Electronic Data Interchange (EDI)

- **Electronic data interchange** (**EDI**) is the process used by organizations in order to transmit the data between organizations by electronic means. It is used to transfer electronic documents or business data from one computer system to another computer system, i.e. from one trading partner to another trading partner without human intervention.

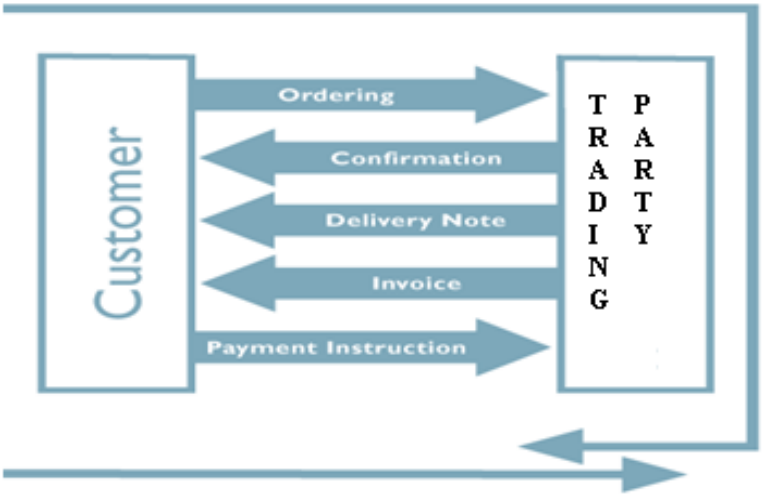


Fig. 8.1 Flow of messages

- Here, are two major parties i.e. Customer & Merchant,
- Customer firstly order for the required product. Trading party then give confirmation, Delivery note, Invoice & Acknowledgements for the product status. At the end, customer pays for the product.
- Here, We have shown the basic overview but EDI is somewhat complex. EDI is used by organizations for transactions that occur on regular basis to a predefined format.
- Organizations that send or receive documents between each other are referred to as "trading partners" in EDI terminology. The trading partners agree on the specific information to be transmitted and how it should be used.
- EDI is also known as paperless trading.
- EDI is basically-
- ***"The transfer of structured data, by agreed message standards, from one computer system to another, by electronic means."***

EDI has four elements, each of them essential to an EDI system:

- **Structured Data:** EDI transactions are composed of codes, & short pieces of text. Each Element with a strictly defined purpose. Fore.g An order has codes for the customer & product & values such as quantity ordered.
- **Agreed Message Standards:** The EDI transaction has to have a standard format. The standard is not just agreed between the trading partners but is a general standard agreed at national or international level. A purchase order will be one of a number of agreed message standards.

- **From one computer system to another:** The EDI message sent is between two computer applications. There is no requirement for people to read the message or re-key it into a computer system. For e.g. The message is directly between the customer's purchasing system & the supplier's order processing system.
- **By electronic means:** Usually this is by data communications but the physical transfer of magnetic tape or floppy disc would be within the definition of EDI. Often networks specifically designed for EDI will be used.

Main Features of EDI:

- EDI's use structured formatted messages that are based on agreed standards - in this way the messages can be read by any system that understands the rules they are governed by. However, this is not always as simple as it seems, as there are also the provision of EDI translation software packages.
- Required to set up an interface between the company computer and the EDI sent/received document.
- EDI provides a relatively fast delivery of electronic documents from sender to receiver.
- EDI provides direct communication between applications, rather than between computers.
- EDI includes data management and networking capabilities, data processing, the efficient capture of data into electronic form, the processing and retention of data, controlled access to it, and efficient and reliable data transmission between remote sites.

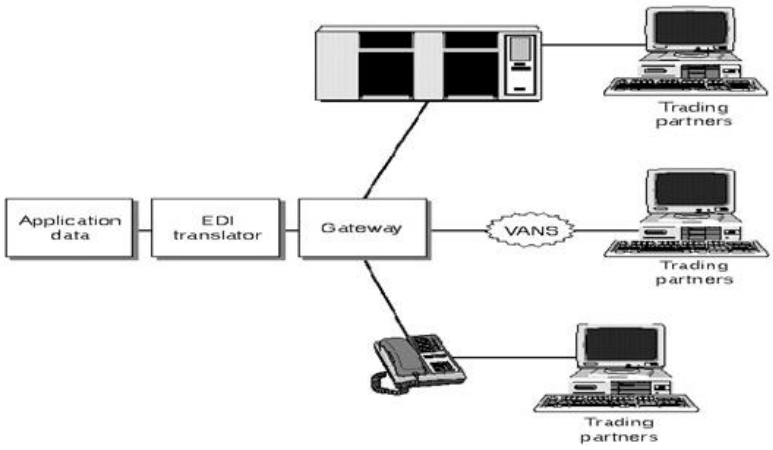
Benefits of EDI:

- **Reduced paperwork:** Even when paper documents are maintained in parallel with EDI exchange, e.g. printed shipping manifests, electronic exchange and the use of data from that exchange reduces the handling costs of sorting, distributing, organizing, and searching paper documents.
- **Cost cutting:** The use of EDI can cut costs. These include the costs of stationary & postage but these will probably be fully matched by the costs of running the EDI service.EDI and similar technologies allow a company to take advantage of the benefits of storing and manipulating data electronically without the cost of manual entry.
- **Reduced Errors:** Another advantage of EDI is reduced errors, such as shipping and billing errors, because EDI eliminates the need to rekey documents on the destination side. Keying an information into the computer system is a source of errors & keying paper orders into order processing system is no exception.EDI eliminates this source of errors. On the down side, there is no order entry clerk who might have spotted errors made by the customer- the customer will get what the customer asked for.
- **Faster Response:** With paper orders it would be several days before the customer was informed of any supply difficulty, such as the product is out of stock. With

EDI the customer can be informed straight way giving time for an alternative product to be ordered or an alternative supplier to be used.

- **Improved funds transmission:** Due to this increased efficiency of non-paper accounts, cash flow will improve as electric fund transmission is able to begin much earlier than previously.
- **Improved Shipping Service:** Shipping is also improved as EDI provides quick and efficient information as it relies on barcode information to communicate. It is able to track inventory and eliminates the incidence of lost packages due to their isolation from the larger shipping order. EDI greatly improves accuracy of data as it is all automated.
- **EDI payment:** Payment can also be made by EDI. The EDI payment system can also generate an EDI payment advice that can be electronically matched against the relevant invoices, again avoiding query & delay.

EDI System



Difference between EDI & Email:

- EDI sounds similar to electronic mail (email), but is actually quite different. While email allow for free unstructured test messages to be sent from one computer to another (or multiple) computers, EDI supports structured business messages to be transmitted between partners. Previously these would have been hard copy documents or printed business documents. So rather than having documents pass from person to person, they go from computer to computer.

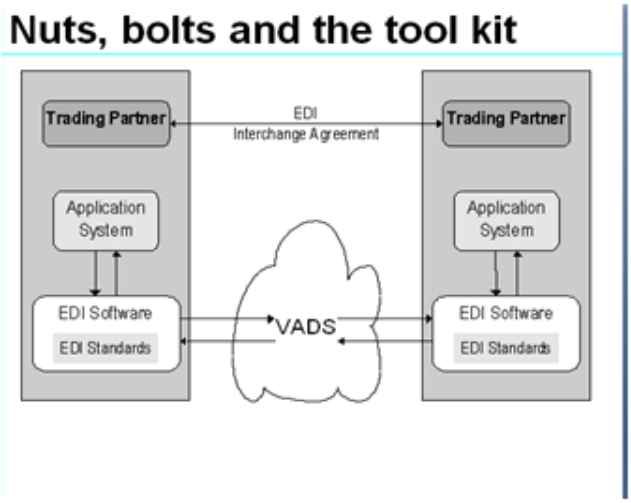
EDI: THE NUTS AND BOLTS

EDI Standards:

- At the heart of any EDI application is the EDI standard. The essence of EDI is the coding & structuring of the data into a common & generally accepted format.
- Documents sent via EDI can serve as input for a receiving a company's business application because they are formatted according to standards that stipulate where

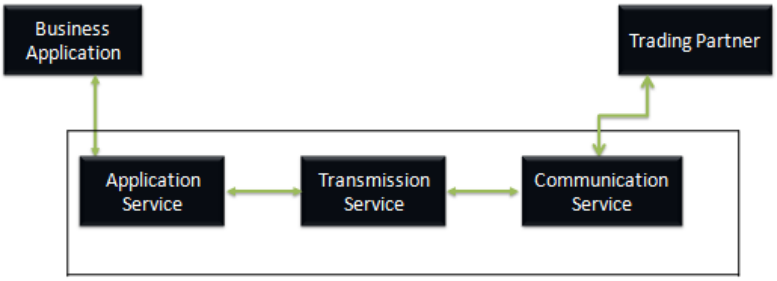
certain information should be located, such as where net total amount should appear on an invoice.

- These standards also define how individual pieces of information should be represented. For example, in the standards for an electronics industry purchase order, there are specific codes defined to identify the type of product or service being requested, e.g. PN (company part number), BY (buyers part number), VP (vendors part number), PW (part drawing), etc.



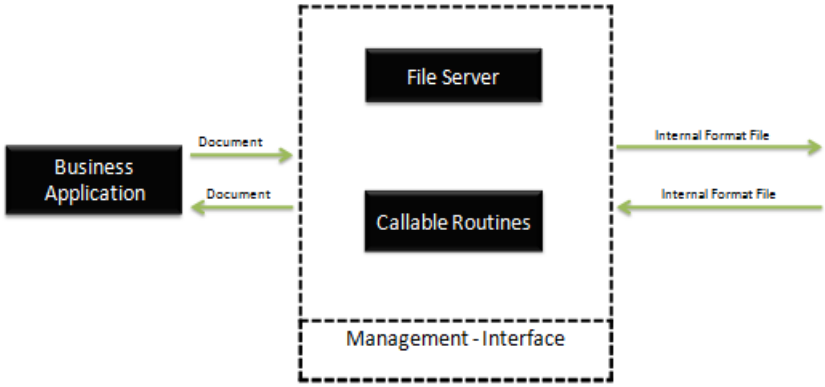
Components of EDI

1. Application service
2. Translation service
3. Communication service



1. **Application Services :-**

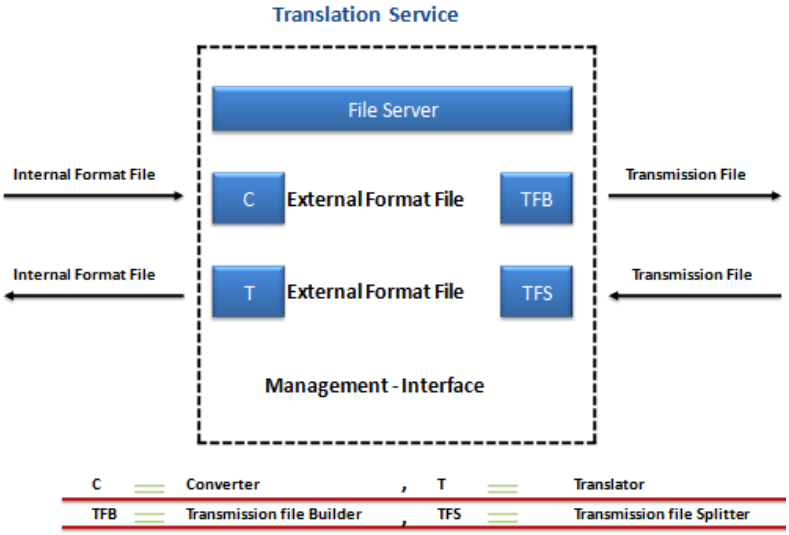
It provides the link between application and EDI. It allows you to send documents from an EDI system. The set of callable routine is used to transfer document from the business application into EDI document, destination can be either intra-company or to the external companies.



Application Service

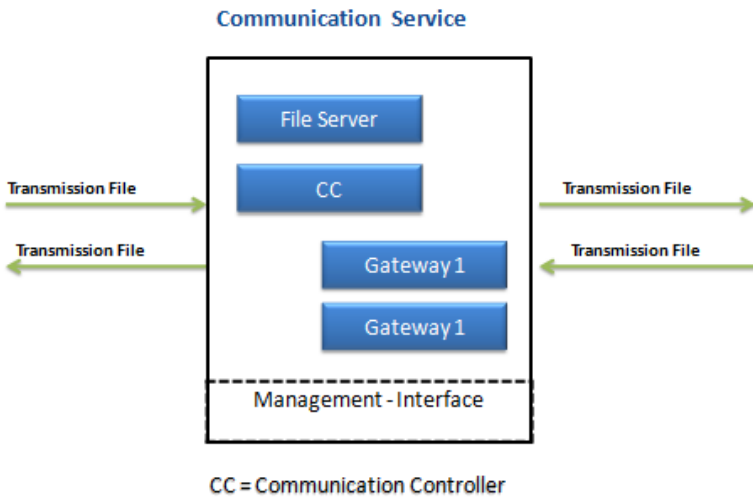
2. Translation service:-

Converts the outgoing documents from an internal format file to an agreed external format. Translates internal document from external format to EDI internal format file.



3. Communication service:-

The communication service sends and receives transmission files to and from the trading partners either directly or by using party service called a valued added network (VAN).



File Types

EDI creates following files as a document passes through the system:

1. **Internal format file (IFF):-**

It contains single document for single trading partner.

2. **External format file (EFF):-**

It contains same data as the internal format file translated into the appropriate standard document format.

3. **Transmission file:-**

It contains one or more document for the same trading partner. Documents of same format are packed into functional groups. The functional groups going to one trading partner are packaged into an interchanged set.

EDI software

1. **Translators:-**

Every EDI sender and receiver should have EDI translator. It varies based on the computer on which it is going to reside. The computer may be a micro computer or a midrange or a mainframe. Translator reads the fixed length file and generates valid EDI standard and maintains control information.

2. **Application link software:-**

Application link software is used to collect information from the business application and then it formats into fixed length computer file and passes it onto translators.

Types of EDI standards:

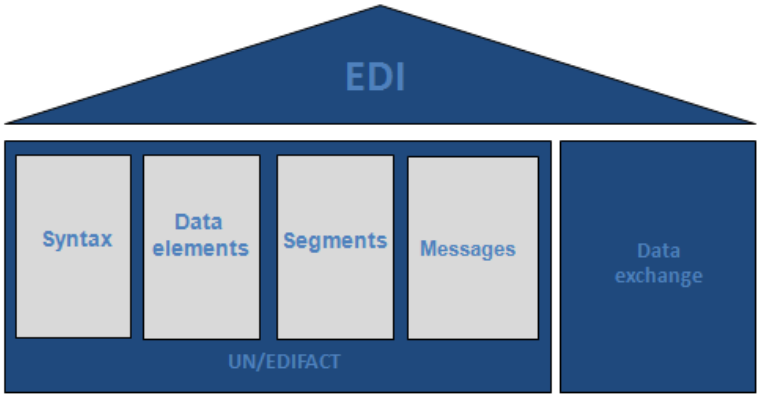
- **Proprietary standard** - EDI standard developed for a specific company or industry. This is also called a non-public or private standard.
- **Public standard** - EDI standard developed for use across one or more industries.

EDIFACT

- Electronic Data Interchange for Administration, Commerce, and Transport is the international set of EDI standards
- Became a UN standard in 1987

- Maintenance and further development is the responsibility of the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT)
- Includes syntax rules and implementation guidelines, message design guidelines, data elements, code sets, and other definitions
- Used for business-to-business (B2B) communication rather than business-to-consumer (B2C)
- Allows multi-country and multi-industry exchange

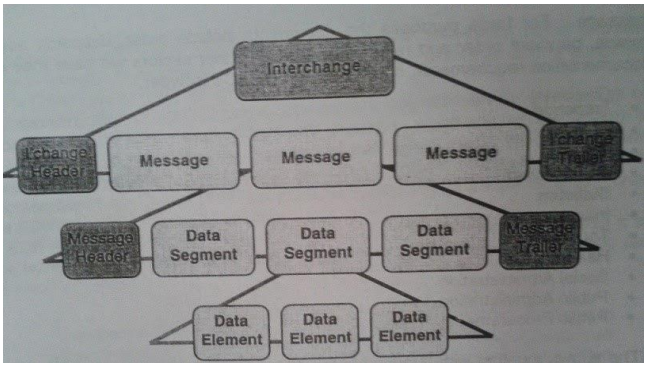
The four pillars of EDIFACT



- **Syntax**
- Rules for the definition of a message structure
- **Data elements**
- Smallest data unit
- Include codes & the values for items such as date & address code
- **Segments**
- Groups of related data elements
- **Messages**
- Ordered sequence of segments
- Defines a business transaction

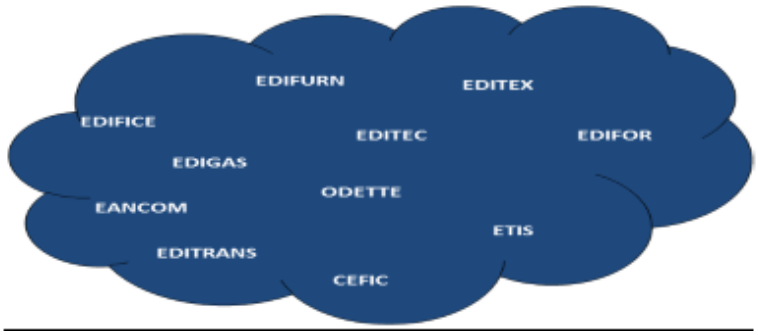
- **United Nations/Electronic Data Interchange For Administration, Commerce and Transport (UN/EDIFACT) is the international EDI standard developed under the United Nations.**

EDIFACT Structure Chart

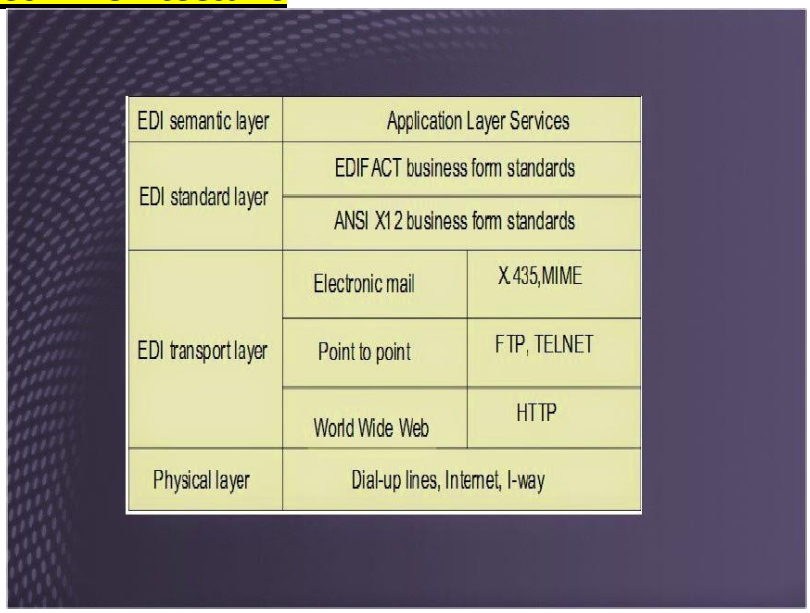


- **For EDIFACT each document type is referred to as a message. For trade purposes the documents include order, dispatch advice, invoice, payment order & remittance advice. Other sectors include their own documentation requirements, sectors using EDIFACT include:**
- Transport
- Customs
- Finance
- Construction
- Statistics
- Insurance
- Tourism
- Healthcare
- Social Administration
- Public Administration

EDIFACT subsets



EDI Layered Architecture



EDI Semantic layer:-

- Describes the business application

 Procurement example
- Requests for quotes
- Price quotes
- Purchase orders
- Acknowledgments
- Invoices

 Specific to company & software used

EDI Standard Layer:-

 Specifies business form structure so that information can be exchanged it also influence the content at application layer.

 The most competing standards are:

- American National Standards Institute(ANSI)X12
- EDIFACT developed by UN/ECE, Working Party for the Facilitation of International Trade Procedures

EDI Transport Layer:-

 It corresponds with non electronic activity of sending business from one company to another company.

 It can send via postal service, registered and certified mail & email etc.

 Generally, EDI transport layer chooses email as the carrier service.

EDI Physical Layer:-

 It describes physical devices which are involved in transaction.

 Dial-up lines, Internet, Value-Added Networks etc.

EDI in India

EC/EDI Council of India:

Chairman: Secretary Department of Commerce
Secretariat: EC/EDI Division Department of Commerce
Udyog Bhawan, New Delhi - 110011

EC/EDI council is the apex body consisting of all the key government departments and representatives of trade and industry. It is responsible for laying down the policy frame work and direction for:-

- promotion and propagation of EDI and Electronic Commerce.
- creating awareness and education among the potential EC/EDI functionaries and users
- streamlining procedures and practices attending to legal issues
- human resource development
- any other issue connected with EDI and Electronic Commerce

India EDIFACT Committee:

Chairman: Additional Secretary Department of Commerce
Secretariat: EC/EDI Division Department of Commerce

Udyog Bhawan, New Delhi - 110011

The India EDIFACT Committee (IEC) is responsible for formulatin standards, streamlining the procedures in line with UN/EDIFACT and maintain liaison with UN/EDIFACT bodies.

To address all the information needed on different sectors and its interface with UN/EDIFACT standards following Message Development Groups are working –

- Ports Message Development Group under Indian Ports Association (IPA)
- Airports Message Development Group under Airports Authority of India (AAI)
- Financial Message Development Group under Indian Banks Association (IBA)
- Customs Message Development Group under Central Board of Excise & Custom (CBEC)
- Private Sector Message Development Group under Federation of Indian Export Organisations (FIEO)
- **Working Group:** The working group is responsible for motivating various functionaries in the government and ensure scheduled implementation of program.
- **Technical Assessment Group:** The Technical Assessment Group is responsible for assessing the messages developed by the various agencies for structure and syntax conformance, to review the Implementation Guidelines prepared by various agencies for the respective messages developed by them and to prepare and circulate the EDIFACT Message Directory.
- Chairman : Senior Technical Director, NIC Department of Commerce Secretariat : EC/EDI Division Department of Commerce Udyog Bhawan, New Delhi - 110011

Education and Awareness: The Department of Commerce has identified key areas where immediate attention was required such as user awareness and human resource development. For creating awareness in respect of EC/EDI, four organizations have been identified namely Federation of Indian Export Organizations (FIEO), All Indian Management Association (AIMA), National Informatics Centre (NIC) and Indian Institute of Foreign Trade(IIFT). The course contents for awareness and training programmes have been structured and programmes for various level of management have been devised. This Ministry also organizes EDICON (An international conference and exhibition on Trade Facilitation (TF/EC/EDI) every year along with special session for CEOs of top Indian companies.

VAN Service Providers: Department of Telecom has already licensed a number of operators for Value Added Network (VAN) services. National Informatics Centre (NIC) and Videsh Sanchar Nigam Limited(VSNL) are the two major companies/organizations providing high speed information highway for EC/EDI services within the country and connectivity to foreign networks. A number of other companies also recognized the emerging EC/EDI market and approached the Department of Telecommunications, which is the licensing authority for

(VAN) Value Added Network operations in India. Companies such as Global Electronic Commerce Services Ltd., Mahindra Network Services, Satyam Infosys, CMC Ltd., Manipal Control Data Electronic Commerce Systems etc.., have started EC/EDI services.

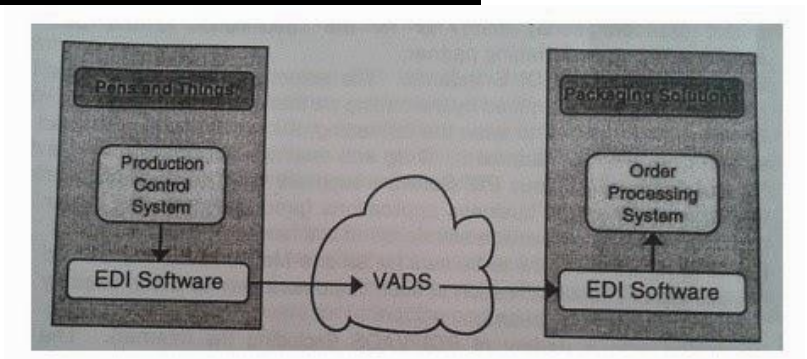
Co-ordinated EC/EDI implementation project

- To facilitate international trade a co-ordinated EC/EDI implementation project is underway in following departments/organisations :
  - Customs
  - Directorate General of Foreign Trade (DGFT)
  - Apparel Export Promotion Council/Cotton & Textile Export Promotion Council etc.
  - Port Trusts
  - Airport Authority of India (AAI)
  - Container Corporation of India (CONCOR)
  - Reserve Bank of India (RBI)
  - Scheduled Banks
  - Airlines
  - Indian Railways
  - CHA/Freight Forwarders
  - Export Promotion Organization

EDI IMPLEMENTATION

- The First Technical element of the EDI system is the EDI software. It is a complete suite of software for creating, transmitting, receiving, managing and tracking EDI documents. It contains the tools needed to fine-tune EDI invoicing, from EDI document editing, to document review, to document selection.
- The system design is comprehensive and can convert invoices, returns, change notices, statements, purchase orders, and title catalogues into the EDI format.
- If pens & things is to send an order from its production control system to packaging solutions it needs to code that order into the agreed EDI standard &'squirt' it into the chosen VADS. To pickup the order at the other end, packaging solutions has a similar need to extract the data from the network & to decode the data from EDI message into its order processing system. The coding/Decoding of EDI messages & interfacing with VADS in normally achieved using EDI software as shown in Fig.

Sending an order using EDI software



- Technically EDI comes down to imports/exports to/from your system and some data communication. It is good practice to keep this import/export as simple as possible, and to concentrate on the impact of EDI on your system and organization. You will want ONE import/export in your system (for each information flow).You don't want to handle all the EDI details in the import/export module, like you don't want to handle the logic of printer drivers in your application.

EDI Enabled Procurement Process

PROCUREMENT

- Procurement is the process whereby companies purchase goods and services from various suppliers. These include everything from indirect goods like light bulbs, uniforms, toilet paper, and office supplies, to the direct goods used for manufacturing products.
- Procurement also involves the purchase of temporary labor, energy, vehicle leases, and more. Companies negotiate discount contracts for some goods and services, and buy others on the spot. Procurement can be an important part of a company's overall strategy for reducing costs.
- Historically, the individuals or departments responsible for purchasing a company's goods and services relied on various methods for doing so. The most basic included placing orders via telephone, fax, or mail.

E-PROCUREMENT

- Electronic procurement methods, generally referred to as e-procurement, potentially enable the procurement process to unfold in a faster, more efficient manner, and with fewer errors. These methods include electronic data interchange (EDI), online marketplaces or e-marketplaces, and various blends of the two.
- EDI deals more with the way information is communicated during procurement than it does with the act of linking buyers and suppliers.
- By definition, EDI is the electronic exchange of business information—purchase orders, invoices, bills of lading, inventory data, and various types of

confirmations—between organizations or trading partners in standardized formats.

- EDI also is used within individual organizations to transfer data between different divisions or departments, such as finance, purchasing, and shipping. Two characteristics set EDI apart from other ways of exchanging information.
- First, EDI only involves business-to-business transactions; individual consumers do not directly use EDI to purchase goods or services.
- Secondly, EDI involves transactions between computers or databases, not individuals. Therefore, individuals sending e-mail messages or sharing files over a network does not constitute EDI.
- EDI can occur point-to-point, where organizations communicate directly with one another over a private network; via the Internet (also known as open EDI); and most commonly, via value-added networks (VANs), which function like telephone lines by allowing for the transfer of information.
- In the early 2000s, although many companies still relied on VANs, the Internet was playing a larger role in EDI. It is possible for companies to translate the files used during EDI and send them to another company's computer system over the Internet, via e-mail, or file transfer protocol (FTP).
- Because it is an open network and access is not terribly expensive, using the Internet for EDI can be more cost effective for companies with limited means.
- It has the potential to provide them with access to large companies who continue to rely on large, traditional EDI systems.
- The low cost associated with open EDI also means that more companies are likely to participate. This is important because the level of value for participants often increases along with their number.

E-procurement tools and applications:

Some e-procurement tools and applications include:

- Electronic systems to support traditional procurement
- EDI (electronic data interchange)
- ERP systems
- Internet as a support or complement to traditional procurement
- Electronic mail (e-mail)
- Web enabled EDI
- Extensible markup language (XML)
- World wide web (www)
- Internet tools and platforms that replace traditional procurement

EDI (Electronic Data Interchange)

- EDI is an application whereby electronic messages can be exchanged between computer programs of two separate organizations. Some features of EDI include:
- Messages are exchanged in groups, known as batches.
- Messages can automatically be sent, transmitted and stored between computers without retyping or keying data.

- EDI has to be implemented by each pair of organizations (sender and receiver) who wish to use it. This means that the implementation costs of EDI are relatively high.
- EDI is mostly used where the messages exchanged concern such matters as orders, confirmations, transport information and invoicing.

- EDI traditionally runs on so-called, "Value Added Networks", which are closed networks (unlike open networks like the Internet).
  The figure below illustrates the categories of electronic communication exchange between people and computers:-

Communication Party 1 / Communication Party 2	Person	Computer Programme
Person	Email	World Wide Web
Computer Programme	World Wide Web	Web enabled EDI / XML

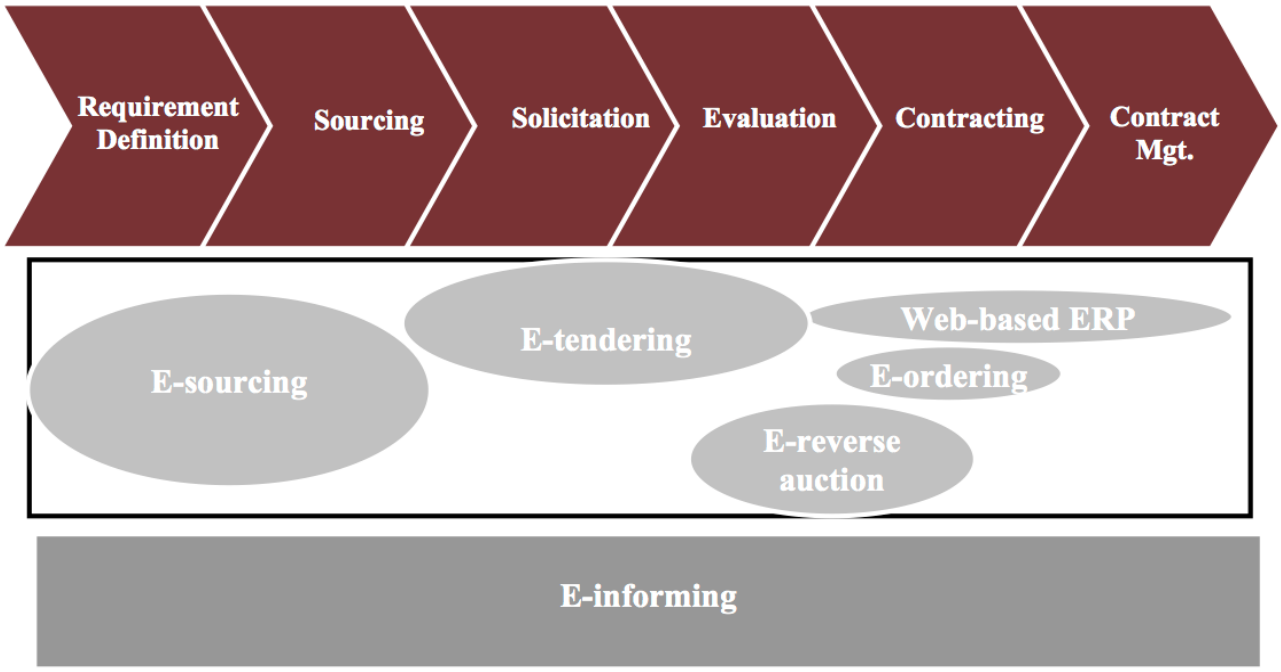
Internet tools and platforms that replace traditional procurement: Some internet tools and platforms that replace traditional procurement include:

- E-sourcing
- E-tendering
- E- auctioning
- E-ordering and web-based ERP
- E-informing
- **E-Sourcing:** E-sourcing supports the specification phase; it can be used to pre-qualify suppliers and also identifies suppliers that can be used in the selection phase. For suppliers the benefit is: "marketing" and for the buying organizations the benefit is facilitating the sourcing of suppliers. The UN Global Market Place (UNGM www.ungm.org) is an example of an E-sourcing tool.
- **E-tendering:** E-tendering supports the selection stage and acts as a communication platform between the procuring organization and suppliers. It covers the complete tendering process from REOI via ITB/RFP to contracting, usually including support for the analysis and assessment activities; it does not include closing the deal with a supplier but facilitates a large part of the tactical procurement process. It results in equal treatment of suppliers; transparent selection process; reduction in (legal) errors; clear audit trial; more efficiency in the tactical procurement process and improved time management of tendering procedures. Some UN organizations such as UNDP-IAPSO and UNHCR have

used E-tendering in the formulation of long-term agreements for vehicles, tents, motorcycles and pharmaceuticals through an in-house developed tendering portal.

- **E-auctioning:** E-auctioning supports the contract stage. It enables the closing of a deal with a supplier if parties agree on price. They operate with an upward or downward price mechanism e.g. e-auctioning with upward price mechanism for the selling organization and e-reverse auctioning with a downward price mechanism for the buying organization. They can be made in accordance with traditional ITB/RFP. They are internet based using open or closed systems.
- **E-ordering and web-based ERP:** E-ordering and web-based ERP is the process of creating and approving procurement requisitions, placing purchase orders, as well as receiving goods and services ordered, by using software systems based on the Internet.
- **E-informing:** E-informing is not directly associated with a stage in the procurement process; it is the process of gathering and distributing procurement information both from and to internal and external parties using Internet technology.

E-procurement in the procurement cycle: The figure below shows the six forms of e-procurement plotted in the procurement process



Each of these forms can be explained as follows:

- E-sourcing supports the specification phase; it identifies suppliers that can be used in the selection phase.
- E-tendering supports the selection phase; it facilitates the REOI and ITB/RFP activities, usually including support for the analysis and assessment activities.
- E-reverse auctioning supports the contract phase; it enables closing a deal with a supplier;

- E-ordering and web-based ERP is the process of creating and approving procurement requisitions, placing purchase orders, as well as receiving goods and services ordered, by using a software system based on the Internet.
- E-informing is not directly associated with a phase in the procurement process; it is the process of gathering and distributing procurement information both from and to internal and external parties using Internet technology.

E-procurement strategy – costs, benefits and risks

The following costs and benefits as identified by de Boer, Harink et al. (2002), can be influenced by e-procurement:

- The cost of expenditure on goods/services related directly to the production/service delivery.
- The cost of non-production of goods and services.
- The cost of operational procurement activities – e.g., requisitioning, ordering, expediting and administrative support.
- The cost of tactical procurement activities – e.g., formulating specifications, selecting suppliers, negotiating with suppliers, contracting, disposals etc.
- The costs of strategic procurement activities – e.g., spend analysis, transaction analysis, market analysis, planning, developing procurement policies etc.
- Internal benefits arising from investments in particular inter-organizational relationships.
- The contribution of investments in particular inter-organizational relationships to revenues.
- These costs and benefits should be assessed in relation to each e-procurement tool. While it is usually assumed that e-procurement will automatically deliver benefits, the actual benefits will depend on many factors including: cost of required investment, ability to convert associated savings to cash, nature of the procurement process being automated, particular supply market and the extent to which the organization supports its implementation.