

3.0 INTRODUCTION

In the first two units of this block, we have seen what is data communication, and networking and how they play important role in information exchange. Impact of networking be it LAN or WAN and data communication has been felt across the globe, in various sectors such as education, medicine, transport, etc. This trend of information sharing in most sophisticated manner has completely revolutionised the concept of communication. It brings with it increased access to people in different fields.

3.1 OBJECTIVES

At the end of this section you would be able to

- understand and define the trends and impact of data communication and networking in various fields
- describe E-Mail and EDI
- explain the concept of Internet
- describe present scenario of networking in India.

3.2 EMERGING TRENDS

Networking revolution has swept the country and slowly but steadily more and more enterprises are beginning to rely more on various form of electronic data exchange.

3.2.1 E- Mail (Electronic Mail)

E- Mail system is basically used for sending message electronically to individuals or group of individuals in an inter and intra office environment. It requires networks to connect them. In the world of information technology E-Mail is consider to be first experience and exposure to the field of data communication and networking.

But an E-Mail system can do more than just send message back and forth. Applications that will be build on the messaging infrastructure include multimedia mail, database access, document sharing, fax muting, scheduling etc. The most promising area are work flow, deviation support, task automation information routing etc.

Every day E-Mail vendors coming up with their new version of E-Mail system. Let us discuss few important aspect of a perfect E-Mail systems.

(a) Easy management

A huge E-mail system can involve thousands of users exchanging hundreds of thousands of messages every day, and administrating such work load is great a challenge. But an efficient E-mail provides various tools to the administration task. E-Mail system should have openness to various platform such as Windows, DOS, OS/2 etc.

While the E-Mail administrator sets the global parameters for the system, some system maintain directory security. However they allows user to add addresses as needed. An E-Mail system that implements directory synchronisation, automatically update the directory, which interms help to handle gateway related directory administration from within the same program.

The following are in additional features that can lighten the administrative load while ensuring reliable communication which include the ability to-

- Setup an user account in just one place and synchronise directory updates in a manner that maximise the network traffic.
- Drag and drop user account, including user's messages, folders password and user configuration details.
- Create users automatically by extracting names from a network, LAN manager directory or an ASCII files.
- Exchange directory information over a gateway, either automatically or by using in the import utility, allowing users to send mail to external recipients just as they would to local address.

It is a very difficult task in managing storage space in a E-Mail system for smooth functioning of it. One should delete old messages based on whether they have been read, source and duration of the message, date and time on which the message was received.

Reliable delivery of message is vital to the effectiveness of an E-Mail system. Most of the mail system uses incompatible naming conventions and addressing which often result in loss of mail which crossing the gateway. The E-mail, system should provide reports that track performance and cost of the system.

Security of directory structure is one of the most important requirement of an E-Mail system, while protecting it and at the same time permitting other user to reach people with whom they need to communicate. In a E-mail system it is very important for a user to exchange mail. A long term solution to directory service is provided by X.500 which codifies directory structures and provides a way for directions on linked systems to find and query each other

(b) Scalability

This is one of the important factor to be taken in the consideration while deriving a LAN trased E-Mail system. A scalable E-mail system should consists of a directory that should grow along with the demand from supporting a single work group to a very large user community, while maintaining a high speed of access and directory synchronisation. It should also have a smooth migration path that allows for a smooth evolutionary migration from or coexistence with, host based system. There are two basic types of directory scalability, one in synchronisation and other is propagation, first one is a transaction based procedure for bringing directions upto date within a system. In each transaction to the system there is a specific incitation and a acknowledgment step by in process involved. Synchronisation has two benefits that work together to reduce mail traffic. They are:

- (a) update manages flow in and out of a single server, unlike a less reliable delivery mechanism in which every server sends updates to every other servers.
- (b) a single transaction is sent to each server during synchronisation period instead of one for each administrative system.

Whereas propagation is the possible process of sending directory updates to at other server as they occur.

(c) Enterprisewide Connectivity

This allows user to communicate with people on different E-Mail systems and on remote work ratings. Users should not be conceived with while network or E-Mail system a recipient is on, or be burdened will complain addressing to reach external E-Mail uses.

Gateway are one means, vehicle provides a smooth migration from an old E-Mail system to a new LAN based E-Mail system. One should always consider both quantity of connecting and granting of gateways available. Normally gateways supplied with E-Mail system from same vendor provides more flexibility in connectivity.

As the work environment expand aford office walls, so do your E-mail needs, Remote E-mail users must be able to work of the network as easily as when connected. An E-mail system with remote facility should have in following features.

- (a) offline message creation
- (b) batch transfer of mail
- (c) off-line directory services
- (d) transmit and receive mail while using other application.

The E-Mail should connects the feature to compose and send messages easily. Message editing and the ability to easily send attachments that can be quickly opened and read by the recipient one important to improve productivity and incurse use of an E-Mail system. A good E-mail system should have the following editing features.

- (a) Automatic differentiation of text created when typing, from initial message.
- (b) ability to cut and paste
- (c) choice of fonts
- (d) spell checking
- (e) support for OLEC object linking and embeddings which allows user to incorporate graphics, sound and text into in message.

Attaining a file or object to an E-Mail message is the faster way to route information to a workgroup.

One of the advantages of E- Mail is that it gives users the ability to review, respond to a file, and discard incoming message quickly. E- Mail is fast becoming more than just a way to route electronics notes. It is becoming a mission artificial communication medium and infrastructure for workgroup applications that makes it easier for people to work together.

3.2.2 EDI

Electronic Data Interchange is the inter- organisational exchange of business documentation in structured, machine- processable form.

EDI is often viewed as simply a way of replacing paper documents with electronic documents, and replacing traditional methods of transmission such as mail, phone, or in-person delivery with electronic transmission. However, EDI is actually a way of replacing manual data entry with electronic data entry. The purpose of EDI is not to eliminate paper, but rather to eliminate processing delays and data re-entry.

Electronic data interchange can be used to electronically transmit documents such as purchase orders, invoices, shipping notices, receiving advices, and other standard business correspondence between trading partners. EDI can also be used to transmit financial information and payments in electronic form. When used in this application, EDI is usually referred to as EFT, Electronic Funds Transfer.

What is Application -To-Application EDI ?

Figure 1 shows the use of EDI in place of traditional methods for the transmission of a purchase order between a buyer and seller and demonstrates the key concept behind EDI. Once data are entered into the buyer's computer system, the same data are electronically entered into the seller's computer, without the need for rekeying or re-entry. This is normally referred to as application-to- application EDI. When EDI is fully integrated with application programs, not only do data flow electronically between trading partners without the need for rekeying, data also flow electronically between internal applications of each of the trading partners.

The repeated rekeying of identical information in the traditional paper-based method business communication creates a number of problems that can be eliminated or significantly reduced through the usage of EDI.

- These problems include-
- Increased time
- Low accuracy
- High labour charges
- Increased uncertainty

EDI has become a major means of business communications among large companies in the U.S. EDI can

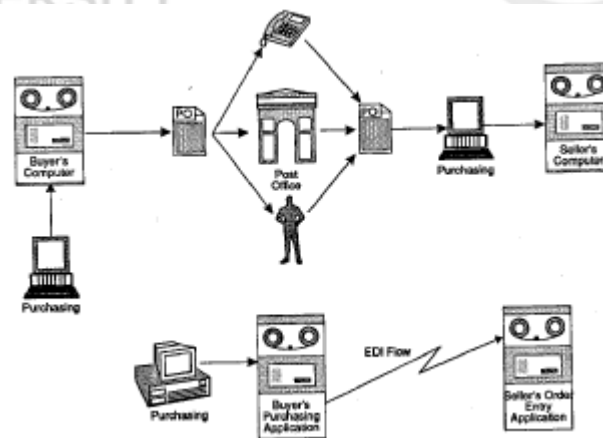


Figure 1 : EDI vs. traditional methods

do for communications between unrelated companies what Electronic Funds Transfer (EFT) has done for transactions between large financial organizations-substitute electronic transactions for paper ones.

EDI consists of standardized electronic message formats (called transaction sets) for common business documents such as Request for Quotation, Purchase order, Purchase Change Order, Bill of Lading, Receiving Advice, Invoice, and similar documents. These electronic transaction sets enable the computer in one company/organization to communicate with the computer in another company/organization without actually producing paper documents. The human effort required to read, sort, and physically transport such documents is eliminated. The documents just mentioned, for which standard EDI formats are either in existence or under development, constitute about 85% of the official communications associated with commercial transactions between business, government educational institutions, and non profit establishments in U.S. and most of the industrialized world.

To take full advantage of EDI's benefits, a company must computerize its basic accounting records. Trading partners are individual organizations that agree to exchange EDI transactions. EDI cannot be undertaken unilaterally but requires the co-operation and active participation of trading partners. Trading partners normally consist of an organization's principal suppliers and wholesale customers. Large retail stores, because they transact business with a large number of suppliers, are among the early supporters of, and participants in EDI.

Benefits of EDI

Computers have speeded up the production of invoices, purchase orders, receiving tickets, and the like. When these documents are produced by high-speed printers, however, they must still be burst, inserted, and distributed (usually mailed), and copies must be filed by the originating organization the originals must be physically transported to the addressee, opened, carried to the appropriate individual within the addressee organization, and processed, which usually means manually keying the data into an MIS system.

The use of EDI eliminates many of the problems associated with traditional information flow.

- The delay associated with making are eliminated, time required to re-enter data is also eliminated.
- Since data is not repeatedly keyed, the chances of error are reduced.
- As data is not re-entered at each step in the process, labour costs can be reduced.
- Because time delays are reduced, there is more certainty in information flow.

The other advantage in the use of EDI is that it generates the functional acknowledgement whenever an EDI message is received, and it is electronically transmitted to the sender. This acknowledgement states that the message is received.

Therefore, the core concept of EDI is that data are transferred electronically in machine processable form, i.e. the EDI message can be immediately processed by receiving computer without any human intervention, or interpretation or rekeying.

Therefore, EDI is most suited in the area as where any of the following characteristics exit:

- Handles a large volume of repetitive standard action.
- Operates on very tight margin.
- Faces strong competition requiring significant productivity improvements.
- Operates under time constraints.

EDI eliminates the paper documents associated with common business transactions. Consequently, the handling, filing, and transportation necessitated by the existence of the paper documents are also eliminated. Electronic documents (messages) can be duplicated and routed (transmitted) instantly to anyone in the organization with a need to see them. Where a hard copy of a document is desired or required by law, a microform copy or paper copy can be produced. Space that normally would be occupied by files of multiple paper copies can be devoted to more productive use and the manual filing operations eliminated entirely.

All of the above benefits result in a more efficient operation and usually provide identifiable cost savings to the company that implements EDI. In addition, the entire process of information transfer between companies is speeded up by eliminating the time required for the preparation and physical movement of paper documents.

These benefits are so compelling that companies must soon adhere to EDI standards if they expect to sell to large U.S. organizations such as Fortune 1000 companies, where the volume of these documents is always burdensome. The alternative will be to send paper documents to a third party (service bureau) where the document is converted to an EDI message acceptable to the addressed company. Such service bureaus are already in operation in U.S.A. It is this kind of computerisation which is forcing India as country to adopt EDI technology for transactions international.

Components of EDI

The three main components to send or receive an EDI message are

- EDI Standards
- EDI Software
- Third party provides (or direct links)

EDI Standards

EDI standards are essentially the agreements between the users of EDI on how the data are to be formatted and communicated. For communicating an EDI message certain formatting rules and syntax is to be followed. The rules that govern EDI communication are called EDI Standards-Formatting Standards and Communication Standards.

In EDI, the information is processed by the receiving system without human interpretation and rekeying, and for this the information must be in a structured format. EDI standard specify how and where the information will be written so that it can be read and processed electronically.

EDI standards also provide guidelines on communication of electronic message. These guidelines are referred to as communication Transport Protocols, and they address issues such as

- Communication Passwords and identification codes
- Rate and transmission mode
- Line protocols (asynchronous or bisynchronous)
- Network availability and service level
- Communication links

X.400 is an EDI Communication Standard for transmission messages of electronically.

Certain industry groups (such as trucking/rail/ocean/are transport companies) had more incentive to adopt EDI than others (the benefits were more obvious and /or the payoff achieved earlier). These groups proceeded to develop their own EDI standards.

ANSI X 12

Independent efforts resulted in standards for participants in specific industries It then become evident, however, that all businesses could benefit from the use of EDI. So some groups promoted the ideas of an industry-wide EDI standard. This led to the formation of the Accredited Standards Committee (ASC) X 12. The X 12 Committee of the American National Standards Institute (ANSI) has, therefore, developed

standards (voluntary) for use by all U.S. businesses. Today, EDI standards, are firm but not static because the development of EDI is a continuing effort. That is, specific industry groups are continuing to evolve new transaction sets that may be candidates for standardization.

Retail Industry Standards

Certain large segments of the retail industry also saw the advantages of EDI and proceeded to develop unique standards. This was not purposefully done to be different, but the earlier standards efforts of the transportation industry were not adequate to accommodate some of the retailers requirements. The Uniform Communication Standard (UCS) was devised by the grocery segment and adopted by them and several other retail sectors.

International Standards

EDIFACT is an international EDI Standard (for Administration, Commerce and Trade).

Edifact activity is undertaken by two international organisations. The International Standard Organisation (ISO) is responsible for developing syntax rules and the data dictionary. The United Nations Economic Commission Document Standards is the other agency concerned with use and promotion of EDIFACTS Standards. The international standard groups are using the ANSI X 12 standards and the TDI Standards (Trade Data Interchange - used primarily in UK and in Europe for Warehousing and distribution).

List of UN/EDIFACT standard message for trade applications is given in the Annexures.

EDI Software

EDI software consists of computer instructions that translate the information from unstructured, company-specific format to the structured EDI format, and then communicates the EDI message. EDI software also receives the message and translates from standard format to company specific format. Thus the major functions of the EDI software are data conversion, data formatting and message communication.

The EDI software is available for mainframes, mini computers, and micro computers. The requirements of EDI is computer of any type, a communication modem and a software.

What is required to use EDI?

Some hardware for communication. but major requirement is that software should be capable of handling and controlling any incoming or outgoing EDI message to any number or combination of trading partners. Such software is generally called as EDI converter or translator, and is totally independent of the computer applications that pass data to it or receive data from it.

EDI solutions can be broadly configured into four categories :

- i) Stand-alone-EDI converter software on PC and generate data with the help of data entry forms or screens.
- ii) Front-end or EDI gateway - connect EDI PC to the existing in house computer an import/export flat-file into/from the application software.
- iii) EDI software co-hosting on in-house mainframe-Application program interface with EDI using API or FPI (File Programme Interface of File Bridge).
- iv) Using VAN's EDI capability - Generally VANs provide EDI conversion services; the application program can send/receive flat-file to VAN for conversion and transmission to trading partner and vice-versa.

EDI in Custom Computerisation

EDI provides an ideal solution for customs computerisation where a number of agencies are involved namely - IAAI, CWC, CONCOR, Airlines, CHAs, Exporters, Importers, DGFT, RBI, Export Promotion Councils and Bank. The concepts of EDI can be introduced in the Customs department with respect to IGM/EGM and BE/SBs. At a later date this community will be able to communicate using EDI over NICNET to all their national and international counterparts.

IGM/EGM

EDIFACT has a standard message for IGM/EGM known as customs Cargo Report Message (CUSCAR). Therefore, efforts should be made for exchange of information between Customs and different Airlines. It is understood that most of the Airlines are using SITANET for transmission of IGM to their local Delhi Offices. Therefore Customs Department should have interface with SITANET over a leased line for receiving the IGMs directly on to the systems. It is essential that the Airlines should be willing to send the information in EDI standards. This should be taken up by the department with individual Airlines.

As a pilot project, this should be taken-up with Air India/Indian Airlines, and subsequently the same can be extended to other Airlines. For implementation of EDI, Air India should have FREDI or any other EDI converter software on its system. The systems will be connected through a dial-up modem and data exchange will take place.

Shipping Bills/Bills of Entry

EDIFACT has standard message for both SBs/BEs known as CUSDEC (Customs Declaration Message).

CHAs/Exporter/Importer will prepare the document through Export/Import document package, and create a flat file in a format required by EDI package. FREDI or EDI converter software will convert the message into EDIFACT standards. This message will be transmitted to the customs House System using dial-up modem.

NIC is developing the existing DOS based Export Documentation Package (SPRED) and the Import Documentation package in EDI forms using FREDI software package. These will be made available to exporters and importers for communication with the Customs Computer System. For national and international communications with their trading partners they will be allotted EDI mailboxes on the Network Server of NICNET.

3.3 NETWORKING SCENARIO

We have seen what electronic data communication is and how its plays a crucial role in the success of organisations. Its impact has been felt across in globe. Let us take a look at some of the international Indian networks.

3.3.1 Inter Net

Inter net is world's largest networks, originated out of a US department of defence funded project. It is a unique collection of networks with vast proportions of its own kind. It has evolved into one of the technologies greatest democracies, permitting the passage of all kind of information exchange with full

freedom. The first result of the project funded by US defence department for a fault to learnt networking system, is Arpanet, which interms become the largest, the most potent and definitely most uncontrollable force in the world.

The networks or computers operating in different platform are connected to internet by a common protocol known as TCP/IP Transmission control protocol/internet protocol. Internet provides the following services.

(a) Global Electronic Mail

As we have already discussed, E-Mail permits user to send and receive messages electronically to an individuals or a group. Internet mail make delivery of area of message more wide and reliable.

(b) USENET-Views and News

Views and News or USENET is the BBS (Bulletin Board Service) of internet. The messages in this BBS are organised into thousands of topical groups or News groups which cover specific areas of interest.

(c) TELNET-Remote Login

Telnet allows an internet user to access a remote cost. After properly connected and hagged into the remote host, the use can enter data, run programs or do any other operation.

(d) FTP-File Transfer Protocol

It permits an internet user to move or transfer a file from one computer to another even if they are running on different platform (or operating system). The files may data, graphics, text etc.

(e) Navigators-Information Servers

More than 1000 new users are joining internet each month making it a global information ocean. This also makes very difficult to find any thing specific on internet. There are several powerful writing used in internet for searching information. These information tracking utilities are means to develop easy method of discovering, locating, and retrieving information on various object freely available on internet. Some of is well known utilities are Gropher, Archie, Hytelnet, WAIS, www.

3.3.2 BITNET (Because-Its Time Network)

BITNET was established by city university of New York and University of Yale basically to exchange information between universities. The basic series provided by BITNET are:

- (a) exchange of electronic messages (datafile)
- (b) electronic student admission
- (c) remote job entry and storing research information

3.3.3 Compuserve

Compuserve is a commercial network based in US compuserve uses telephone icons and microwave for communication. Compuserve user can easily communicate with each other, around the world. Following are in services offered by compuserve

- (a) Electronic Mail box for message transfer
- (b) Bulletin Board Services
- (c) News report alongwith report on sports and weather
- (d) Information on computer hardware and software.

3.3.4 ISDN (Integrated Services Digital Network)

ISDN is basically used for Communication of both data and voice. ISDN was first launched in Singapore in 1990. It has the following features

- (a) transmission and processing of digital data
- (b) processing of various types of information data, voice, video etc.
- (c) electronic mail box
- (d) tele conferencing
- (e) telefax, videofax, telefax. etc.

3.3.5 NICNET

NICNET is a satellite-based nationwide network of NIC (National Information Centres). The basic idea of interviewing NICNET is to extract data from each village, district and city of India. It consists of earth stations in almost all districts, state capitals, regions and NIC headquarter in Delhi. The basic objectives of NICNET are:

- (a) To help government in better planning administration
- (b) To assist in achieving in objectives of IQBS
- (c) To help government maintain communication in times of national emergencies and natural disasters.

3.3.6 I-Net

I-Net is first PSPDNC (Packet Switching Public Data Network) owned by Dot (Deptt. Of Telecommunication). It allows communication between various types of communication devices using protocol conversion. I-Net provides following services:

- (a) Communication units across major metropolies of India

- (b) Connections facility to other international network
- (c) Allowing subscriber to form a private network within I-Net I-Net uses telephone connections and satellite for communication.

3.4 SUMMARY

In this unit, you have been conveyed the functions of E-Mail and Electronic Data Inter-change. The difference between the two has to be appreciated. Some description of the various standards that exist as well as their need in cast of EDI was presented. A brief description of some of the well known networks both in India and abroad were presented.

3.5 OPEN INDENT QUESTIONS AND ACTIVITIES

1. Explore whether there is any E-Mail service provider in your town and if so obtain the rates for various services. Make a comparison with charges for similar work if it had been done through Ordinary mail, Speed post, International Air mail or through Fax.
2. Explore with some business organisations to whom you have access, whether they are aware of EDI. If so, are they contemplating moving towards it ?
3. If you find that not many businesses are aware of the potential of EDI, what would you attribute this to
4. Try to visit an organisation within your reach and find whether they are connected to a National Or International network ?