

18 CHAPTER

Electronic Data Interchange- EDI



LEARNING OBJECTIVES

- To acquire basic knowledge on EDI
- To know the brief history of EDI
- To understand the various types of EDI
- To learn the advantages of EDI
- To know about the layers of EDI
- To study about UN/EDIFACT

18.1 Introduction to EDI

The Electronic Data Interchange (EDI) is the exchange of business documents between one trade partner and another electronically. It is transferred through a dedicated channel or through the Internet in a predefined format without much human intervention.

It is used to transfer documents such as delivery notes, invoices, purchase orders, advance ship notice, functional acknowledgements etc. These documents are transferred directly from the computer of the issuing company to that of the receiving company, with great time saving

and avoiding many errors of traditional “on paper” communications.

Before the popularization of Internet-based E-Commerce, it was a major E-Commerce model. EDI includes data exchange between buyers and sellers, trade partners, and also internal data exchange within departments of a company. There are many internationally accepted EDI standard e.g. EDIFACT, XML, ANSI ASC X12, etc. See Figure 18.1

EDI is “Paperless Trade” and EFT (Electronic Transfer) is “Paperless Payment”



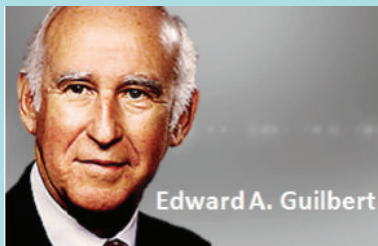
Figure: 18.1 Electronic Document Exchange

HISTORY OF EDI

With the popularity of computers, many companies and organizations use computers to store and process data. However, different organizations use different application systems, and the format of the data generated is not the same. When organizations need to communicate for their business needs they have to rekey. This was time consuming and a major obstacle in the business operations. In order to solve this problem, some enterprises have agreed a specific standard format, which can be regarded as the origin of the EDI application concept.



Like many other early information technologies, EDI was also inspired by developments in Defense Research Organization. **Ed Guilbert**, is called as the father of EDI. He manifested shipping standardized format (much like the 856, or ASN) during the 1948 Berlin airlift. Guilbert with his team developed the first standardized system for business documents, that later influenced how documents would be passed from computer to computer. This standard helped to track “what was contained in the shipment”, “who was delivering the cargo”, while not allowing language barriers or confusing formats to delay the shipment.



Soon, businesses began to realize that using EDI will smoothen the business transactions and increase the profit. These standardizations made ordering and shipping faster, more organized, and less expensive. Earlier, EDI documents were

transmitted electronically by the use of Radio teletype, telex messages, or telephone.

In late 1960s, shipping line, railroads, airlines, and truck companies of USA were exchanging electronic messages for their businesses. These messages were in different formats, and it resulted in problems in transfer of goods. In 1968, these companies grouped together among themselves and formed the Transportation Data Coordinating Committee (TDCC) to develop EDI standard formats.

In 1975, first EDI standards were released by TDCC, of which Ed Guilbert was a major contributor. In 1977, a group of supermarket companies and their business partners begin drafting and using an EDI project. The TDCC is renamed as Electronic Data Interchange Association (EDIA) in 1978. Later in that year, the EDIA was undertaken by the American National Standards Institute and becomes the ANSI X12 committee. Since then this committee is responsible for the publication of EDI standards.

Later in 1985, UN created the EDIFACT to assist with the global reach of technology in E-Commerce. EDIFACT is the most widely used EDI.



The first EDI messages was sent in 1965 from the Holland-American steamship line to Trans-Atlantic shipping company using telex messages. The computer had sent a full page of information in roughly 2 minutes. These messages were then written on the magnetic tapes that could be loaded onto another computer.

18.2 EDI Types

The types of EDI were constructed based on how EDI communication connections and the conversion were organized. Thus based on the medium used for transmitting EDI documents the following are the major EDI types.

- Direct EDI
- EDI via VAN
- EDI via FTP/VPN, SFTP, FTPS
- Web EDI
- Mobile EDI

Direct EDI /Point-to-Point

It is also called as Point-to-Point EDI. It establishes a direct connection between various business stakeholders and partners individually. This type of EDI suits to larger businesses with a lot of day to day business transactions.

EDI via VAN

EDI via VAN (Value Added Network) is where EDI documents are transferred with the support of third party network service providers. Many businesses prefer this network model to protect them from the updating ongoing complexities of network technologies. See Figure 18.2



A value-added network is a company, that is based on its own network, offering EDI services to other businesses. A value-added network acts as an intermediary between trading partners. The principle operations of value-added networks are the allocation of access rights and providing high data security.

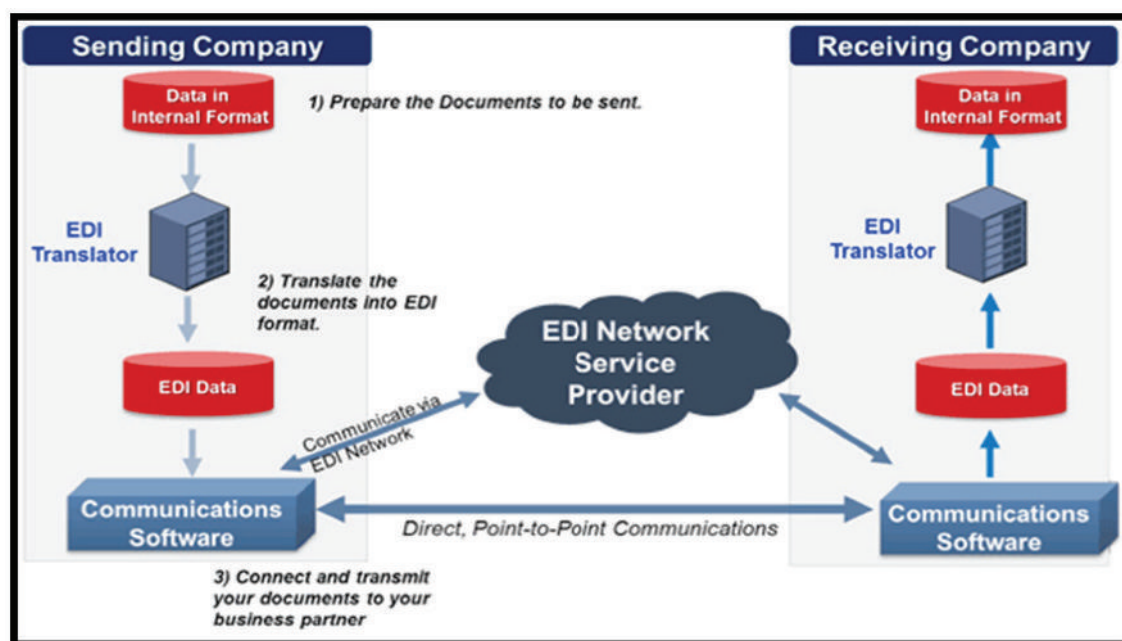


Figure: 18.2 EDI via VAN

EDI via FTP/VPN, SFTP, FTPS

When protocols like FTP/VPN, SFTP and FTPS are used for exchange of EDI based documents through the Internet or Intranet it is called as EDI via FTP/VPN, SFTP, FTPS.

Web EDI

Web based EDI conducts EDI using an web browser via the Internet. Here the businesses are allowed to use any browser to transfer data to their business partners. Web based EDI is easy and convenient for small and medium organizations.

Mobile EDI

When smartphones or other such handheld devices are used to transfer EDI documents it is called as mobile EDI. Mobile EDI applications considerably increase the speed of EDI transactions.

18.3 Advantages of EDI

EDI was developed to solve the problems inherent in paper-based transaction processing and in other forms of electronic communication. Implementing EDI system offers a company greater control over its supply chain and allow it to trade more effectively. It also increases productivity and promotes operational efficiency. The following are the other advantages of EDI.

- Improving service to end users
- Increasing productivity
- Minimizing errors
- Slashing response times
- Automation of operations

- Cutting costs
- Integrating all business and trading partners
- Providing information on process status
- Optimizing financial ratios

18.4 EDI Layers

Electronic data interchange architecture specifies four different layers namely

1. Semantic layer
2. Standard translation layer
3. Transport layer
4. Physical layer

These EDI layers describes how data flows from one computer to another. See Figure 18.3

EDI Semantic layer	Application level services	
EDI Standard translation layer	EDIFACT business form standards	
	ANSI X 12 business form standards	
EDI Transport layer	Electronic mail	X.435, MIME
	Point to point	FTP, TELNET
	World Wide Web	HTTP
Physical layer	Dial-up line, internet, I-way	

Figure: 18.3 EDI Layers

18.5 EDI Components

There are four major components of EDI. They are

1. Standard document format
2. Translator and Mapper
3. Communication software
4. Communication network

18.6 EDI Standards

The standard is the most critical part of the entire EDI. Since EDI is the data transmission and information exchange in the form of an agreed message format, it is important to develop a unified EDI standard. The EDI standard is mainly divided into the following aspects: basic standards, code standards, message standards, document standards, management standards, application standards, communication standards and security standards.

The first industry-specific EDI standard was the TDCC published by the Transportation Data coordinating Committee in 1975. Then other industries started developing unique standards based on their individual needs. E.g. WINS in the warehousing industry.

After the development of the two major regional EDI standards and a few years after trial, the two standards began to integrate and conduct research and development of common EDI standards. Subsequently, the United Nations Economic Commission for Europe (UN/ECE/WP.4) hosted the task of the development of international EDI standards. In 1986, UN/EDIFACT is officially proposed. The most widely used EDI message standards are the United Nations EDIFACT and the ANSI X12.

18.7 UN/EDIFACT

United Nations / Electronic Data Interchange for Administration, Commerce and Transport (UN / EDIFACT) is an international EDI - standard developed under the supervision of the United Nations.

In 1987, the UN / EDIFACT syntax rules were approved as ISO: ISO9735 standard by the International Organization for Standardization. See Figure 18.4

EDIFACT includes a set of internationally agreed standards, catalogs and guidelines for electronic exchange of structured data between independent computer systems.



Figure: 18.4 UN/EDIFACT

It is a cross-industry, standard data format of electronic data for commercial transactions. Maintenance and further development of this standard goes through the United Nations Center for Trade Facilitation and Electronic Business (UN/CEFACT), which is affiliated to the UN Economic Commission for Europe (UNECE).

EDIFACT directories

The versions of EDIFACT are also called as directories. These EDIFACT directories will be revised twice a year; on 1st April and 1st October to include new or update existing EDIFACT messages. EDIFACT directories have names like D.18B

(D stands for Directory, 18 is the year and A/B indicates the month of release)

EDIFACT subsets

Due to the complexity, branch-specific subsets of EDIFACT have been developed. These subsets of EDIFACT include only the functions relevant to specific user groups.

Example:

CEFIC - Chemical industry

EDIFURN - furniture industry

EDIGAS - gas business

EDIFACT Structure

EDIFACT is a hierarchical structure where the top level is referred to as an interchange, and lower levels contain multiple messages. The messages consist of segments, which in turn consist of composites. The final iteration is a data element. See Figure 18.5 and 18.6

Segment Tables

Segment table lists the message tags. It contains the tags, tag names, requirements

designator and repetition field. The requirement designator may be mandatory (M) or conditional (C). The (M) denotes that the segment must appear at least once. The (C) denotes that the segment may be used if needed. e.g. C10 indicates repetitions of a segment or group between 0 and 10.

Position	Tag	Name	Req	Rept
0010	UNH	Message Header	M	1
0020	BGM	Beginning of Message	M	1
0030	BUS	Business Function	C	1
0040	DTM	Date/Time/Period	M	4
0060	RFF	Reference	M	1
0070	DTM	Date/Time/Period	C	1
0080	FTX	Free Text	C	5
0090	PAI	Payment Instructions	C	1
0100	FCA	Financial Charges Allocation	C	1
0120	MOA	Monetary Amount	M	1
0130	CUX	Currencies	C	1
0140	DTM	Date/Time/Period	C	2
0150	RFF	Reference	C	1
	etc.			
	etc.			

EDI Interchange

Interchange is also called as envelope. The top level of EDIFACT structure is Interchange. An interchange may contain multiple messages. It starts with UNB and ends with UNZ

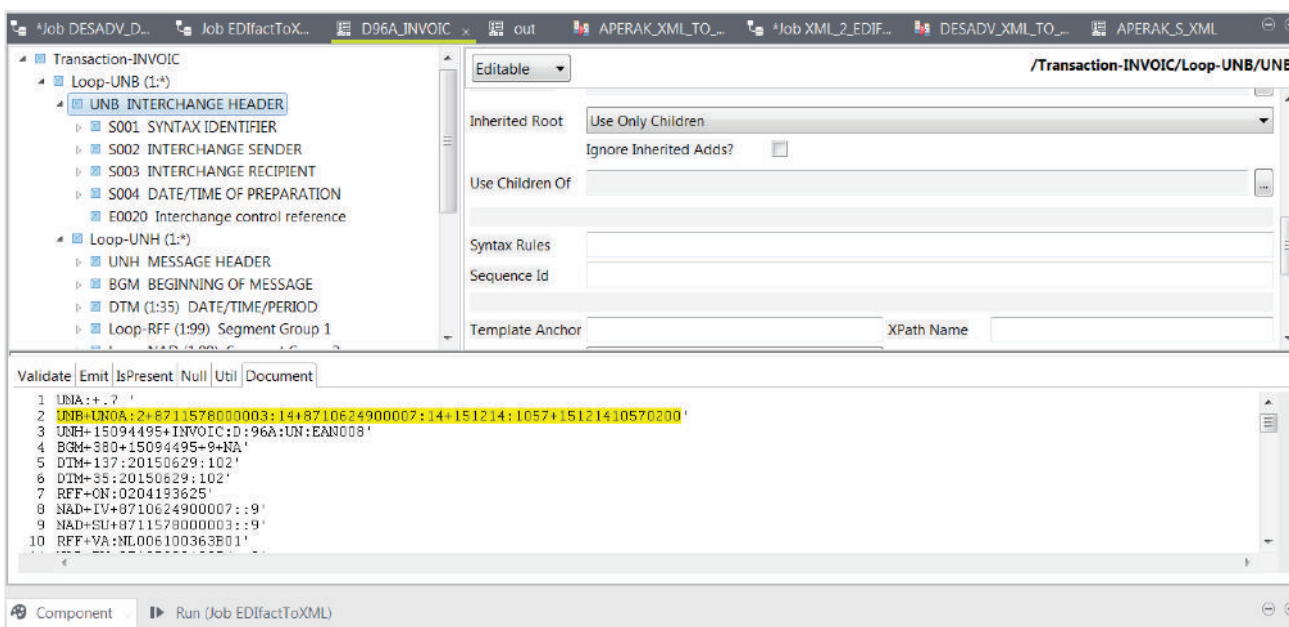


Figure 18.5 Sample EDI Application

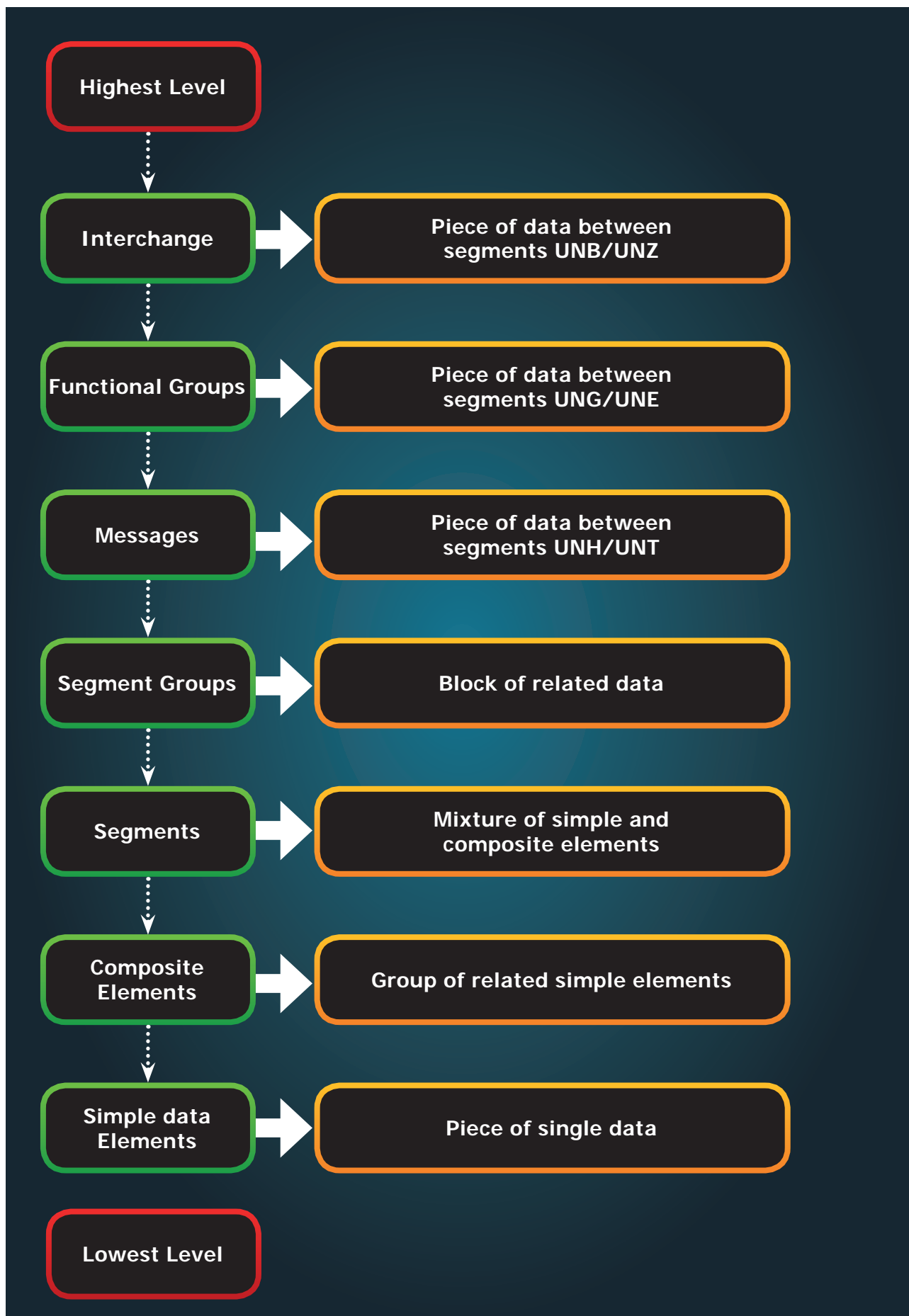


Figure: 18.6 UN/EDIFACT Message structure

EDIFACT message

The basic standardization concept of EDIFACT is that there are uniform message types called United Nations Standard Message (UNSM). In so-called subsets, the message types can be specified deeper in their characteristics depending on the sector. The message types, all of which always have exactly one nickname consisting of six uppercase English alphabets. The message begins with UNH and ends with UNT

- Service messages
 - To confirm / reject a message, CONTRL and APERAK messages are sent.
 - CONTRL- Syntax Check and Confirmation of Arrival of Message
 - APERAK - Technical error messages and acknowledgment
- Data exchange
 - CREMUL - multiple credit advice
 - DELFOR- Delivery forecast
 - IFTMBC - Booking confirmation

EDIFACT Segment

It is the subset of message. A segment is a three-character alphanumeric code. These segments are listed in segment tables. Segments may contain one, or several related user data elements.

EDIFACT Elements

The elements are the piece of actual data. These data elements may be either simple or composite.

An excerpt from an EDIFACT message might be:

DTM + 11: 200 606 200 730: 203'

This whole line is called a segment. The meaning of each code is as follows:

- DTM is the segment identifier and it indicates that the following data is date / time information.
- 11 is a data element. In this example, a qualifier describes what kind of event is meant. The code 11 means: time of dispatch / delivery of goods.
- 200606200730 is another element. Here it represents the date in the format CCYYMMDDHHMM.
- 203 is also an element. 203 is an identifier for the date format.

In this example, 203 means that the date is in the format CCYYMMDDHHMM (as of D.18B, CC – century, YY – Year, MM- Month, DD – Date, HH – Hour, MM – Minute)

EDI Separators

EDIFACT has the following punctuation marks that are used as standard separators.

Character	Uses
Apostrophe '	segment terminator
Plus sign +	segment tag and data element separator
Colon :	component data element separator
Question mark ?	release character
Period .	decimal point

Example:

UNA:+.? ‘
UNB+IATB:1+6XPPC:ZZ+LHPPC:ZZ+940101:0950+1’
UNH+1+PAORES:93:1:IA’
MSG+1:45’
IFT+3+XYZCOMPANY AVAILABILITY’
ERC+A7V:1:AMD’
IFT+3+NO MORE FLIGHTS’
ODI’
TVL+240493:1000::1220+FRA+JFK+DL+400+C’
PDI++C:3+Y::3+F::1’
APD+74C:0:::6++++++6X’
TVL+240493:1740::2030+JFK+MIA+DL+081+C’
PDI++C:4’
APD+EM2:0:1630::6++++++DA’
UNT+13+1’
UNZ+1+1’

POINTS TO REMEMBER

- According to the National Institute of Standards and Technology, EDI is “the computer-to-computer interchange of strictly formatted messages that represent documents other than monetary instruments.”
- EDI is “Paperless Trade” and EFT (Electronic Transfer) is “Paperless Payment”
- **Ed Guilbert**, is called as the father of EDI
- In 1985, UN created the EDIFACT to assist with the global reach of technology in E-Commerce.
- Direct EDI is also called as Point-to-Point EDI
- Every EDI message consist of six uppercase English Alphabets

A-Z GLOSSARY

Advance ship notice	A notification of pending deliveries
FTP	A standard network protocol used for the transfer of computer files between a client and server on a computer network.
Interchange	The top level message of EDI hierarchical structure
Invoice	A commercial document issued by a seller to a buyer containing product name, quantity and price.
Purchase order	A commercial and first official document issued by a buyer to a seller indicating types, quantities, and agreed prices for products or services.
Segment	Segments may contain one, or several related user data elements.
Separators	punctuation marks that are used to separate segments or elements.
TDCC	Transportation Data Communication Committee - The first industry-specific EDI standard.
Telex	A type of teleprinter
VAN	Value Added Network, a third party network service provider

EVALUATION



Part - I

Choose the correct answer

1. EDI stands for
 - a) Electronic Details Information
 - b) Electronic Data Information
 - c) Electronic Data Interchange
 - d) Electronic Details Interchange
2. Which of the following is an internationally recognized standard format for trade, transportation, insurance, banking and customs?
 - a) TSLFACT
 - b) SETFACT
 - c) FTPIFACT
 - d) EDIFACT
3. Which is the first industry-specific EDI standard?
 - a) TDCC
 - b) VISA
 - c) Master
 - d) ANSI
4. UNSM stands for?
 - a) Universal Natural Standard message
 - b) Universal Notations for Simple message
 - c) United Nations Standard message
 - d) United Nations Service message



5. Which of the following is a type of EDI?
- Direct EDI
 - Indirect EDI
 - Collective EDI
 - Unique EDI
6. Who is called as the father of EDI?
- Charles Babbage
 - Ed Guilbert
 - Pascal
 - None of the above
7. EDI interchanges starts with _____ and ends with _____
- UNA, UNZ
 - UNB, UNZ
 - UNA, UNT
 - UNB, UNT
8. EDIFACT stands for
- EDI for Admissible Commercial Transport
 - EDI for Advisory Committee and Transport
 - EDI for Administration, Commerce and Transport
 - EDI for Admissible Commerce and Trade
9. The versions of EDIFACT are also called as
- Message types
 - Subsets
 - Directories
 - Folders

10. Number of characters in an single EDIFACT messages
- 5
 - 6
 - 4
 - 3

Part - II

Short Answers

- Define EDI.
- List few types of business documents that are transmitted through EDI.
- What are the 4 major components of EDI?
- What is meant by directories in EDIFACT?
- Write a note on EDIFACT subsets.

Part - III

Explain in Brief Answer

- Write a short note on EDI.
- List the various layers of EDI.
- Write a note on UN/EDIFACT.
- Write a note on EDIFACT message.
- Write about EDIFACT separators

Part - IV

Explain in detail

- Briefly explain various types of EDI.
- What are the advantages of EDI?
- Write about structure of EDIFACT.



STUDENT ACTIVITY

- Prepare a chart explaining various types of EDI standards. (e.g. web EDI)

