

## 4.1 EDI

Q1. What is EDI? How does it build up relationship between organizations?

Answer :

April/May-09, Set-1, Q4 M[16]

Electronic Data Interchange (EDI)

For answer refer Unit-IV, Q6.

### EDI and Organizations

EDI establishes computer-to-computer links between the trading partners or organizations. These links enable them to exchange information electronically and avoid the traditional (paperwork) method of information exchange. Exchanging information electronically is faster when compared to traditional method. With the help of EDI different organizations can share information like purchase orders, invoices, confirmation notices, shipping receipts etc.

Prior to the use of EDI, the communication of an organization with its trading partners was done through postal systems. This would take hours of time and sometimes days and weeks. With the advent of EDI, communication between business partners has become faster, easier and efficient. As a result, new business opportunities are rising up. Also global business practices like outsourcing (BPO, KPO) are possible through the use of EDI. For example, efficient communication between American, Asian and European trading partners has made it possible to do business without considering the geographical differences.

Trading partners can maintain close relationships among themselves if there is an efficient interaction channel among them. This would definitely improve the business standard and will create competitive and strategic advantages.

Today the annual growth rate of companies adopting EDI has reached 45 percent. Nearly 90 percent of top Fortune 1000 companies have already adopted EDI. This rapid implementation of EDI will surely change the way in which business is done in inter-organizational electronic commerce.

Q2. What are financial EDI and financial VANs? State their applications.

Answer :

April/May-09, Set-2, Q4 M[16]

### Financial EDI

For answer refer Unit-IV, Q13.

### Financial VANs

For answer refer Unit-IV, Q32.

### Applications of Financial EDI

#### Commercial Organizations

To share business related data like purchase order, payment receipt etc.

#### Insurance Companies

To exchange insurance related data between the health-care provider and insurers. For example, healthcare claim, mortgage insurance applications etc.

#### Tax Collection Bodies

To allow tax payers to file their taxes online.

#### Logistics and Shipment

To exchange information like shipping manifests, bills of lading, shipping status etc.

#### Online Auctions

To allow customer to view the specifications, price details of the items (products) and also allows them to bid for items online.

#### Banks

To provide facilities like online money transfer, automated check clearing etc.

### Applications of Financial VANs

#### Business Organizations

Financial VANs provide communication modes and transfer protocols to securely share business and financial data between organizations.

#### Banks

To exchange financial data like cheque clearance information, money-transfer details etc.

#### Third Party Organizations

Some third party organizations use VANs to provide secure store and forward mailbox delivery of EDI documents. Other organizations can simply use the facilities provided by these third party organizations to transfer their data securely.

### Q3. Distinguish between EFT and ACH transfers.

Answer :

April/May-09, Set-4, Q4 M[16]

For answer refer Unit-IV, Q13, Topics: Electronic Funds Transfer, Automated Clearing House.

#### 4.2 E-Commerce

**Q4. What are the applications of EDI? Mention their advantages and disadvantages.**

**Answer :**

#### EDI Applications

Aug./Sep.-08, Set-1, Q4 M[16]

Electronic Data Interchange (EDI) can be defined as a medium of transmitting business information in a standardized format. Generally, there are several applications of EDI. These applications are still under development, they include monitoring of railway rolling stock, plans for container ships, notification of explosive goods on ships, trains, buses or aeroplanes, exchanging of CAD/CAM (Computer Aided Design)/(Computer Aided Manufacturing) documents, tracking of different tenders, storing of trade related documents like airway bills, custom clearance, air ticket settlements, goods purchase and supply related documents exchange etc. EDI is widely used in the following scenarios.

#### EDI in International Trade

For answer refer Unit-IV, Q11.

#### Advantages and Disadvantages

For answer refer Unit-IV, Q11, Topic: Role of EDI in International Trade.

#### Financial EDI

For answer refer Unit-IV, Q13 and Q14.

#### Advantages

1. Quick transfer of money for the customer is possible with financial EDI.
2. Transactions can be done at any time (i.e.,) round the clock.
3. Eliminates the need to approach a bank to carry out a transaction.
4. Replaced all labor-intensive activities.

#### Disadvantages

1. There are chances of losing cash if connection terminates abruptly.
2. They are more prone to cyber attacks (made by hackers).
3. Payments may incorporate significant delays if the transmission speed is low or transmission media is congested.

#### 3. Health Care and Insurance EDI

For answer refer Unit-IV, Q16.

#### Advantages

1. EDI facilitates claiming of health and insurance funds electronically which reduces the processing time to a great extent.
2. EDI enables the doctors to communicate with the doctors of other hospitals, for providing better treatment to the patients.
3. EDI also eliminates the chances of misplacing of documents via postal services or some other unreliable form of transport.

#### Disadvantages

1. In order to make an EDI transfer, the user must be aware of all the issues involved in it.
2. Installation costs are more because EDI enabled software must be available at both the sender and receiver terminals.
4. **Manufacturing/Retail Procurement using EDI**  
For answer refer Unit-IV, Q17.

#### Advantages

1. The overhead and the cost involved in storing a large inventory of products is eliminated by using Just-In-Time technique.
2. The retailers make use of the Quick Response (QR) technique, which mainly focuses on the inventory level of all the products. Once the product inventory goes below a specific level, QR technique automatically generates purchase orders for its suppliers.

#### Disadvantages

1. There is a possibility of losing bulk orders if inventory level becomes low.
2. JIT and QR techniques work well till the relationship between retailers, suppliers and manufacturers is good but once this relationship breaks, the supplier and the retailers will not have sufficient stock to satisfy customer demands until they get a new manufacturer.

#### Q5. Explain the information flows in the EDI purchasing process.

April/May-08, Set-1, Q4 M[16]

#### Answer :

April/May-08, Set-2, Q4 M[16]

For answer refer Unit-IV, Q9, Topic: Information Flow with EDI.

#### Q6. Write short notes on EDI.

#### Answer :

EDI can be defined in so many different ways. Few possible definitions of EDI are,

1. Electronic Data Interchange (EDI) is a technique which follows a standardized procedure for electronically transmitting information of various kinds. For instance, commercial information, administrative information etc. or
2. EDI can be referred to as a process used by various trading partners for transmitting information among themselves without any interference.
3. EDI can be defined as a medium of passing business information in a standardised format.

In order to survive in today's electronic market, most of the companies are trying out different methods of improving their business. For instance, they are using a method called EDI (Electronic Data Interchange).

Electronic Data Interchange is a method by which relevant business information is exchanged from one computer to another computer in an electronic format. Other than companies, this method is also used by banks, government organizations etc.

EDI has made an impact on the working of various organizations. Business information can be transferred quickly to various parts of the world. Organizations can have access to their business partners anytime and anywhere in the world. Before EDI, organizations had to rely on postal systems for exchange of business information. Organizations also could not contact their business partners whenever they wanted. This was because working hours of each partner was different.

The rate at which order filling was done before using EDI improved with the use of EDI. As a result, buying and selling costs of an order has been greatly reduced. Electronic processing of orders takes less time than manual processing of orders.

EDI first came into the picture in the year 1960. For whole of 1960 and 1980 this method was used mainly for two purposes,

- ❖ Shipping
- ❖ Transportation.

Gradually as time went on, by 1980, EDI was also used for,

- ❖ Retailing purposes
- ❖ International trading purposes.

With its growing popularity, a time will come when EDI will be used as a standard mode of online communication by various organizations.

Most of the people have a perception that E-commerce and EDI are strongly connected. E-commerce is just used as a supporting factor of EDI. The main purpose of EDI in e-commerce is to make sure that exchanging of information between supplier-customer, supplier trading partner etc., get better and better. In order to do this, EDI eliminates those factors that prevent customers, suppliers etc., from exchanging information.

## **Q7. Explain four layers of EDI architecture.**

**OR**

## **Illustrate EDI layered architecture.**

**Answer :**

### **EDI Layered Architecture**

Architecture of EDI mainly consists of four different layers.

- (i) EDI semantic/application layer
- (ii) EDI standards translation layer
- (iii) EDI transport/packaging layer
- (iv) Physical network infrastructure/EDI document transport layer.

Description of each of these layers is as follows,

#### **EDI Semantic/Application Layer**

This is the first layer of the EDI architecture. EDI semantic layer tells which business application plays an important role in the development of EDI.

This layer is particularly based on the type of company that operates on this layer and the kind of software used by the company for the operation.

Therefore, data available on this layer will be in company specified format. Hence, company before transmitting the data to their partners must convert the data into universally accepted format. In order to do this, company requires usage of different EDI standards. The current EDI standard that can be used are,

- (a) ANSI X12 } These standards define how
- (b) EDIFACT } a particular EDI form looks

Consider there are two trading partners who want to transmit a file between them. A special type of software is used by trading partners for file transmission. This type of software is called EDI translation software. This software converts the file sent by the trading partner at the sender's side into a format that is easily understood by the trading partner at the receiver's side.

#### **(ii) EDI Standards Translation Layer**

This is the second layer of the EDI architecture. This layer describes the structure of EDI form that was available on the EDI application layer and how the EDI form looked on the above layer.

#### **(iii) EDI Transport/Packaging Layer**

This is the third layer of the EDI architecture. In this layer, the business form is sent from one company to another. Various companies does not use any electronic medium for transmission of business information among themselves. They transmit information either by using regular postal system, or a special type of carrier service called as united parcel service. Often the informations is exchanged via e-mail.

#### **(iv) Physical Network Infrastructure/EDI Document Transport Layer**

This is the fourth layer of the EDI architecture. In this layer, transmitting business document is more complex when compared with the transmission of e-mail information, or file sharing through a modem or some other electronic device. The reason behind this is the business document information is far more organized than the e-mail information and hence requires lots of processing.

Figure of the EDI layered architecture is shown below.

EDI Semantic Layer (1 <sup>st</sup> Layer)	Application Level Services					
EDI Standard Layer (2 <sup>nd</sup> Layer)	EDIFACT Standards				ANSI X12 Standards	
EDI Transport Layer (3 <sup>rd</sup> Layer)	E-mail	X435, MIME	Point to Point	FTP TELNET	WWW	HTTP
EDI Physical Layer (4 <sup>th</sup> Layer)	Internet, I-way Dial Up Lines					

Figure: EDI Layered Architecture

### Q8. Compare EDI and e-mail.

**Answer :**

Comparison between EDI and E-mail

Electronic Data Interchange		E-mail
1. The working of EDI is completely software based. Whenever the information is to be transmitted from one computer to another computer, sender should have a separate software for sending the information and receiver should have a separate software for receiving the information. There is no human interference.	1.	The working of e-mail is part human based and partly software based. Whenever the information is to be transmitted from one computer to another computer, either at the sender side or the receiver side, human interference is required.
2. In EDI, data is organized in such a format that it can only be interpreted by the software	2.	In e-mail, data is organized in such a format that it can be interpreted by humans.

### Q9. Explain EDI in action.

OR

Explain information flow with and without EDI.

**Answer :**

#### EDI in Action

In order to understand the importance of EDI, let us explain information flow between organizations without using EDI and by using EDI. For this, consider a communication example between customer and vendor regarding purchasing application.

#### Information Flow Without EDI

Here the interaction takes place between customer and vendor by using mailrooms called paper based mailrooms. These mailrooms are available on both customer side as well as vendor side. Suppose a customer wants to pass a purchase order request to vendor, then the following steps are involved.

- (i) Customer must first take out a receipt of purchase order information from his/her mailroom.
- (ii) Customer must then transmit this receipt to the vendor.
- (iii) Vendor gets the receipt of purchase order in a letter or fax format.
- (iv) Finally, this receipt of purchase order is stored in vendor's mailroom.

Listed above are the main drawbacks of information flow without EDI.

Figure for information flow without EDI is shown below.

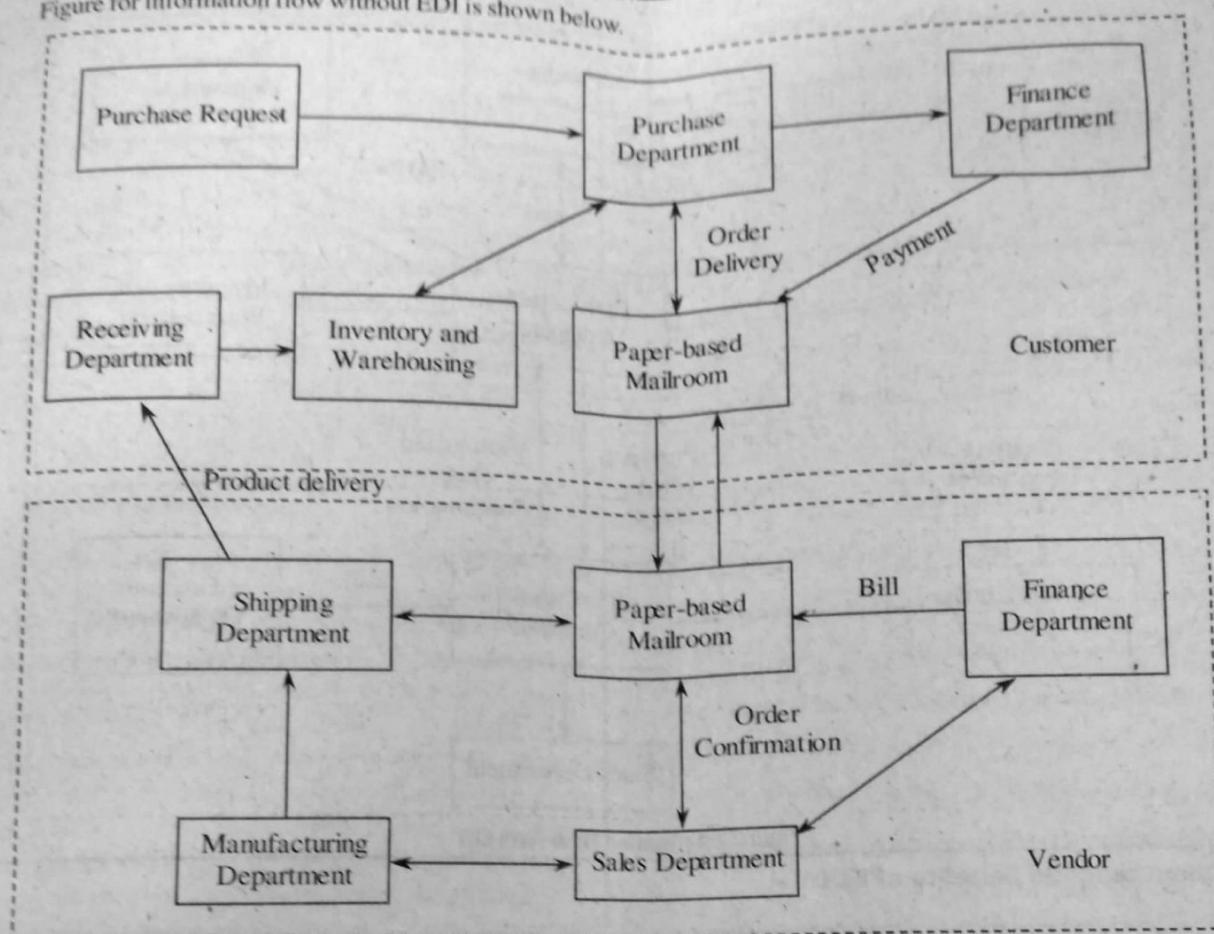


Figure: Information Flow Without EDI

#### Information Flow With EDI

By using EDI, communication between customer and vendor takes place through EDI enabled computers. These computers are available on customer's side as well as on vendor's side.

1. Customer transmits purchase order request from his/her EDI-enabled computer to vendor's EDI-enabled computer.
2. Vendor respond to the request by giving confirmation message from his EDI-enabled computer.
3. Vendor transmits booking request from his computer to transport company's EDI-enabled computer.
4. Transport company respond to the request by giving a confirmation message from its computer.
5. In this step, vendor transmits advance shipment notice from his computer to customer's EDI-enabled computer.
6. In this step, transport company transmits status message to the vendor in order to know about the status of the vendor.
7. In this step, customer passes receipt advice message to the vendor in order to know about the detailed list of various products supplied.
8. In response, vendor sends list of products supplier along with their cost to the customer.
9. Finally, customer transmits the payment check to the vendor.

The given below figure is almost similar to the figure of the information flow without using EDI. The only difference is that instead of paper based mailrooms, EDI-enabled computers are used. As a result, flow of information changes in particular.

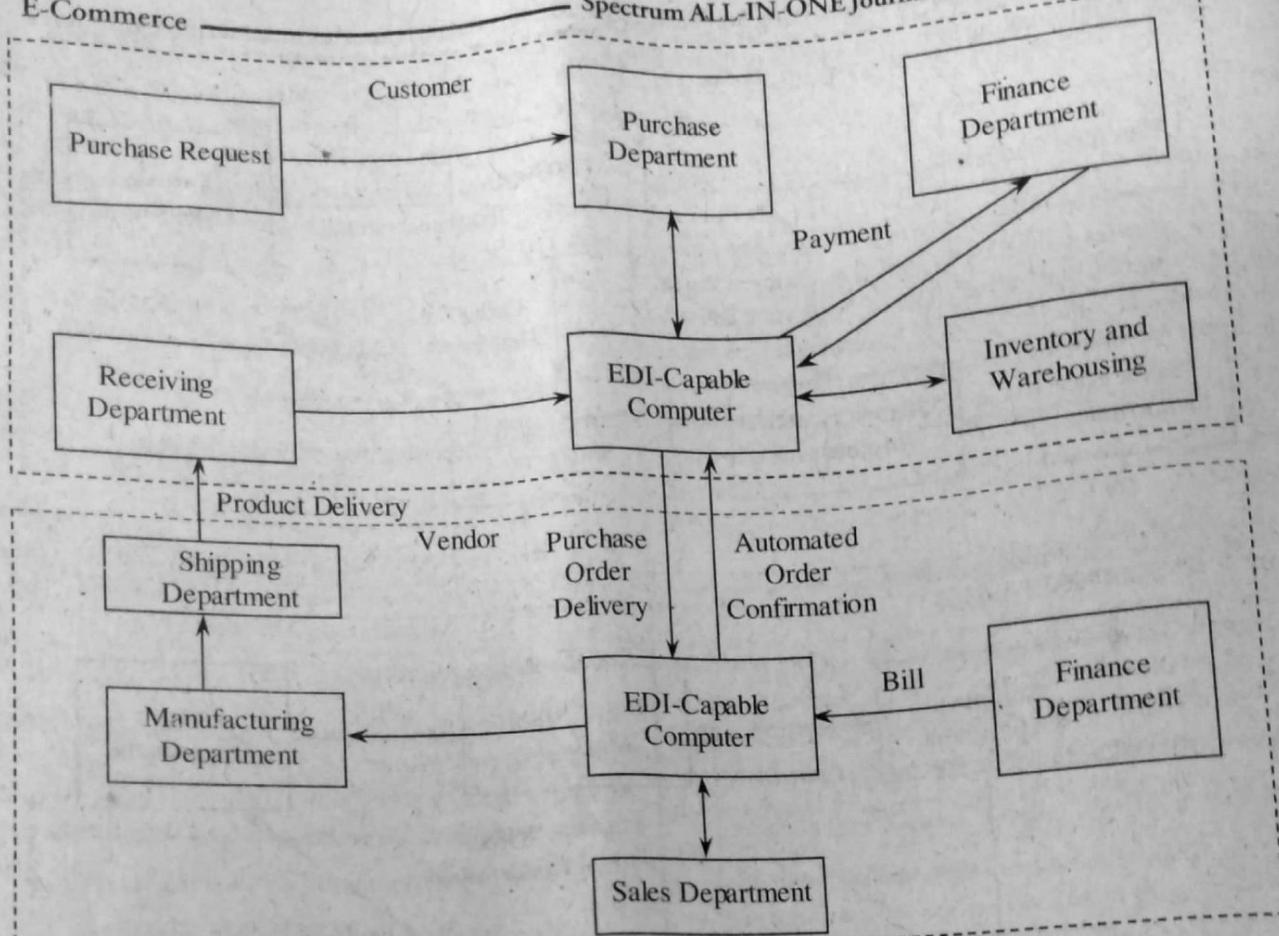


Figure: Information Flow With EDI

#### **Q10. Explain tangible benefits of EDI.**

**Answer :**

##### **Tangible Benefits of EDI**

In order to be successful in today's electronic market, companies have to satisfy customers as well as their suppliers. This requires lot of money and time.

Following are the ways by which EDI can reduce the time and cost.

- By reducing paper based systems.
- By improving problem resolution and customers service.
- By expanding the customer/supplier base.

(a)

##### **By Reducing Paper-based Systems**

Before EDI, various companies required lot of man power for doing their work. For instance, keeping records of the customers as well as suppliers, storing company's relevant information incurs lot of time wastage. With the help of EDI, all this has changed. Everything is done automatically and making payments through EDI also become a lot easier and quicker.

(b)

##### **By Improving Problem Resolution and Customers Service**

Companies with the implementation of EDI, can solve their business problems a lot quicker than they used to mainly solving business problems that occurred due to improper entry of data. EDI also plays an important role in improving the customer service of the company. By using EDI, order of the customers can be completed faster without any errors.

(c)

##### **By Expanding Customer/Supplier Base**

By using EDI, companies can interact with different customers having different needs and also with different kind of suppliers.

**Q11. Explain about EDI in international trade.****Answer :**

There has been a strong relationship between international trade and EDI. Using EDI for doing international trade started way back in 1948. In recent years, measures have been taken by various countries to improve trade relations. For instance, countries like United States, Mexico and Canada signed an agreement called Free Trade Agreement which states that there will be open trade transactions between these countries. For open trade transactions, organization of the trade is very important, i.e., trade efficiency. With trade efficiency, transactions can be carried out more quickly and with less cost. This trade efficiency is possible by using EDI method.

**Role of EDI in International Trade**

Generally, most of us are interested only in physical features of international trade. For example, aircrafts, ships etc. But, we are unaware of the internal process that is required for doing international trade. The internal process is based on the documents/papers that contain trade related data like type of goods to be transmitted and number of goods to be transmitted. The main objective of doing this trade transaction is to transmit the documents containing goods information and goods simultaneously and on time. It should not be the case where goods have arrived earlier and the documents containing goods information have arrived late. There is a possibility that later it may be found that some of the goods were not required at all. These delays in arrival of documents is due to improper management of documents.

Transmission of information is made easier by the use of EDI method. For most of the time, paper based systems have been used for doing international trade. However, there has been several drawbacks with such systems.

These drawbacks are,

- Delay in delivery of information.
- More labor is required in these systems. As a result, costs more.
- Chances of more errors occurring. This makes paper based systems less efficient.

Due to these drawbacks, paper based systems have been replaced by EDI.

Paper based systems are very costly for small scale traders for doing international trade transaction. This is because doing this type of transaction requires about sixty original documents containing trade related data and approximately three hundred and sixty xerox copies of these

documents. Most importantly, these documents must be thoroughly verified before proceeding with the transaction. All this headache is not there in small-scale traders with use of EDI method. EDI makes the task easier for small-scale traders for doing international trade transaction by providing good efficient services.

Using EDI for doing international trade have several advantages. Some of the advantages are as follows,

- Cost of transaction is less.
- Transmission of goods on time.
- Better customer service.

**Q12. Explain components of international trade.****Answer :****Components of International Trade**

People who are largely responsible for the emergence of international trade are freight forwarders. The job of these people is to help vendors and customers do trade transactions between themselves. For this, freight forwarders provide different services like,

- Booking of goods to be transmitted.
- Registration of goods to be transmitted through aircrafts.

Other than the above services, freight forwarders makes reservations on cargo airlines for those companies who transmits and produces almost all kinds of products required by the customers. Also, these people help agents who work on behalf of customs department that are required for clearance of goods that are imported.

Companies that are mainly involved in international trade transactions like airlines customs etc. use EDI for such transactions. The vendor/seller from his computer transmits necessary documents and goods information to his customer as well as the agents of the custom department through a modem. The customer on receiving the information, makes a report of that information by using a software. This report contains information of the goods that will be arriving late. This report will be compared with the date expected for production of goods. Hence, this will help customers to determine which are the goods that should be given more importance. The agent on receiving the data from the vendor/seller converts it into a automated broker interface data by using a software and passes it to the customs department. Other than freight forwarding, international trade is also used for transport management, banking and insurance, customs etc.

The diagrammatic representation of components/internals of international trade is shown in the figure below.

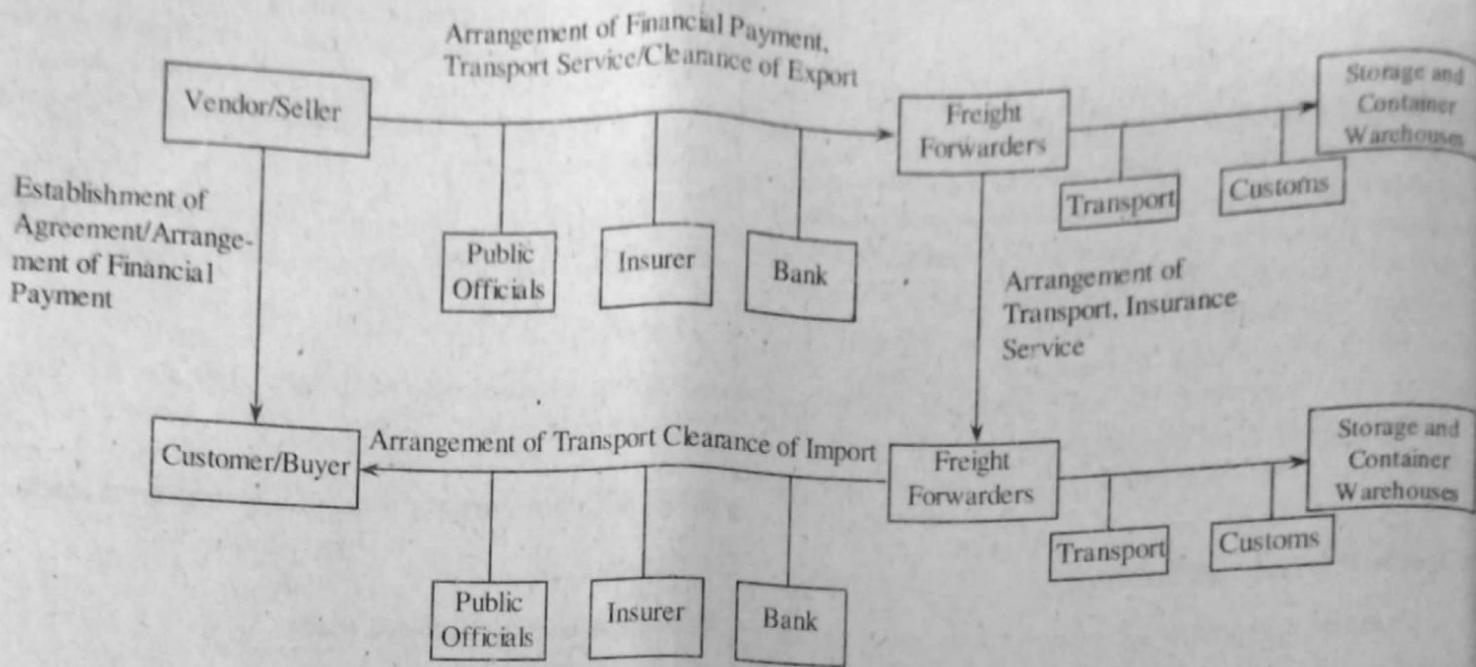


Figure: Components/Internals of International Trade

**Q13. What is financial EDI? Explain different types of financial EDI.**

**Answer :**

### Financial EDI

Financial Electronic Data Interchange is a special type of EDI mechanism used for doing financial transactions online. With the use of financial EDI, transmission of financially related transactions will be more quick and less time consuming. For instance, transfer of money or payment transactions.

### Types of Financial EDI

Financial EDI consists of three types of payment methods. These methods are as follows,

- (a) Checks
- (b) Electronic funds transfer
- (c) Automated clearing houses.

Following is the description of the above three methods.

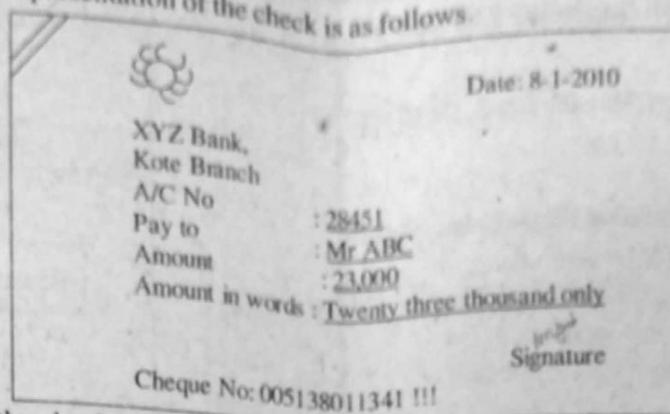
#### (a) Checks

It is one of the payment methods used in financial EDI. It is commonly used payment method.

#### Payment Transaction Process between Customer and Supplier using Checks

Assume that the cost of that TV is around Rs. 23,000. Instead of carrying this much amount of cash, you keep a check book with you. So, you pay the amount of TV through check to the dealer. In order to encash the check, the dealer goes to the bank in which you will be having your account. The dealer gives the check to the cashier. Cashier checks there is sufficient balance in the account by typing your account number on the system. If yes, check will be encashed. Otherwise, check will not be encashed. Once the dealer has got the amount, he will deposit the money in his bank account.

The simple diagrammatic representation of the check is as follows



As we can see, on top of the check, name of the bank will be written. Then on the right hand corner of the check, date is provided just under it the name of the bank, there are various fields which are as follows.

#### A/C No

In this field, customer writes his own bank account number.

#### Pay To

In this field, to whom the amount should be paid is written.

#### Amount

Here, amount is written in numerical form.

#### Amount in Words

In this field, amount is written in alphabetical form.

On the bottom right hand side, there is a signature of the customer. Finally, check number will be written at the bottom of check.

### (b) Electronic Funds Transfer

Electronic Funds Transfer is the second payment method used in financial EDI. EFT is a transmission technique used by various banks to do payment transactions among each other. Different kinds of payment transactions are possible like credit transactions debit transactions etc. In simple terms, we can say that EFT is a technique used for bank-bank communication.

Electronic funds transfer can also be called as wire transfers. This transmission technique has been in use by banks for more than three decades.

Electronic checks is one of the forms of electronic funds transfer. Example of electronic checks is net cheque. Electronic checks is a type of payment system which is done online. Electronic check payment system is the equivalent of traditional check or paper check payment system i.e., the working procedures of both the payment systems are same.

Electronic cash is also known as digital cash or e-cash is another form of electronic funds transfer. Electronic cash is also a type of payment system which is done online.

Electronic cash or e-cash is the latest payment system to be introduced in the market. Instead of paying cash manually, cash can be paid electronically with the help of electronic cash system.

### (c) Automated Clearing House

This is the third type of payment method used in financial EDI. All transactions are processed through a special type of central server called Automated Clearing House (ACH) for instance, credit based transactions like direct deposit payroll payments, payments to contractors and vendors etc., and debit based transactions like consumer payments, payments of bills, mortgage loans etc., are all possible through Automated Clearing House. Therefore, rather than using credit cards or debit cards for doing transactions, most of the businesses today are doing transactions through ACH payment system. This type of payment system is particularly useful for two types of customers.

- ❖ Industrial corporate customers
- ❖ Financial corporate customers.

There are two reasons for this,

- (i) With the help of ACH payment system, financially related information of these customers is transmitted very quickly world wide.
- (ii) Quick transfer of money of their customers.

#### 4.10 E-Commerce

**Q16. Explain the working of financial EDI for e-commerce.**

**Answer :**

#### Financial EDI Payments

There are two types of information that are absolutely necessary in financial EDI.

- ❖ Payment information
- ❖ Remittance information

So, financial EDI payments can be done in two possible ways,

By transmitting payment information and remittance information simultaneously.

By transmitting payment information and remittance information separately.

The description of the above two ways is given below,

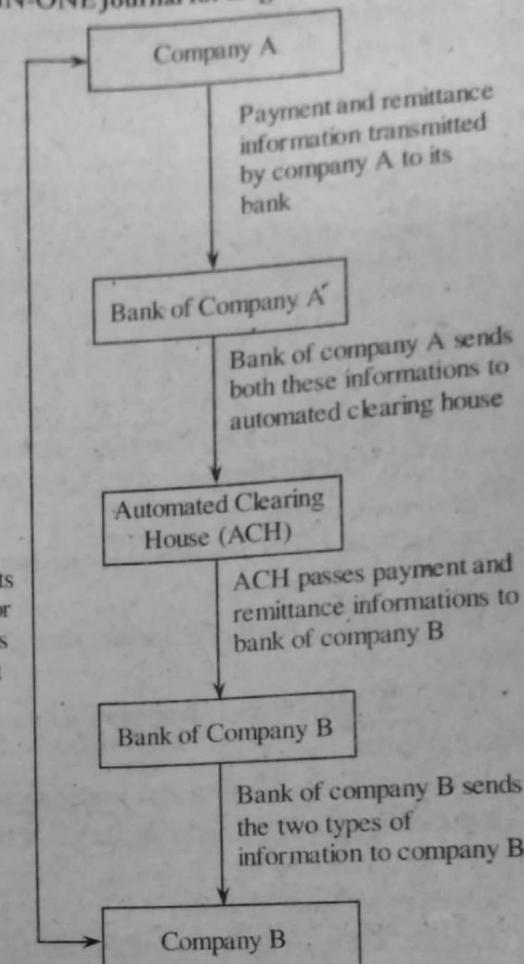
#### Transmitting Payment and Remittance Information Simultaneously

In order to explain this transmission process, take the example of two companies, say company A and company B involved in financial EDI payment transaction. For doing such type of payments, a special central bank server called ACH(Automated Clearing House) is compulsory. ACH manages transactions that take place between customer's bank and supplier's bank. In our example assume company A as the customer and company B as the supplier.

#### Payment Transaction Process between Company A and B in a Step wise Fashion.

1. Company A passes the remittance information and payment instructions to its bank. Both the information contains the details of the amount to be paid to the supplier as well as the date that was given for payment respectively.
2. On receiving both these information, bank of company A sends them to ACH.
3. ACH operator updates the payment instructions, extracts accounting data, and then sends the payment instructions remittance information to the bank of company B.
4. Finally, bank of company B sends both these informations to company B.

The diagrammatic representation of transmission process of payment and remittance information simultaneously is as follows.



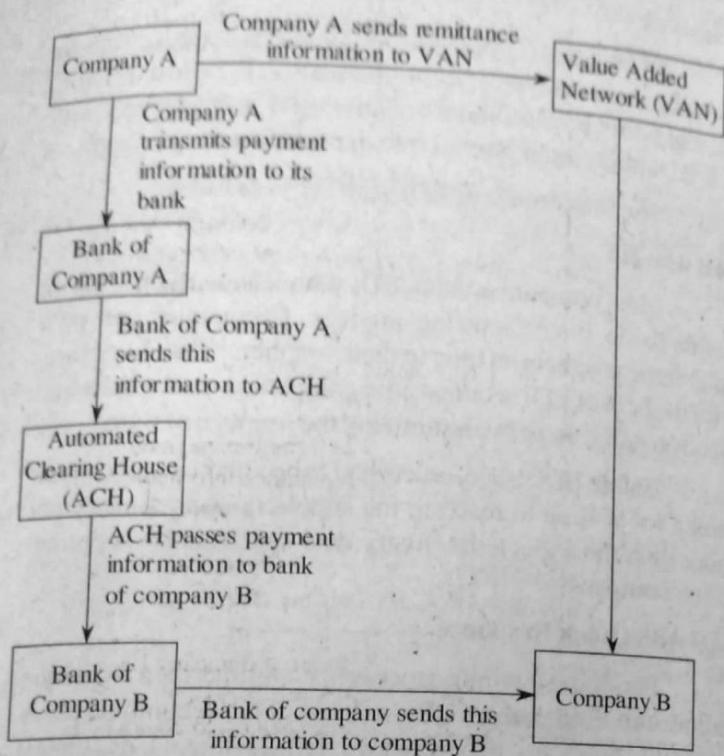
**Figure: Simultaneous Transmission of Payments and Remittance Information**

#### Transmitting Payment and Remittance Information Separately

In the previous transmission process, company A transmitted payment instructions and remittance information simultaneously to company B. In the current type of process, both these pieces of information are transmitted separately to company B.

The step wise explanation of this type of transmission process is as follows

1. Company A passes the payment instructions to its bank.
2. On receiving this information, bank of company A sends the information to ACH.
3. ACH transmits payment instructions to bank of company B.
4. Bank of company B on getting the information passes it to company B.
5. For passing remittance information to the company B, company A uses a special type of network called value added network. Company A sends remittance information to value added network.
6. VAN on receiving the remittance information, sends it to company B.



**Figure: Separate Transmission of Payment and Remittance Information**

### Q15. Explain different financial EDI standards.

**Answer :**

Problem that financial EDI is currently facing is managing payment instructions and remittance information properly. The reason for this is separate standards are used for each information. In other words, standards used for transmitting payment instructions are different and standards used for transmitting remittance information are different.

In order to overcome this problem, some special types of standards have been developed by merging the standards used for payment information and standards used for remittance information. These standards are as follows,

- (i) BAI
- (ii) 820 and 823
- (iii) CCD
- (iv) CTP
- (v) CCD+
- (vi) CTX
- (vii) EDIFACT

- The description of each of these standards is as follows,
- (i) **BAI**  
This is one of the financial EDI standard used for transmitting the information required for Financial EDI payment. BAI stands for Bank Administration Institute.
  - (ii) **820 and 823**  
This financial EDI standards has been developed in 1980 by ANSI for transmitting payment instructions and remittance information. ANSI stands for American National Standards Institute.
  - (iii) **CCD**  
This financial EDI standard has been developed by special type of organization called NACHA. CCD stands for Cash, Concentration and Disbursement. It is used for payment and remittance information transmission.
  - (iv) **CTP**  
The full form of this financial EDI standard is Corporate Trade Payments. This standard is mainly used for proper storage of remittance information.
  - (v) **CCD+**  
This financial standard was developed by NACHA in 1987. The functionality of this standard is similar to that of CCD standard.
  - (vi) **CTX**  
Another form of financial EDI standard that is used for transmitting payment and remittance information is CTX. CTX stand for Corporate Trade Exchange. Like CCD and CCD+ standards, this standard also came into picture with the help of NACHA. The drawback of this standard is that its implementation is less.
  - (vii) **EDIFACT**  
This financial EDI standard was developed by United Nations in 1987. This standard can also be referred to as UN/EDIFACT. Full form of EDIFACT is EDI For Administration, Commerce and Transport.

### Q16. Explain about health care and insurance EDI.

**Answer :**

**Health Care and Insurance EDI**

Nowadays, people are spending lot of money on their health. In other words, we can say that people have become more health conscious today. So, it is important that health care service providers promotes their services properly to the people. This can be done by using EDI as a medium of transmission. For EDI to be used in transmission of health care and insurance related information health care providers must follow a law. This law is called Health Insurance Portability and Accountability ACT or HIPAA. HIPAA provides standards for transmission of transactions through EDI. There are different types of health care/insurance related transactions. For each transaction, particular standard is defined. The transactions are as in the following.

#### **4.12 E-Commerce**

- (i) Transactions regarding health care claim.
- (ii) Transactions regarding pharmacy claim
- (iii) Transactions regarding health care claim status.
- (iv) Transactions regarding health care eligibility/benefits inquiry
- (v) Transactions regarding insurance services.

The description of each of these transactions are as follows.

##### **(i) Transactions Regarding Health Care Claim**

With the help of EDI, health care providers transmit information to the people about the process that is required for health care claiming as well as the information about the cost of the process. To send this type of information, health care providers must follow a standard defined by HIPAA called Health Care Claim Professional standard. Without using this standard, information cannot be sent as health care claiming information as defined in this standard.

##### **(ii) Transactions Regarding Pharmacy Claim**

Health care providers send information through EDI to people regarding the procedure needed for pharmacy services claiming and also the information about the cost of the process. To transmit such type of information, health care providers follows Pharmacy Claim Transaction standard.

##### **(iii) Transactions Regarding Health Care Claim Status**

Another benefit for health care providers by using EDI is that they can also provide information on how to know about the status of health care claim to the people. Standard used for such type of transaction is Health Care Claim Status Request.

##### **(iv) Health Care Eligibility/Benefits Inquiry**

By using EDI, health care providers transmit information to the people about the conditions that are required to be eligible for accessing health care services. In order to send such information, an HIPAA standard called Health Care Eligibility and Benefit Inquiry standard must be followed.

Advantages of using EDI are,

- ❖ No manpower required
- ❖ Hence with the reduction of manpower, no wastage of time in transmitting the transactional information.

This in turn also leads to the decrease of transactional cost.

##### **(v) Transactions Regarding Insurance Services**

Insurance providers with the help of EDI provides information to the people of how to make premium payment on various insurance services. For instance, premium payment on life insurance plan. Premium payment can be referred as paying the amount regularly on a particular insurance service to the insurance providers. Standard used by insurance providers to send this type of information is Payroll Deducted and Other Group Premium Payment for Insurance Service.

**Q17. Explain manufacturing/retail procurement using EDI.**

##### **Answer :**

Manufacturing process in e-commerce is basically done by using a special type of technique called JIT or Just in Time. To make this process more feasible, EDI is used along with JIT. EDI plays an important role in manufacturing process.

The importance of EDI with JIT is as follows,

##### **EDI with JIT**

Most companies using EDI with JIT are finding it a lot easier to do manufacturing process. Companies can now deliver the products on time to their suppliers. This is because, with the help of EDI, a orders after completion can be delivered electronically, thereby minimizing the wastage of time.

Before EDI usage, orders had to be sent manually, which took a lot of time to reach to the suppliers. Sometimes even more than the expected delivery date specified by suppliers to the company.

##### **EDI with Quick Response**

For doing retailing process in e-commerce, a technique called quick response (QR) is used. This technique plays different roles for different people. Customers use quick response technique so that they get to know about the latest products and their services in the market. Retailers and suppliers use this technique to have an edge over their competitors. Just like EDI was used along with JIT to make the manufacturing process easier, similarly, EDI is used with Quick Response for simplification of the retailing process.

There are mainly two reasons why EDI is used with Quick Response.

- (i) EDI is used with QR to minimize the time that is taken for order generation till order completion. Suppose the customer has given you an order and asked to complete it in three months. But you have completed the order in four months. Hence customer will think twice before giving you the order next time. With the usage of EDI, everything from order generation till order completion will be done electronically.

- (ii) Another reason for using EDI with QR is to identify which type of goods are for sale and what type of goods are for purchase. For this, a special EDI technique called Point of Sale (POS) is used. In other words this technique issued for proper inventory management.

**Q18. Explain business information in product design**

**OR**

**Write short notes on business information product design.**

**Answer :**

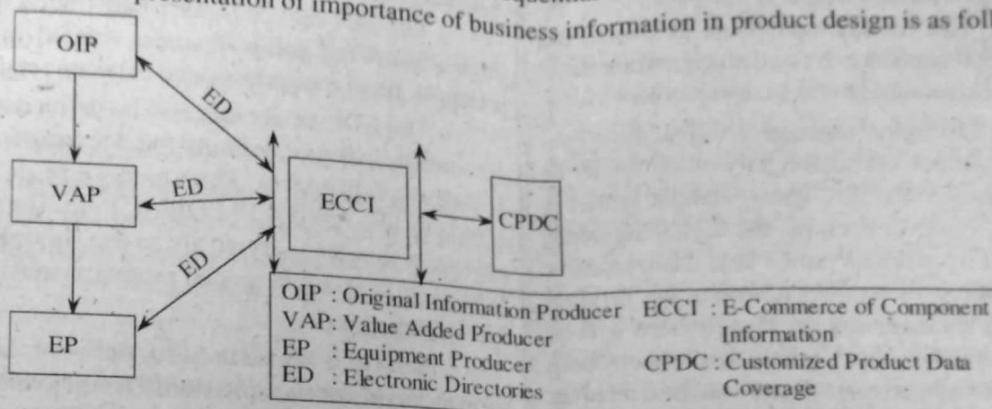
If one needs to do business with any company, it should have information about that company. For instance, reputation of that company in the market, the impact of the company on the market, annual turnover in recent years etc.

Similarly, in electronic commerce, before designing a particular product, companies need to have information about that product like,

- (a) How much time it will take to prepare that product.
- (b) Whether that product will be feasible to customers or not.

This type of information is called as business information. Without this type of information, companies cannot survive in today's market. Techniques such as JIT and QR are inconsequential without business information.

The diagrammatic representation of importance of business information in product design is as follows.



**Figure: Business Information in Product Design**

#### **Q19. Discuss the legal, security and privacy issues involved in EDI.**

**Answer :**

Aug./Sep.-08, Set-4, Q4 M[16]

Mostly, EDI transactions are carried out on a large scale for example

- ❖ Transactions between two countries
- ❖ Transactions between two corporations.

Therefore, it is necessary that transaction data is legalized and secured before transmission.

Legalizing and securing process also plays an important role when any particular application is designed, especially an EDI based application.

In order for an EDI to be used globally, it is mandatory that transactions through EDI should be legalized. Efforts have been made to legalize EDI based transactions. Unfortunately, it has not been achieved so far.

Generally, for making transactions legal in e-commerce, a law is used. This law contains three types of communication standards or rules which basically define what type of transaction are legalized. These two standards are based on special type of service called USPS or united states postal service.

The three communication standards are as follows.

- (i) Instantaneous communication standard (USPS)
- (ii) Delayed communication standard (USPS)
- (iii) Delayed communication standard via non-USPS.

##### **(i) Instantaneous Communication Standard**

This is one of the standard based on United State Postal Service. This standard is used to make telephonic based transactions legal.

##### **(ii) Delayed Communication Standard via USPS**

This is another standard based on USPS. It is mailing system transactions especially USPS mailing system.

##### **(iii) Delayed Communication Standard via Non-USPS**

Unlike previous two standards, this standard does not use features of USPS. This standard legalizes telegram base transaction.

Digital signatures are cryptographic process of making sure that the transactions between the sender and receiver is legal. Digital signatures, guarantee that no alterations occur during transactions.

#### Transactions between Sender and Receiver using Digital Signatures

Before transmitting a message the sender uses hashing technique to converts it into a special type of message called message digest. This message digest is then encrypted by using a private key which is known only to its owner, the sender, is called digital signature. Now, the original message as well as the digital signature is sent to the receiver.

Receiver gets the original message as well as the digital signature. In order to check the authenticity of the sender or in other words, if receiver wants to know whether sender is authorized or not the receiver decrypts the digital signature into a message digest by using its public key. Also, receiver with the help of hashing techniques converts the original message into another message digest. Hence there will be two message digests. Finally, the receiver cross checks both the message digests. If both message digest matches, receiver will be assured that the sender is authorized. There is no question of alteration of such type of transaction process.

If digital signature process is implemented for EDI transactions, then legalization of EDI is possible.

#### Q20. Explain different types or services of EDI.

##### Answer :

For doing EDI transactions some of the latest EDI services that have been developed are as follows,

- ❖ Traditional EDI service
- ❖ Open EDI service

##### Traditional EDI Service

Traditional EDI service is a type of an EDI service where orders are transmitted through a special type of network called Value Added Network (VAN). In other words, we can say that traditional EDI service is a service where EDI transactions are done through Value Added Network. Traditional EDI service can also be referred to as conventional EDI service.

Traditional EDI service is also used for converting EDI based documents into a standard that trading partners can understand by using a special technique called EDI Translation Software and sending those documents to them with the help of communication channels.

Different techniques are used in traditional EDI service. Few of them are as follows,

- ❖ Electronic funds transfer
- ❖ Trade data interchange.

Electronic funds transfer is issued in traditional EDI service so that this service is able to carry out finance related transactions.

Trade data interchange technique is used in traditional EDI service as it enables this service to do trade related transactions.

Traditional EDI service can be classified into two types

- ❖ Old EDI service
- ❖ New EDI service.

##### Old EDI Service

Old EDI service is one of the traditional EDI services that is used for doing business related transactions. For example, retail transactions and between retailer and supplier.

Old EDI service can also be defined as a service used for standardizing or defining the documents so that they are transmitted properly. Documents are defined by using standards like ANSI X12 EDIFACT etc. The drawback of this service is that it is very costly to use. In order to access this type of service, some special programs must be built.

##### New EDI Service

New EDI is also used for defining the documents for proper document transmission. The difference is that in new EDI service, no standards are used. The standardization of documents is done by the programmer. The programmer creates certain programs for standardizing the documents.

In new EDI service, documents are defined not only for easier transmission, but also for easier processing. Other than this, new EDI service also plays an important role in transmission of documents that are structured. For example, XML documents. For this, new EDI uses a special technique called DTD (Document Type Definitions).

An example of new EDI service is Interactive EDI Service also called Interactive Query Response. Interactive EDI Service can be defined as a service where business transactions are done by using internet as a medium of transmission rather than through value added network.

##### Open EDI Service

Open EDI service is used as an alteration for traditional EDI service. The problem in traditional EDI service is that lot of time is taken for transactional exchange through EDI between two companies. For EDI based transactions, companies should sign an agreement. After signing of the agreement, transactional standards must be defined for legalization of transactions. For different transactions, different standards are needed. So, creating standard for each transaction, will take a long time. Thus, till the development of standards, both companies have to be associated with each other, because without them, transactions cannot be legal.

To overcome these drawbacks, open EDI service is used. In open EDI service, there is no need of sign an agreement for doing transactions.

- ❖ Business Operational View (BOV) standard.
- ❖ Functional Service View (FSV) standard.

#### **Business operational View Standard**

It defines how business transactions should be done in open EDI service FSV defines how I.T plays an important role in doing transactions.

## **4.2 EDI Implementation**

### **Q21. Explain the costs and benefits of EDI.**

**Answer :**

#### **Cost and Benefits**

The implementation of EDI (Electronic Data Interchange) for exchange of business-related documents eliminates the human intervention because it involves electronic exchange of documents between different computers. Thus, the cost associated with the management of personnel, potential occurrence of administrative errors and possible delivery delays are reduced to a great extent. The benefits of EDI implementation can be broadly classified as direct benefits and strategic benefits.

#### **Direct Benefits**

1. It eliminates the need of reentering the information at the destination computer because the documents are transferred electronically rather than physically in a hard copy format.
2. The processing of EDI documents is comparatively cheaper than the paper-based documents.
3. The customer demands will be met quickly because of significant decrease in the potential error occurrence. Moreover, the documents are exchanged much faster than the paper-based documents.
4. Effective management of documents is available.

#### **Strategic Benefits**

1. Cost of the products will be significantly reduced.
2. Prompt delivery of product/service to the customer augments the relationship between the company and the customers.
3. Businesses can maintain competitive edge with the rivals by improving the quality of their products/services.
4. Relationship with different traders will get improved.
5. Planning for business and forecasting of sales will be more accurate because of the availability of information at right place and at right time.
6. Data-entry operators will be more satisfied because instead of entering the data into the system they are subjected to more creative activities.

Most of the EDI supportive organizations generate orders consistently with JIT manufacturing and quick response retailing principles that is, they generate smaller in quantity but more frequent orders.

If the fax-based technology is used, the orders need to be feeded into the computer before they are processed which may be erroneous and takes time. However, if orders are received electronically using EDI the processing time will be reduced to a great extent.

### **Q22. How does EDI work on internet? What are the roadblocks?**

**Answer :**

#### **EDI Over Internet**

**Aug/Sep.-08, Set-2, Q4 M[16]**

The transmission of the EDI messages over internet is done using an internet mail. The EDI data is encapsulated into an e-mail message based on the specification provided by Internet Engineering Task Force - Multipurpose Internet Mail Extensions (IETF – MIME). EDI over the internet was proposed by considering all the major aspects including security, integrity, reliability, flexibility and cost. It does not require the pre-established connection between the sender and the receiver so, multiple number of firms ranging from small scale to the large scale can be exchange their EDI messages with an ease. Internet with its maximum coverage capability eliminates the limitation of original EDI networks which are based on hub with multiple spokes.

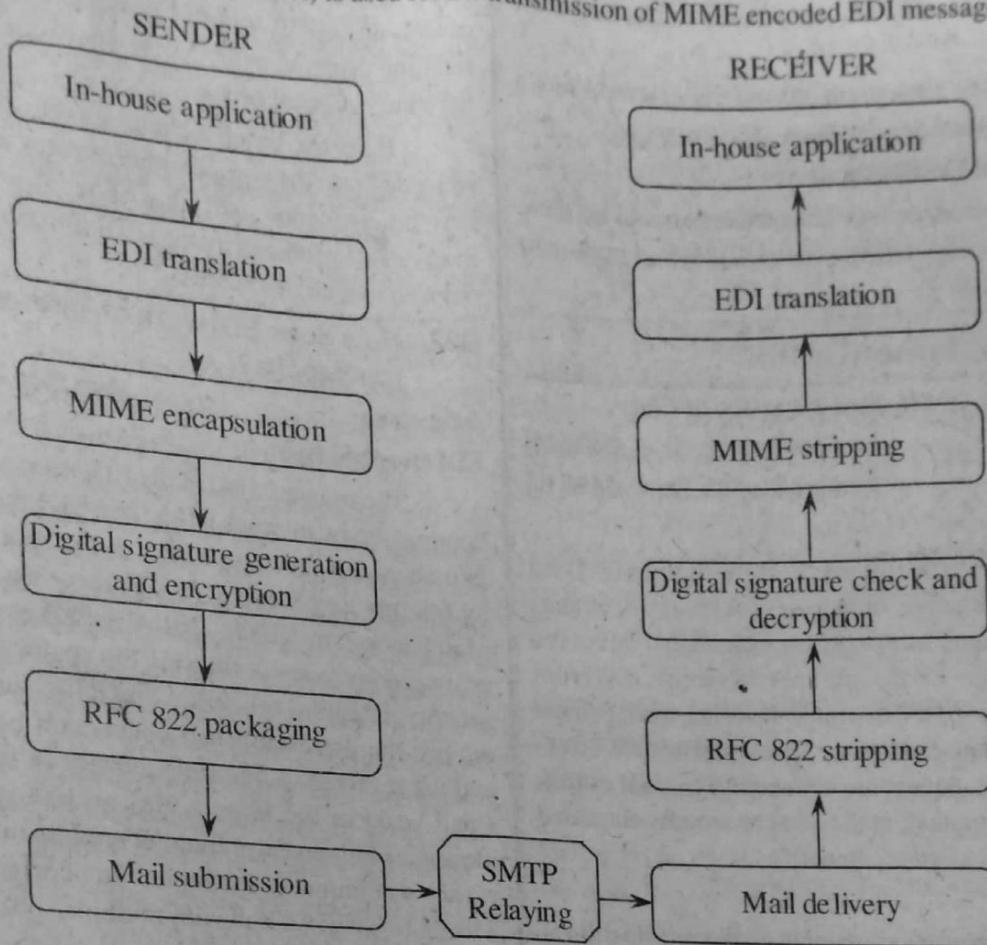
All the trading partners will individually register their businesses as domain names on internet which remains same even if their network service providers change. The mailbox under a particular domain receives the EDI messages through the internet, these incoming EDI messages are processed by the filtering software which responds by providing the information about setting up of trading partner relationship automatically. EDI over internet can be simplified to a great extent by introducing the mechanisms that enable direct delivery of EDI messages to EDI document processing machines, instead of storing and forwarding them from mailboxes. The values present in MIME-headers are reviewed and the messages are forwarded to appropriate applications by filtering programs. Thus, EDI messages are forwarded to EDI translator programs which then extracts the business interchange for further processing in the receiving system.

The EDI messages can be transmitted via standard exchange protocols using an e-mail model defined by transfer agent/user agent. The format of MIME encoded message is shown below.

**HEADERS :** Address of author and recipient  
Summary of subject  
Date of creation, etc.

**BODY :** Structured body parts such as text, voice, graphics.

SMTP (Simple Mail Transfer Protocol) is used for the transmission of MIME encoded EDI message over internet.



**Figure: EDI Over Internet**

The security standards for EDI messages are specified by Internet Engineering Task Force- EDI. The security functions including encryption (decryption digital signature, problem handling, delivery acknowledgments, etc are performed using a secure e-mail software which acts as a security between EDI mailer and mail processing program.

Initially, the roadblocks for carrying EDI transactions over internet were the security issues associated with internet and its inability to perform third party verification for messages being transmitted and inability to provide audit logs. As the security protocols and encryption procedures have been incorporated into TCP/IP structure of internet, the roadblock in terms of security was eliminated to a certain extent. However, there doesn't exist any built-in feature for third party verification so, it will continue to be an issue. Nonrepudiation issue must also be considered because EDI transactions often involve large amount of money. To avoid denial of the transactions made by the traders nonrepudiation function was provided which gives the confirmation about the occurrence of the transaction. Initially, the audit logs of value added network provide the nonrepudiation function. This function was provided either for indirect connection-based EDI or for comparing message logs for direct connection-based EDI.

### **Q23. What are the various requirements of EDI? How does it differ from e-mail?**

**Answer :**

Aug/Sep.-08, Set-3, Q4 M[16]

For successful transmission of EDI messages, the following components are required.

1. EDI standard
2. EDI software
3. Communication networks.

#### **1. EDI Standards**

For answer refer Unit-IV, Q25.

#### **2. EDI Software**

For answer refer Unit-IV, Q27.

### 3. Communication Networks

Communication networks are the mediators through which EDI documents are electronically exchanged between the trading partners. The EDI server on the network maintains the mail boxes of the users, these mail boxes are used to store electronic documents which can be uploaded or downloaded according to the user's convenience. The communication network facilitates the user with a single point interface to the trading community thus, the user doesn't need to handle different communication protocols maintain record of time zones, identify the availability of computer system at the other end.

Following aspects must be considered before selecting a network service provider.

- (i) Level of customer service provided.
- (ii) To what extent their systems are compatible with the changes incurred in standards and additional features are provided by their systems for future enhancements.
- (iii) Cost associated with their systems.

Internet engineering task force addresses all the issues related to the message delivery acknowledgment as well as the security of electronic documents exchanged over the internet.

Most of the EDI server products are developed based on X.400 message handling systems because they provide reliable message transmission. In addition, the delivery notifications are transmitted back to the source.

X.435 recommendation is one of the recommendation sets explicitly defined by ITU for message handling. This recommendation set contains a message handling application known as EDIMG (Electronic Data Interchange Messaging) which is responsible for exchanging EDI information the content type of a new message and associated procedures  $P_{edi}$ . The  $P_{edi}$  is a protocol designed for EDI messages.

An EDI message is divided into two parts,

- (i) Header and
- (ii) Body.

Header part of EDI message contains the information needed for providing selective retrieval feature that can fulfill EDI requirements. It also contains the specific fields of both X.400 and EDI. The EDI specific fields are obtained from the elements of EDI header segments. This enables the EDI user agent to make decisions based on the EDI-specific fields data. Usually, X.435 represents the EDI FACT-UNB segment's data elements.

The X.400 message handling system is responsible for the generation of delivery and nondelivery reports which intimates the sender about delivery and nondelivery of messages respectively. However, they do not provide information on whether the receiver has read the message or not. In order to overcome this limitation of X.400 message handling system, the EDI notification concept was introduced in X.435 recommendation.

EDI notifications can be classified into the following three types.

1. Positive Notification (PN)
2. Negative Notification (NN)
3. Forwarded Notification (FN)

The Positive Notification (PN) is sent by the User Agent (UA) at receiver as soon as it accepts the responsibility of receiving an EDI message. On the other hand, if it can't accept the responsibility and can neither forward the EDI message then, the Negative Notification (NN) is sent. The Forwarded Notification (FN) is sent by the receiver UA if it cannot accept the responsibility of the EDI message but can forward it to some other UA. Each of these notification have certain fields in common, they include,

- (a) Identification of EDI message for which the notification is sent/received.
- (b) OriginatorRecipientName of the UA from which the notification originates.
- (c) OriginatorRecipientName of the first recipient in a forwarding chain.
- (d) The time at which the notification is generated.

#### Difference between EDI and E-mail

For answer refer Unit-IV, Q8.

#### Q24. Explain basic kit necessary for EDI implementation.

##### Answer :

Generally, when any two companies or organizations want to do business with each other, they sign an agreement or a contract which consists of the information regarding,

- (i) Kind of business transaction to be done
- (ii) How the business transaction will be done
- (iii) Source of transmission for business transactions
- (iv) Standard that will be used for transactions.

Similarly, the same procedure is followed when doing business in e-commerce. In e-commerce, EDI technique is followed for doing transactions. An important point to be noted here is that if the concerned parties that want to do business agrees to use EDI, only then EDI can be implemented. Otherwise, it cannot be implemented.

The benefit of using EDI process is that there will be no interference during transmission. This is because EDI system provides a standard by which information can be transferred.

#### **4.18 E-Commerce**

Standards play a very important role in the success of EDI system. Standards make sure that the information is properly transmitted. Other than standards, there are few other components that are as equally important in making EDI successfully.

- (a) Translation software
- (b) Banks
- (c) VAN services
- (d) Trading partners.

#### **Features of EDI**

1. Messages are created anatomically through EDI. This means that no human involvement is required in message generation.
2. Another feature of EDI is that integrity of the message is also verified automatically. In short, we can say that EDI minimizes the human interference.
3. Information can be received quickly through Electronic Data Interchange.
4. By using EDI, different forms of business documents can be transmitted. For instance purchase orders, invoices etc.

#### **Q25. Explain two major standards and structure of EDI transaction.**

##### **Answer :**

The main aim of using EDI is not just to make sure that two concerned parties communicate properly or not, but also to focus on how different software and hardware devices can be used at the same time for smooth flow of business data.

Previously, many standards were developed in the market. But most of them were found to be incompatible. This affected the usage of EDI considerably. To overcome this incompatibility, two standards were developed. These standards are as follows.

- ❖ ANSI X 12 standards
- ❖ EDIFACT standards

#### **ANSI X 12 Standard**

One of the standards that is used to describe how EDI based transactions should be done is X 12 standard. This standard was developed by American National Standards Institute (ANSI) along with Accredited Standards Committee (ASC) in 1979. Hence, this standard is also referred to as ANSI ASC X 12 standard.

Types of transactions defined by this standard are,

- (a) Purchase order transactions
- (b) Delivery order transactions
- (c) Invoice transactions
- (d) Shipping transactions.

The type of standard is mostly used by United States. The protocols used for ANSI X 12 defined transactions are,

- (i) MIME based protocol
- (ii) X.400 protocol

There are different types of X 12 standards. Some of them are as follows.

- ❖ X 12 finance standard
- ❖ X 12 transportation standard
- ❖ X 12 insurance standard.

#### **EDIFACT Standard**

The full form of this standard EDI for Administration, Commerce and Transport. This type standard was developed under United Nations in the year 1987. Hence, it is also referred as UN/EDIFACT. ANSI X 12 standard got merged with EDIFACT standard in the year 1997. The purpose of these standards is to be as versatile as possible. EDIFACT standard was further developed with the help of UN/ECE. It stands for United Nations Electronic Commission for Europe.

Some of the transactions defined by this standard are similar to those defined by ANSI X 12 standard. For instance, purchase order transaction, delivery order transaction, invoice transaction etc. This type of standard can be used to transmit information among various countries or companies. Most of the transactions under this standard are done by using an interactive exchange protocol called I-EDI. EDIFACT standard specifies how data can be properly organized by defining some rules for it.

With so many benefits provided by EDIFACT standard, in future there are chances that all the countries will be using only this standard for doing transmissions.

#### **Structure of EDI Transactions**

Structure of EDI consists of three important fields

- (a) Transaction set
- (b) Data segments
- (c) Data elements

Each field is interrelated to one another.

##### **(a) Transaction Set**

Transaction set is the first field in structure of EDI message. Transaction set can be defined as a collection of data segments or documents that are transmitted using EDI. There are around three hundred transaction sets in ANSI X 12 standard.

##### **(b) Data Segments**

This is the second field in the EDI structure. Data segments are nothing but set of data elements. The purpose of using data elements are that they provide information details regarding different transactions like:

- ❖ Information related to invoice transaction.
- ❖ Information related to shipping transaction
- ❖ Information related to purchase order transaction.

##### **(c) Data Elements**

Third and final field in EDI structure is data elements. This field comprises numerical data like,

- (i) Identification number of the transaction.
- (ii) Cost of the product to be sold.

Give the working of EDI using different layers.  
What are the costs in EDI implementation?

**Answer :**

The structures of ANSI X 12 standard and EDIFACT standards are similar to one another. Both standard consists of three important fields, transaction set, data elements, data segments.

The differences between these two standards are as follows.

**Definition of Data Segment Field is Different in both Standards**

1. Usually, data segment field provides information about various transactions. Suppose one needs to specify the data for invoice transactions or any other transactions. In ANSI X 12 standard qualifier must be used before a particular element. Consider data as an element. So, for invoice transactions, the elements is defined as invoice data, where invoice is the qualifier.

In EDIFACT standards there is no need of qualifiers before each element. If the data element is specified as only date, it is enough.

2. Another difference is ANSI X 12 standard comprises more data elements and data segments than EDIFACT standard. Also, EDIFACT standards consists of special type of elements called composite elements. These elements are rarely used in ANSI X 12 standards.

With less number of data elements and data segments, EDIFACT standards can be updated as well as expanded. But this, updation and expansion feature has its own advantages and disadvantages.

**Advantages of Updation and Expansion of EDIFACT**

Previously if any company used EDIFACT standard to interact with various suppliers of other companies, it had to use one standard from for communication. But by updation/expansion of EDIFACT standard, different forms of EDIFACT standards have emerged. Hence the company can use different forms for communicating with suppliers of different companies.

**Disadvantages of Updation and Expansion of EDIFACT**

Even to interact with its own suppliers a company has to make use of different versions of EDIFACT standards.

**Q27. Explain EDI software implementation and how much an EDI cost.**

**OR**

**Explain how EDI works and how much will be an EDI implementation cost.**

**OR**

**Answer :**

The four layers of EDI software are,

- (a) Business application layer
- (b) Internal format conversion layer
- (c) EDI translator layer
- (d) EDI communication layer.

Using these four layers, message is encapsulated in a form of packets and transmitted to the destination using VAN network. When receiver gets the packets, it performs decapsulation in order to retrieve actual message.

**Business Application Layer**

In this EDI layer, a document in a software application is created which is then transferred to EDI translator. The responsibility of EDI translator is to convert message into the format as specified EDI standard. If EDI translator and software application belongs to different vendors, it becomes necessary to merge document preparation application with EDI translation software. If both the softwares belong to same vendor, then data transmission can be performed with high speed. EDI translator also helps in creation and wrapping of document into EDI package.

The document that is created has a unique mail box ID that is used to identify target business partners.

**Translator Layer**

The main purpose of using translator is to define the association that exists between data elements present in software application and EDI standards. Translation is the core part of EDI process.

The task of translator is to ensure that data is translated according to the format as specified in EDI standards that business partners can use to understand the message. There is a chance of running a business without EDI translator, which could be a risk if business partners are unable to read the message that is transmitted.

Many companies themselves have developed their own custom EDI translators as,

- (i) When compared to commercial translator, custom translator does not get any support or help when required or if any difficulty arises.
- (ii) Custom translator is confined to transact with only one business partner i.e., it is limited and performs the operation within the organization boundary.
- (iii) It is extremely difficult to update custom translator.

Communication can be a module of translation software or it can be a separate application.

The different types of access methods through which communication is possible. They are as follows,

1. Direct-dial systems
2. Limited VAN services
3. Full VAN services.

### **1. Direct-dial Systems**

Using these systems, business partners can communicate with each other through modem. The benefit of such systems is that they are more simple to use.

### **2. Limited VAN Services**

The technical services offered by limited VANS are as follows,

- (a) Converting one network protocol to another
- (b) Detecting and correcting errors.
- (c) Routing EDI message envelope to several business partners including buyers and sellers.
- (d) Delivering the received envelope to appropriate mailbox of the intended business partner.

### **3. Full VAN Services**

The important features of this third party VANs include electronic mailbox and also features like providing security through access control and tracking the document.

Gateways are used in order to have inter connectivity between dissimilar third party networks.

There are various reasons why a company is using EDI VAN service provider.

- (i) Route EDI message to correct destination
- (ii) Perform data translation between different message formats.
- (iii) Set up an audit trail for enabling an organization for validating the message.

### **Steps that are Required for Performing EDI Transaction**

- (a) Business layer creates an application which is transferred of EDI translator layer.
- (b) EDI translation layer perform translation so that application is based on EDI standards.
- (c) EDI communication layer receives the application in the form of an EDI envelope. This layer transfers the envelope to VAN mailbox.

On the receiving end,

- (a) EDI communication layer fetches the envelope from the mailbox using VAN network.
- (b) EDI translator decapsulate the envelope and retranslates the message into a form that can be read by receiver.
- (c) EDI business layer performs validation of the application it receives from EDI translator layer.

The diagrammatic representation of the four layers is in the following.

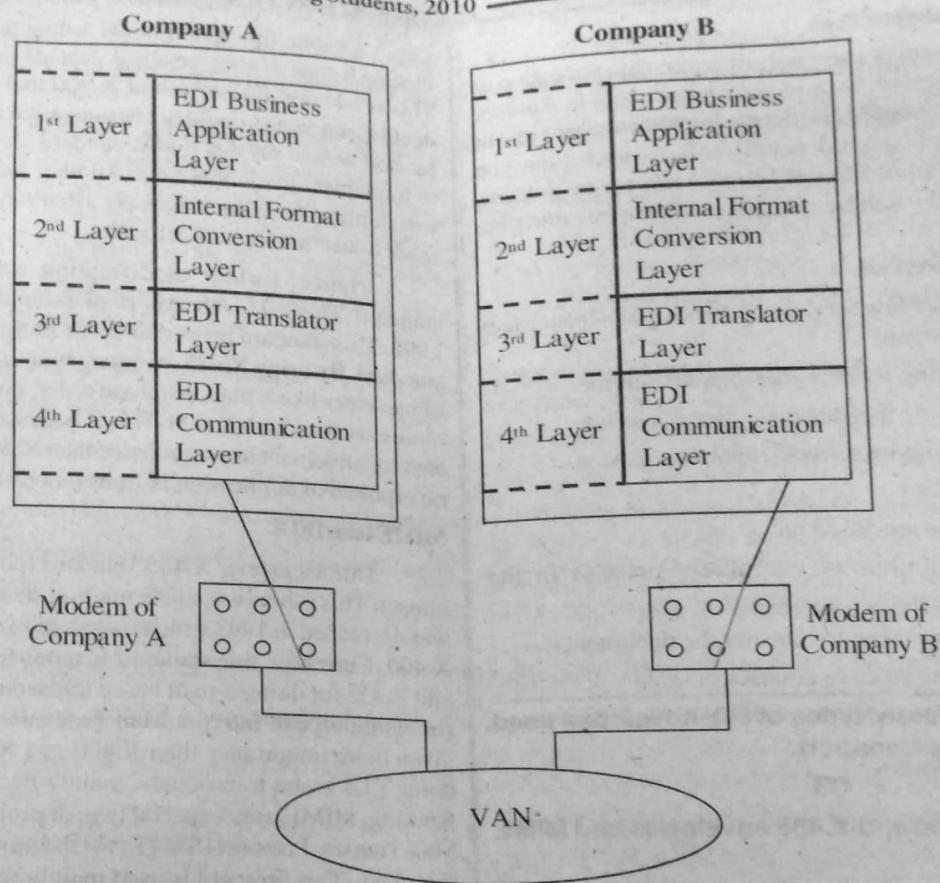


Figure: Four Layers of EDI Software

### EDI Implementation Cost

There are various factors on which the cost of EDI product depends up on,

1. Expected volume of electronic documents
2. Economics of EDI translation software
3. Implementation time
4. Maintenance fees
5. VAN charges.

#### 1. Expected Volume of Electronic Documents

How many documents EDI products can manage depends on the cost of EDI products. If the cost of EDI products are more, then EDI products can manage more number of electronic documents. If cost of EDI products are less, they can manage less number of documents.

#### 2. Economics of EDI Translation Software

Cost of this type of software varies based on two things.

- (a) Usage of latest transaction sets
- (b) Upgrading of transaction sets.

### 3. Implementation Time

To implement or carry out any particular application or software, it is necessary to have knowledge about it. Another important point to be noted is that the implementation time of any particular application depends on how much time you take to learn that application. If you take more time to learn, implementation time will be more. Else, implementation time will be less.

### 4. Maintenance Fees

Following are few services on which maintenance fees are charged by company

- (a) On using its customer support service
- (b) On using its technical support service
- (c) On using its software updation service.

### 5. VAN Charges

VAN charges are based on

- (i) The number of characters present in the document
- (ii) The time taken to transmit the document
- (iii) The time taken to connect.

**Q28. Explain different types of EDI envelopes used for message transport.**

OR

**Explain X.400 and X.435 envelopes and MIME based EDI**

**Answer :**

#### X.400 and X.435 Envelopes

Most of the companies do not prefer doing transactions regularly through e-mail. This is because in order to communicate through e-mail, each company needs to have its own gateway. Suppose there are three companies using e-mail to do the transactions, then three gateways are required. To overcome this problem, both ISO (International Standards Organization) and ITU (International Telecommunications Union) developed a standard called X.400. In this standard, only one gateway is used for doing transactions through e-mail, irrespective of the number of companies involved. X.400 standard was developed in 1980. This standard was further expanded and modified into three different versions.

1. The first version of X.400 was developed in 1984. This version was used mainly for two purposes.
  - (a) Storing of messages
  - (b) Forwarding of messages
2. The second version was created in 1988. The speciality of this version was that it provided security to messages.
3. The third and final version was created in 1992. This version described what kind of messages can be used for transmission.

Despite this X.400 failed to live up to expectation of making E-mail as a universally accepted mode of transmission. This is because the service of X.400 that were explained in detail theoretically could not be converted into practical form. In short we can say that X.400 standard services were difficult to implement in e-commerce. Another reason for the failure was duplication of messages occurred more frequently. This made transmission more difficult.

Hence, further modification was done to X.400 standard. This led to emergence of a standard called X.435 in 1992. This standard proved to be far more secure than X.400 standard. By using X.435, companies could transmit all types of messages like e-mail, purchase order, invoices etc., with far more ease than with X.400. This is because X.435 standard is easy to implement in e-commerce than X.400 and also there is no problem of duplication of transactions in X.435.

#### MIME-based EDI

Unfortunately, X.435 standard too failed to make an impact. This is because a new mailing standard called MIME was developed in 1992 which overshadowed X.435 as well as X.400. Currently, this standard is more feasible than X.400 and X.435 for doing e-mail based transactions. MIME stands for Multipurpose Internet Mail Extension. This standard is given more importance than X.400 and X.435 standards for doing EDI based transactions mainly because of its way of working. MIME uses a special type of protocol called Simple Mail Transfer Protocol (SMTP) for the transmission of e-mail messages. This protocol is used mainly for two reasons.

- (a) It specifies how messages should be transmitted from one computer to another through E-mail.
- (b) It also specifies in what format messages should be transmitted. For example, Word, Excel, Graphics formats etc.

To make sure that the messages are not duplicated or modified during transmission, MIME uses a standard called PEM, PEM stands for Privacy Enhanced Mail. In simple terms a more secure transmission, PEM is implemented.

**Q29. What is MIME? Explain the format of MIME message header.**

**Answer :**

#### Multipurpose Internet Mail Extension (MIME)

There are various other reasons which make MIME more popular than X.400 and X.435 standards.

- (i) By using MIME, E-mail messages can be sent as well as received not only in text format, but also in other formats like graphics, audio, video etc.
- (ii) MIME is also used for sending and receiving message in ASCII characters as well as in non ASCII characters like Arabic, Mandarin etc.

(iii) Another speciality of using MIME is that the e-mail message can be sent and received in symbolized text format. For example, mathematics format.

(iv) Messages can also be sent and received in binary format as well as in compressed format. An example of format is also one of the MIME predefined data types. Compressed format examples are zip file, tar file format.

There are several predefined data types used by MIME. Commonly used data types are as follows,

- ❖ GIF data type
- ❖ Post script data type.

One of the most interesting feature of MIME is that you can also create your own data types for a message. In other words, user defined data types are also allowed in MIME.

MIME standard mainly defines following four different types of header fields.

1. MIME-version header field
2. Content-type header filed
3. Content-transfer encoding header field
4. This header field is in turn divided into two types of headers,
  - (a) Content-ID header field
  - (b) Content-description header field.

Out of these, first three headers are mandatory and the last one is optional.

## 1. MIME-Version Header Field

This is the first header field in MIME message. This header specifies which version is used by MIME. The header version used is 1.0. It can be represented as

MIME-version: 1.0

MIME-version header also makes sure that processing of messages is done properly.

## 2. Content-type Header Field

This is the second header field of the MIME message. The functionality of this field is that it gives information regarding the data types used for defining the messages. Other than this, content-type header field also consists of different fields which are used for defining the type and subtype of a particular message content. The different fields are provided below,

### (i) Text Field

This field defines type and subtype of a message which is in plain text format.

### (ii) Application Field

This is one of the fields in content type header that provides type and subtype of a message which is in the form of some particular application like excel, word etc.

### (iii) Image Field

This field specifies type and subtype of message which are in image format.

### 3. Content-Transfer-Encoding Header Field

This is the third header field of the MIME message. This field specifies which encoding method is used for data transformation.

### 4. (a) Content-ID header-field

### (b) Content-description header field

Both these header fields together comprise of fourth header field of MIME message. Both are used for labelling and identification purpose.

## Q30. Write short notes on MIME user agent.

### Answer :

#### MIME User Agent (UA)

A component which plays a very important role in the working of any mailing system is user agent. Similarly, for mailing system based on MIME standard MIME user agent is used. The speciality of using MIME in doing mail transactions is that different forms of messages like text, graphics, audio, video etc., can be sent. MIME user agent makes sure that user has no problem in receiving such types of message, MIME UA does this by using two special softwares.

### (a) MIME parser

### (b) MIME dispatcher.

The function of MIME parser is to get the detailed information of the MIME message that is transmitted by MIME UA. For instance, content of the message.

The information of the message is then sent to MIME dispatcher. Based on the information received, it specifies in what format the message will be displayed. For example, post script, graphics, text formats or some other formats.

These type of facilities are not available when you are using a more traditional mailing system for transmission of messages.

Another thing to note here is that it is not easy to use any user agent for MIME mailing system. In order for a user agent to be MIME UA, it must possess two important qualities.

1. It must have the ability to act as an interpreter for all types of MIME messages that are to be transmitted. In short, user agent should MIME-aware.
2. Also, user agent must know how to create a MIME message as well as how to read a MIME message. In other words, user agent should be MIME-capable.

## 4.24 E-Commerce

The benefit of MIME UA system is that it has the ability to adopt to changing trends in the market. Suppose a new message format has been included in the MIME mailing system. To access these formats, new software has been launched in the market. MIME UA provides guidelines to the user of MIME mailing system on how to operate the new software.

**Q31. Explain MIME based EDI. What are the computing components of mail handling systems? Explain MIME advantages and disadvantages.**

**Answer :**

For MIME based EDI, refer Unit-IV, Q28, Topic: MIME-based EDI.

Mail system usually comprises of four different components.

- (i) User agent.
- (ii) Message store.
- (iii) Message Transfer Agent (MTA)
- (iv) Directory services.

### (i) User Agent

This is the first component of the mailing system. The significance of user agent can be explained on the operations done by it. Operations are,

- (a) To create different forms of mail message.
- (b) To respond to different mail messages of the mailing system
- (c) Finally, to receive various mail messages sent from the sender.

The purpose of performing these operations is to make sure that user does not find any difficulty in accessing the mailing system. User agent is mostly found in main frame, mini frame or personal computers. A different term is used for user agent on personal computers. It is called mail client.

### (ii) Message Store

This is the second component of mailing systems. The role of message store is to store all the messages that has not been delivered after creation. Normally, only when the user is connected to internet, it can receive mail messages. But, it can receive messages even if the user is not connected to internet.

A message store, has a private mail box for each user for e-mail transactions. A message store also consists of a "Post office" where in the different user mailboxes as well as messages to be sent are stored on only one server.

Message store is also helpful for those users who use EDI for doing mail transactions. User can use its own mailbox system or other EDI user's mailbox system. In other words, we can say share the other user's mailbox system. When other persons mailbox system is used for doing e-mail transactions, one thing should be kept in mind that your own mail address is included in the header or body of mail to the intended person. With this, receiver can know who has sent the mail.

### Spectrum ALL-IN-ONE Journal for Engineering Students, 2010 (iii) Message Transfer Agent (MTA)

This is the third component of the mailing system. MTA specifies how messages are transmitted between various post offices. Different systems will have different mailing standards or protocols used for handling mail messages. Following are few systems with their standards,

- ❖ SMTP for UNIX based systems.
- ❖ MIME for EDI based systems.

These standards are provided by the message transfer agent.

### (iv) Directory Services

The fourth and the final component of mailing system is directory services. Directory services are used to make sure that mail addresses of different users are easily accessed.

The diagrammatic representation of the four components of mailing system is shown below.

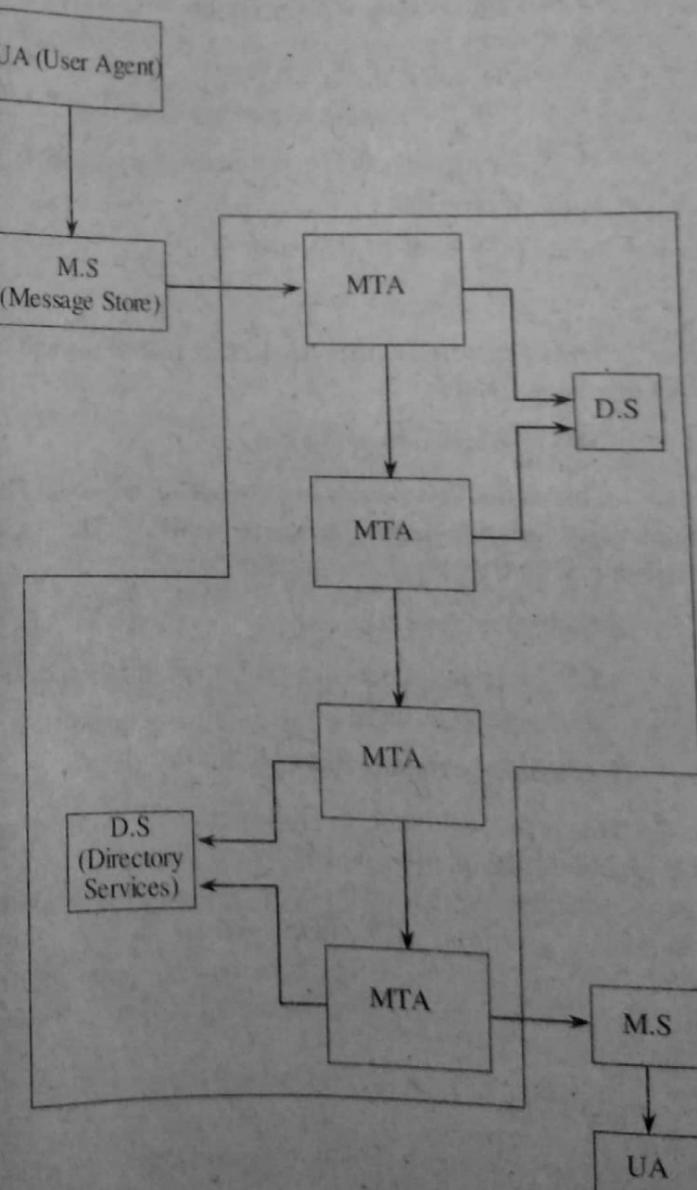


Figure: Four Components of Mailing System

There are so many advantages of using MIME system. Some of them are as follows:

- (i) MIME is used for sending/receiving of those documents which are of multipart type. Multipart is a special type of MIME message where a message is divided into various sections. Examples of well known multipart type documents are internet drafts, RFC's etc. These documents are defined by a standard called IETF (Internet Engineering Task Force). These documents are divided into two sections before transmission.
  - (a) First section contains the abstract of the document.
  - (b) Second section contains information regarding the mode of transmission for the document.
- In order to receive these documents, some special programs are implemented like PINE, ELM etc.
- (ii) Another advantage of using MIME is that it has the ability to adjust to frequent changes of mailing standards Eg., X.400, SMTP etc. As a result, several other systems are slowly becoming MIME oriented. For example, active mail systems, EDI system etc.

#### Disadvantage

The biggest disadvantage in using MIME is the lack of security provided by its user agents. Suppose you have received a file in a particular format. In order to download the file MIME UA provides you with an interpreter or translator. The problem is that if the file contains any virus, the interpreter does not notify you about this. Hence, when you have downloaded the file, there is a possibility that your system will get badly affected by virus.

### 4.3 Value Added Networks

#### Q32. Write a detailed essay on VANs.

OR

**Write an essay on value added networks explaining the price structures, usage, interconnect costs and service providers.**

**Answer :**

#### Value Added Network (VAN)

VAN is a network that makes communication possible among different business partners. These partners exchange EDI messages such as purchase orders, invoices. The other services provided by VAN's are,

- (i) Holding EDI messages in electronic mailboxes.
- (ii) Interfacing with other VAN's.
- (iii) Supporting various telecommunication modes and transfer protocols.

#### Electronic Mail Boxes

It is a feature of software that stores EDI messages which user fetches depending on their needs. It is very much similar to home personal mail boxes.

Many business transactions are performed by establishing a connection directly between businesses or by making use of VAN. VAN act as middleman and allows companies to automatically and securely exchange crucial data over the network. Through VAN, the exchange of EDI messages takes place in the following order.

- (a) A company transmits an EDI message
- (b) This message is stored in VAN mailbox
- (c) It is present in the mailbox, until it is fetched or retrieved by destination company.

EDI process can be understood by considering following example.

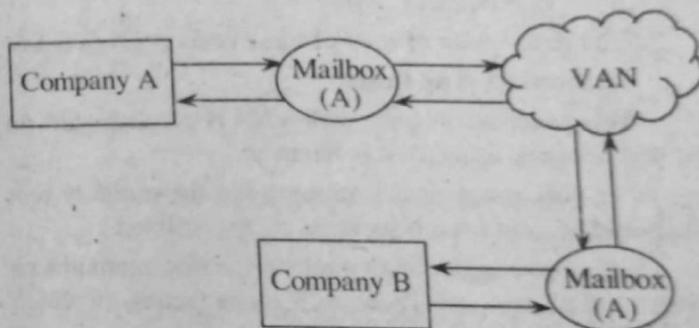


Figure: Working of VAN

Company A sends an EDI message to VAN mailbox. This message consists of a destination address. Using this destination address, VAN transmits the EDI message to mailbox of company B. It is stored over there until company B retrieves it by logging in. Company B sends a reply message to company A in the same way. This cycle is repeated on regular basis. This type of service is termed as mail-enabled EDI. The drawback of this service is that it is very slow and very costly.

The given list is the various choices available to choose instead of using VAN.

1. Using multipart modem, communication ports that allow communication with trading partners.
2. Using single modem that connect to telephone line and performs transaction based on scheduling.
3. Establishing an electronic mailbox on a VAN so that every trading partner can perform the transaction of exchanging messages using this mailbox.

An organization that has many trading partners opt for VAN for using EDI. However, it is not optional for small organization with less number of trading partners.

## 4.26 E-Commerce

There are various factors that are needed to be considered while selecting VAN.

- (a) Reputation of VAN, level of technical support.
- (b) Experience of VAN, service capacity cost, ways of making connection with VAN.

### VAN Pricing Structures

Pricing structure of VAN is based on services that are provided by it. Different services offered by VAN are:

- (i) E-mail capability
- (ii) Inter-VAN connectivity
- (iii) EDI to fax support
- (iv) Supporting EDI translation software
- (v) Transmission of X.12 documents.

There are three categories of costs that are associated with VAN services.

- 1. Account start up costs
- 2. Usage or variable costs
- 3. Interconnect costs.

The description of each of these costs is given below

#### 1. Account Start up Costs

Whenever an account with VAN is created, start up cost and network usage cost is incurred.

Network usage cost is nothing but the monthly rent that should be paid even if services are not utilized.

It may also incorporate mailbox fee that maintains an account and a password. There are various factors on which start up costs depends:

- (a) Number of trading partners
- (b) Line configuration
- (c) Application software
- (d) Whether an organization and trading partner are willing to utilize EDI services.

#### 2. Usage Cost

This is a variable cost that depends on the utilization of EDI services. In E-Commerce, usage refers to the number of transactions carried out by a particular customer. In order to reduce the transaction cost, many transactions are merged together and transmitted in a single envelope.

#### 3. Interconnect Costs

Interconnect cost is noting but the cost that is incurred while establishing a connection for purpose of exchanging EDI messages. Interconnect cost include monthly rent and even incorporate other charges only if any transaction is performed. Usage cost on each transaction is reduced when there is increase in number of transactions conducted. This is because VAN offers discounts depending on volume of transaction. There is a lot of difference in incurrence of costs while sending message to a customers using same VAN or using another VAN.

The different service providers of EDI VAN are,

- 1. AT and T
- 2. British Telecom (BT)
- 3. Cable and Wireless
- 4. GEIS
- 5. Advantis/IBM
- 6. Infonet
- 7. Saturn
- 8. Scitor
- 9. Sprint

##### 1. AT and T

This VAN service provider provides services covering United States and European centers connection is established using X.400 standard.

##### 2. British Telecom (BT)

It is one of the largest service providers that combines packet switching and Tymnet network service. The main responsibility of this provider is to provide end-to-end GNS (Global Naming Service) connection that connects 36 countries using gateways.

##### 3. Cable and Wireless

The main advantage of this provider is that it offers Global Digital Highway that links the main merchantile centres. It demands 8% share of cosmopolitan VAN market and covers around 2500 worldwide companies.

##### 4. GEIS

It is a well known service provider with high level of experience providing its services around 50 countries. The main objective of this provider is to provide EDI and e-mail services to particular commercial applications.

##### 5. Advantis/IBM

It is one of the larger customer based providers which is very experienced in providing SNA (systems network architecture) protocol connectivity.

##### 6. Infonet

Infonet is one of the more established service providers that provide services to all its shareholders present worldwide including MCI, Singapore Telecom, Transport etc.

##### 7. Saturn

This service provider offers well-defined solution for financial market especially for substrate voice services and lower transmission speed communication channels.

##### 8. Scitor

It is a new service provider that is owned by the airline's network "Sita". It covers 150 countries. Since this provider is new in the market, it does not have commercial experience.

##### 9. Sprint

It is a U.S. based service provider that depends mostly on local operators joint venture. The drawback of this provider is that it lacks "one-stop shop" solicitation.

**Answer :**

There are number of factors that make the internet useful for EDI.

1. Flat-cost
2. Inexpensive access
3. Conventional common standards of mail
4. Security.

#### 1. Flat-cost

This factor class does not rely on the volume of transactions being transmitted. The difference between internet flat-cost model and standard VAN model is that internet model does not charge for each character being transferred where as VAN model charges for both sending and receiving characters.

#### 2. Inexpensive Access

Establishing a connection is cheaper while compared to VAN connectivity. It does not include session fee, mail box fee etc., it just incorporate monthly rent for dial up access. Using internet, many users can access internet services that are present world wide.

#### 3. Conventional Common Standards of Mail

Internet mail standards are not owned by anyone that are responsible for managing congestion and routing the messages to the desired destination. Through internet, e-mail is delivered in seconds. Whereas through VAN, delivering the e-mail could take hours.

#### 4. Security

There are various techniques that are used for ensuring data security and to verify authentication. The most commonly used method or technique is public-key encryption which is available in e-mail systems.

The difference between e-commerce services provided by internet and by VAN are,

- (a) Internet services are non proprietary and are based on well known technologies. In contrast, VAN services are proprietary and as a result, it limits inter-operability.
- (b) Internet provides wide range of choice of services to the customer. Whereas, VAN offers limited or confined number of services to the customer.
- (c) Internet implicitly provide software infrastructure to users. On the other hand, VAN needs to configure the application in order to communicate with trading partners.

**Answer :**

#### VAN-Free Internet EDI

In this type of service, transfer of EDI data is possible through internet without using VAN network. In order to perform this type of transaction, business partners must use same protocol for exchanging messages.

This service offers two types of methods through which messages are exchanged.

- (i) E-mail based messaging
- (ii) FTP-based messaging

##### (i) E-mail-based Messaging

E-mail is the conventional method of exchanging message. Every e-mail message should encapsulate EDI interchange and encryption techniques for ensuring e-mail privacy. The following information is exchanged among business partners.

- (a) E-mail address for EDI messages and personal communications
- (b) Agreement on various encryption and authentication techniques used including e-mail feed back in the form of acknowledgment.
- (c) Public keys used in encryption techniques such as PEM or PGP (Pretty Good Privacy).
- (d) Agreement on message format.

##### (ii) FTP-based messaging

Another message exchange method provided by VAN-Free Internet EDI service is FTP-based messaging. In order to exchange EDI messages using FTP, the trading partner needs to create an agreement that will include:

- (a) FTP login and password for each trading partner.
- (b) Rules for naming a file or directory
- (c) Encryption techniques, public keys
- (d) EDI headers that are encapsulated within an EDI message
- (e) Agreement on format of the message.

Most of the organizations today are using internet for doing EDI based transactions. The organization that is the biggest user of internet is United States Department of Defence (DOD). The researchers of DOD states that a trading partner can make a choice of either to use VAN or internet as their communication medium if VAN and internet inter-operate with each other.

OR

Write short notes on EDI gateways.

**Answer :**

### **EDI Gateways**

EDI gateways are used to manage communication among different application systems, standards, protocols etc. It acts like a communication hub or interface that links two or more dissimilar networks.

Responsibilities of EDI gateway include,

1. Converting one network protocol into another.
2. Converting formats of data.
3. Performing code conversion.

Facilities that are provided by conventional gateway are as follows,

- (i) Construction and conversion of EDI messages.
- (ii) Performing decoding process among different application software standards and some in-house standards.
- (iii) Interpreting in-house standard and EDI message format.
- (iv) Providing security features.
- (v) Establishing relationship among trading partners and creating user profiles.
- (vi) Supporting interactive database query.
- (vii) Managing session and maintaining directory services.
- (viii) Exchange of data among organizations using either internet based EDI standard or VAN services.

**Q36. Write notes on,**

- (i) **VAN pricing structures**
- (ii) **VAN service providers.**

**Answer :**

(i) **VAN Pricing Structures**

For answer refer Unit-IV, Q32, Topic: VAN Pricing Structures.

(ii) **VAN Service Providers**

For answer refer Unit-IV, Q32, Topic: VAN Service Providers.