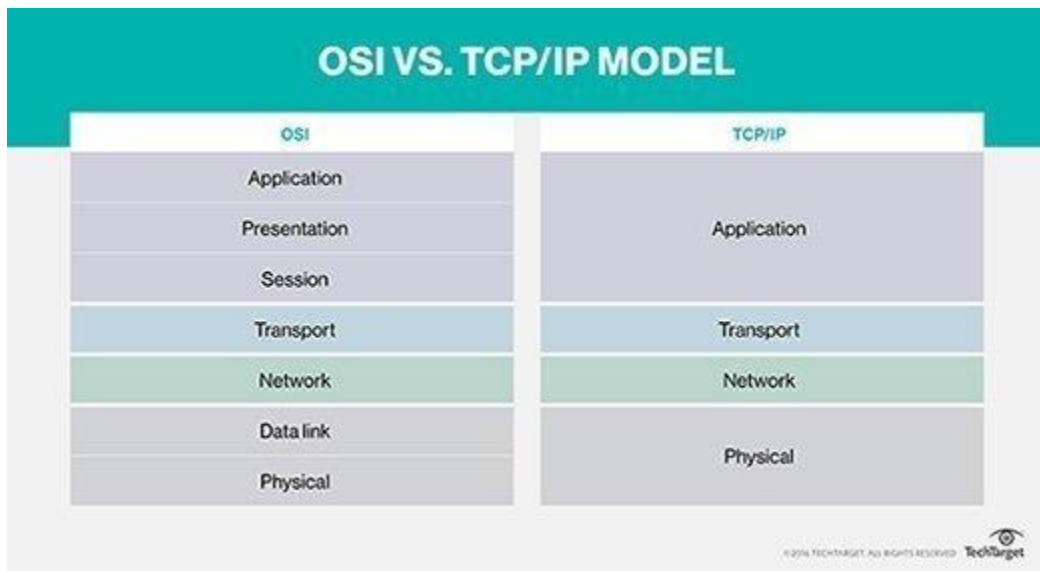
OSI VS. TCP/IP MODEL

The TCP/IP model differs slightly from the seven-layer Open Systems Interconnection (OSI) networking model designed after it, which defines how applications can communicate over a network.

TCP/IP model layers

TCP/IP functionality is divided into four layers, each of which include specific protocols.

The application layer provides applications with standardized data exchange. Its protocols include the Hypertext Transfer Protocol (HTTP), File Transfer Protocol (FTP), Post Office Protocol 3 (POP3), Simple Mail Transfer Protocol (SMTP) and Simple Network Management Protocol (SNMP).

The transport layer is responsible for maintaining end-to-end communications across the network. TCP handles communications between hosts and provides flow control, multiplexing and reliability. The transport protocols include TCP and User Datagram Protocol (UDP), which is sometimes used instead of TCP for special purposes.

The network layer, also called the internet layer, deals with packets and connects independent networks to transport the packets across network boundaries. The network layer protocols are the IP and the Internet Control Message Protocol (ICMP), which is used for error reporting.

The physical layer consists of protocols that operate only on a link -- the network component that interconnects nodes or hosts in the network. The protocols in this layer include Ethernet for local area networks (LANs) and the Address Resolution Protocol (ARP).

Advantages of TCP/IP

TCP/IP is nonproprietary and, as a result, is not controlled by any single company. Therefore, the internet protocol suite can be modified easily. It is compatible with all operating systems, so it can communicate with any other system. The internet protocol suite is also compatible with all types of computer hardware and networks.

Correspondence between the TCP/IP model in the OSI Model
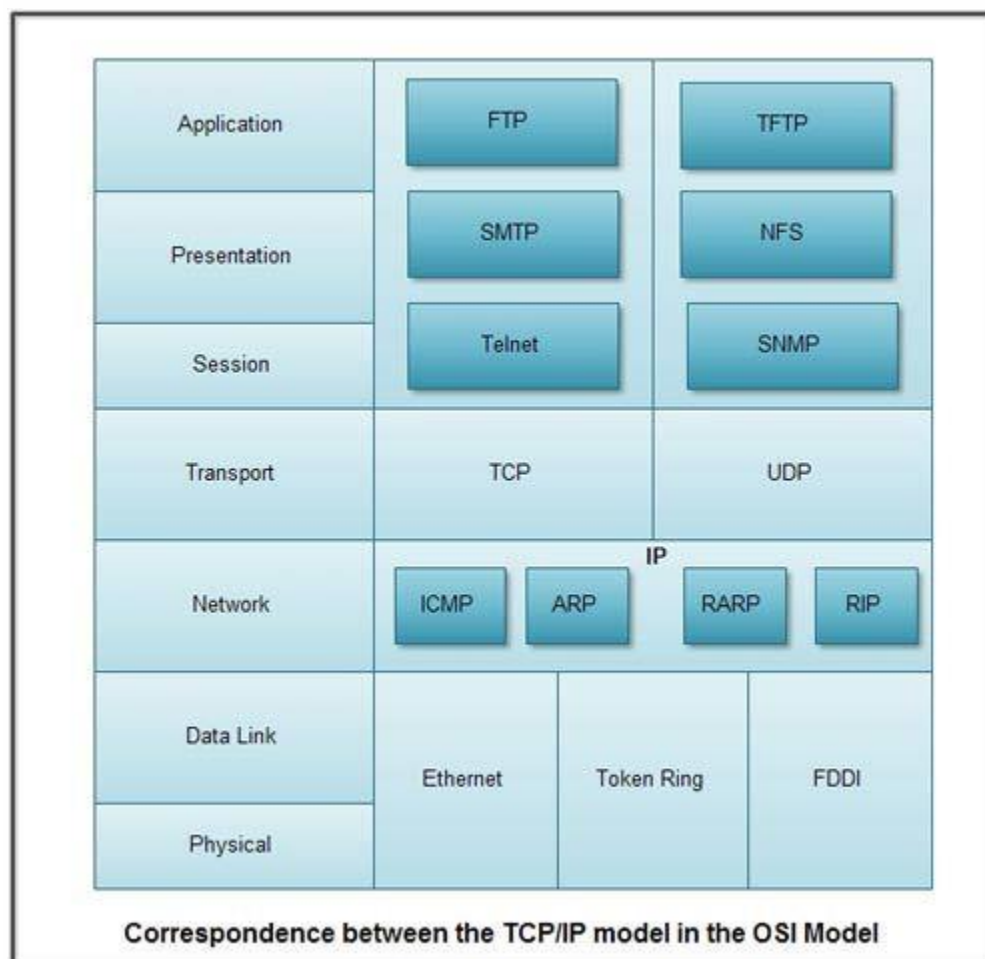
Application Layer

The application layer is provided by the program that uses **TCP/IP for communication**. An application is a user process cooperating with another process usually on a different host (there is also a benefit to application communication within a single host**). Examples of applications include Telnet and the File Transfer Protocol (FTP).**

Transport Layer

The transport layer provides the **end-to-end data transfer by delivering data from an application to its remote peer**. Multiple applications can be supported simultaneously. The most-used transport layer protocol is the **Transmission Control Protocol (TCP),** which provides **connection-oriented reliable data delivery**, **duplicate data suppression, congestion control, and flow control**.

Another transport layer protocol is the **User Datagram Protocol** It provides **connectionless, unreliable, best-effort service**. As a result, applications using UDP as the transport protocol have to provide their own **end-to-end integrity, flow control, and congestion control,** if desired. Usually, UDP is used by applications that need a fast transport mechanism and can tolerate the loss of some data.

Internetwork Layer

The **internetwork layer**, also called the internet **layer or the network layer**, provides the "**virtual network**" image of an internet this layer shields the higherlevels from the physical network architecture below it**. Internet Protocol (IP) is the most important protocol in this layer**. It is a connectionless protocol that does not assume reliability from lower layers. **IP does not provide reliability, flow control, or error recovery.**

These functions must be provided at a higher level. IP provides a routing function that attempts to deliver transmitted messages to their destination. A **message unit** in an IP network is called an **IP datagram**.

This is the basic unit of information transmitted across TCP/IP networks. Other internetwork-layer protocols **are IP, ICMP, IGMP, ARP, and RARP**.

Network Interface Layer

The network interface layer, also called **the link layer or the data-link layer or Host to Network Layer**, is the interface to the actual network hardware. **This interface may or may not provide reliable delivery**, and may be packet or stream oriented.

In fact, **TCP/IP does not specify any protocol here**, but can use almost any network interface available, which illustrates the flexibility of the IP layer. Examples are **IEEE 802.2, X.25,ATM, FDDI, and even SNA.TCP/IP**specifications do not describe or standardize any network-layer protocols, they only standardize ways of accessing those protocols from the internet work layer.