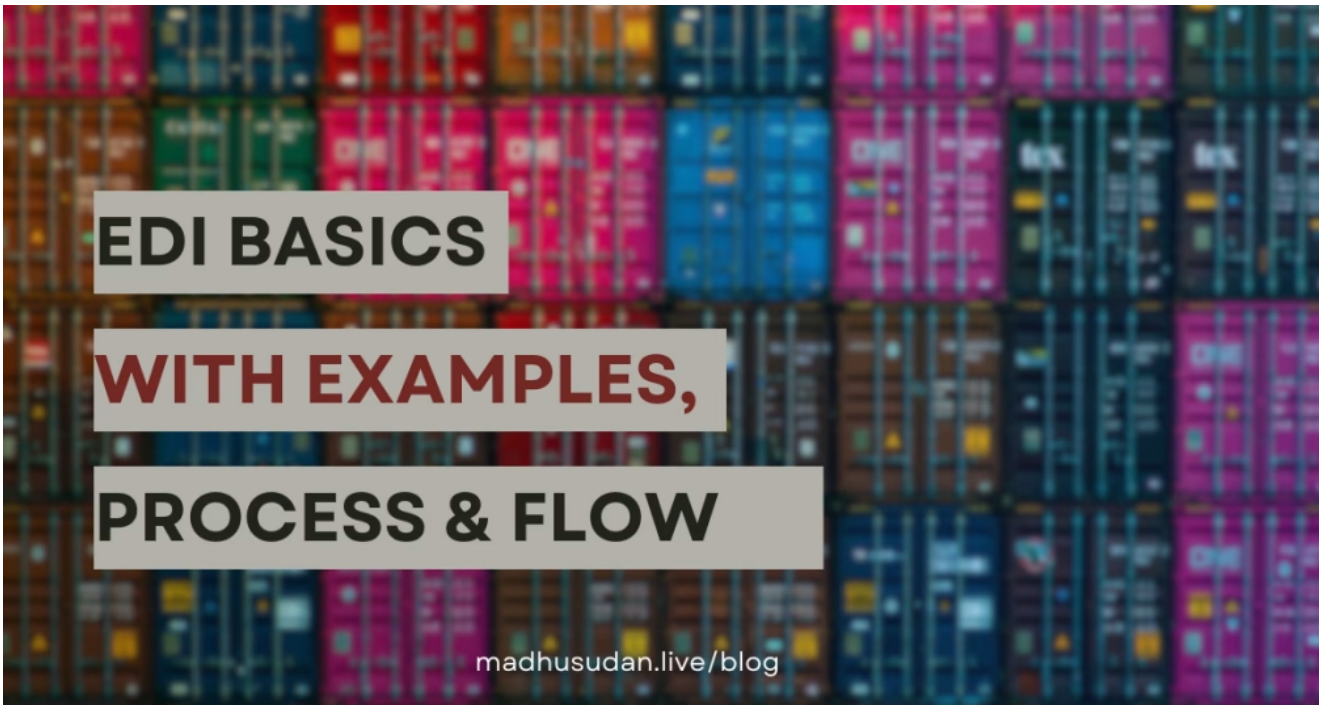
Electronic Data Interchange Basics: Examples, Process and Flow

madhusudan.live/blog/electronic-data-interchange-examples-process-flow



EDI Basics

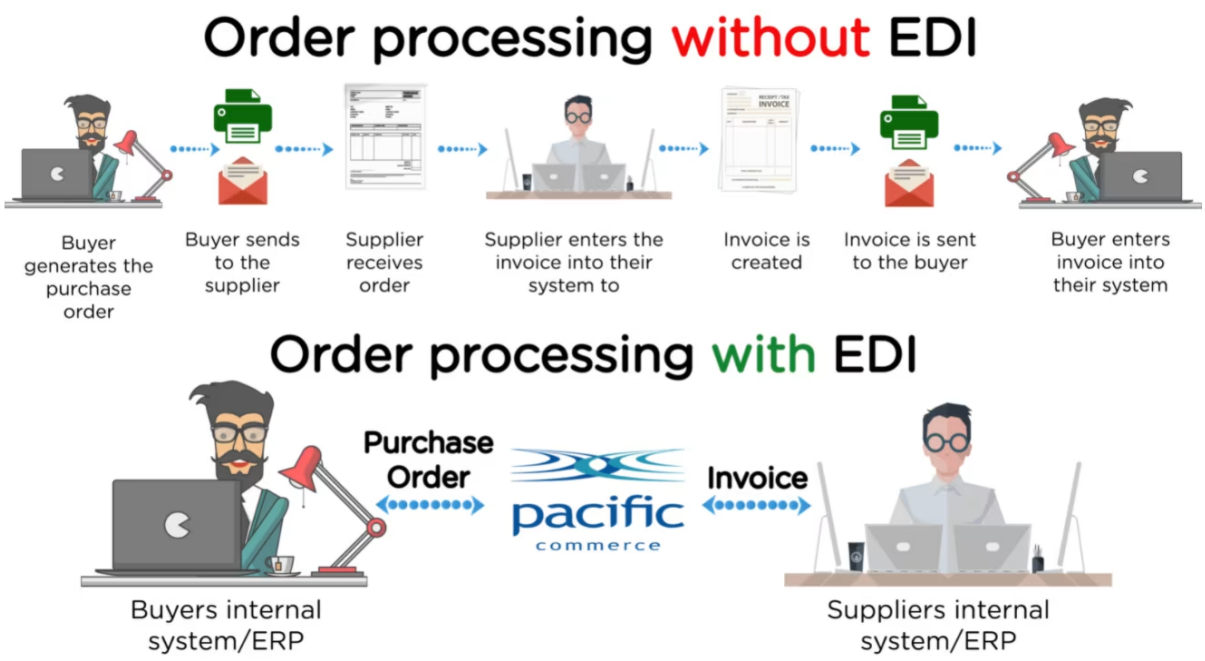
EDI stands for Electronic Data Interchange, which is a **process of exchanging information from one company to another company electronically without using paper documents**. Mainly used in supply chain management or e-commerce to handle transactions effectively and easily.

EDI is completely based on computer system, the data interchange happens over the network, using standard electronic format to communicate the data / information.

Key Benefits of EDI

EDI has so many benefits over the traditional paper documents approach, let's see the benefits first:

1. These processes work without human intervention.
2. EDI is fast, efficient, and can be automated which also reduces errors.
3. It is cost-efficient.
4. EDI Can Increase Sales.



(Source: Google) Processing with and without EDI

Difference between EDI & Paper-based Transactions

Okay, but how does traditional approaches work? You might ask me.

here's a quick comparison between the traditional approach (without EDI) and with EDI.

- Traditional methods require a lengthy and time-consuming process which is difficult to manage, has several drawbacks and has a cumbersome structure.
- The traditional methods take too long to process, it can be as long as 3 to 5 days.
- Traditional methods require a lot of human intervention, so there are chances of data manipulation. Also, the operation does not occur in real time.
- Whereas, EDI is time-saving and normally occurs overnight and can take less than an hour.
- EDI is fast, secure, and reliable as it doesn’t need human intervention and updates within very few minutes, we can say near real-time.

So, I hope you have understood the importance and benefits of EDI, now see where EDI is applicable.

Let's discuss what kinds of business categories can benefit from the EDI technology.

EDI in E-Commerce Business

Typically, there are two categories of a business:

B2C, i.e., Business to Customer:

EDI has less exposure to this Business type as the data or the processing can be comparatively smaller and done easily without the need to have the EDI tools.

An example would be (DMart to Customer)

B2B, i.e., Business to Business:

B2B has a great EDI exposure as the data needs to reflect both parties (Businesses). Also, there is slightly higher complexity and thus processing is not easier, hence we use EDI tools.

For example, DMart to Maggie.

EDI Standards

EDI standards define the structure and format of electronic documents exchanged between trading partners. They ensure that the data is consistent and can be interpreted correctly by both parties.

There are several EDI standards used for electronic data interchange. Here are some commonly used standards:

ANSI (American National Standards Institute): ANSI is a non-profit organization in the United States that governs a set of rules or standards for products, services, systems, or personnel.

Example: If the driver forgot to wear a seat belt, then give a beep sound as an alarm. An example could be if you are driving a car the speed exceeds the limit of 120KMPH then it starts beeping.

The ANSI-specified formats for EDI include:

- X12 transaction sets: Widely used in the United States and globally.
- EDIFACT: Mainly used in European countries, but can also be found globally in rare instances.
- Excel, CSV, JSON, IDOC: Other file formats that can be used for EDI.

Communication Modes / Protocols

To exchange EDI documents, various communication protocols can be used. Some common communication modes/protocols include:

1. **AS2:** Applicability Statement 2 is a widely used protocol for secure data transmission over the Internet.

2. **FTP (File Transfer Protocol):** A standard network protocol used to transfer files between a client and a server on a computer network.
3. **SFTP (SSH File Transfer Protocol):** A secure version of FTP that uses SSH to encrypt data during transmission.
4. **HTTP (Hypertext Transfer Protocol):** A protocol used for transmitting hypertext over the internet.
5. **HTTPS (HTTP Secure):** An extension of HTTP that provides secure communication over a computer network.
6. **ROSET TANET:** A proprietary communication protocol used for EDI exchange.
7. **API Calls:** Application Programming Interface (API) calls can be used to exchange data between systems.

These communication protocols ensure the secure and reliable transmission of EDI documents between trading partners.

In summary, EDI standards define the structure and format of electronic documents, while communication modes facilitate the secure exchange of these documents between trading partners.

How does EDI work?

Let's understand the working of EDI with an example, let's say this is a B2B communication between DMart and Maggie. understand the flow below.

DMart adds a file in FTP and Maggie will have access to the same file and Maggie will update the file with the requirements. This communication will happen over any ANSI-specified communication mode (here consider FTP), and thus both parties will have the file with the updated requirements in an instant.

EDI Tools

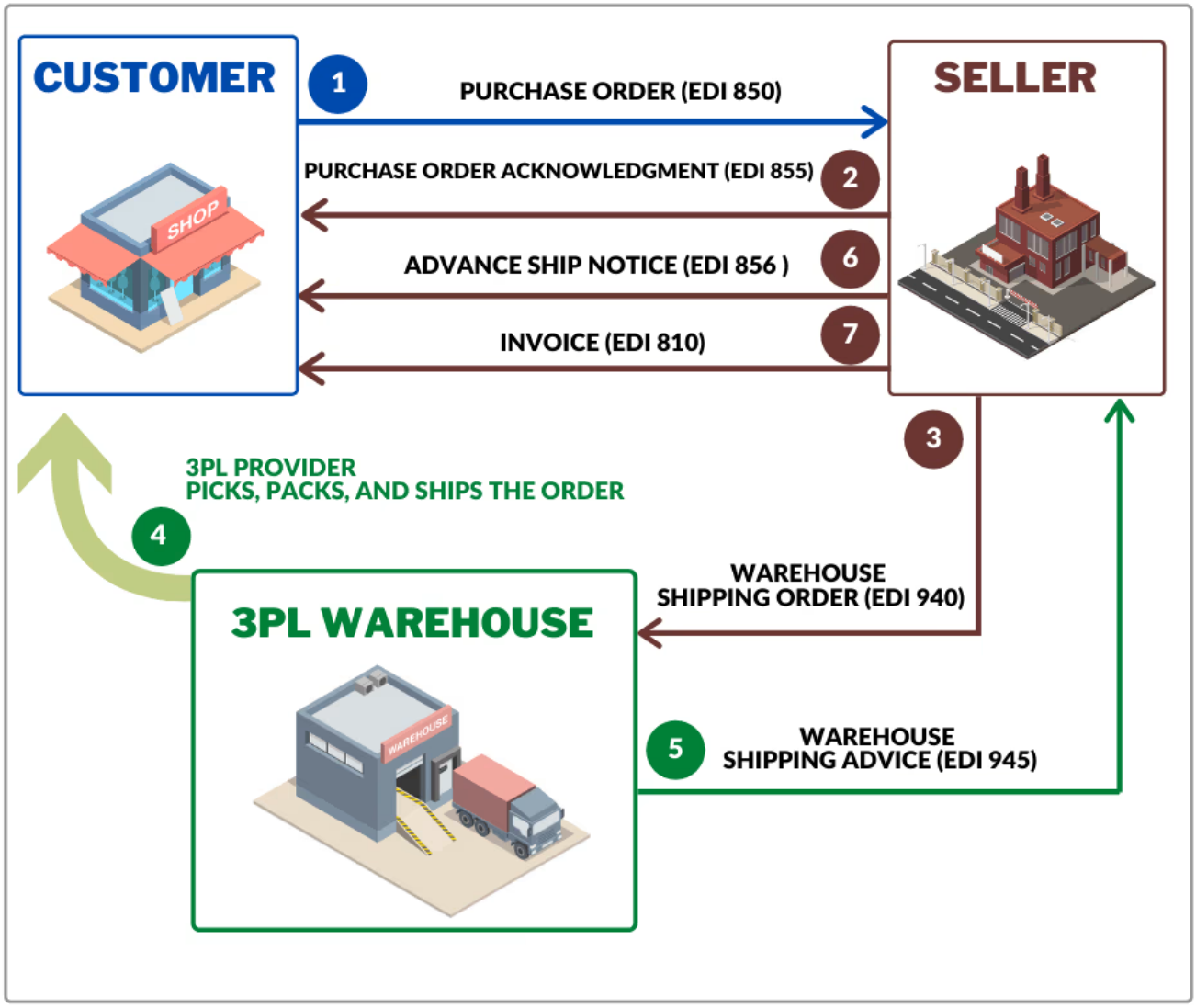
We use many tools to handle these documents, edit, manage the documents, and work with them efficiently, there are several tools available:

Middleware Tools

These are used for communication purposes and are used at the front end

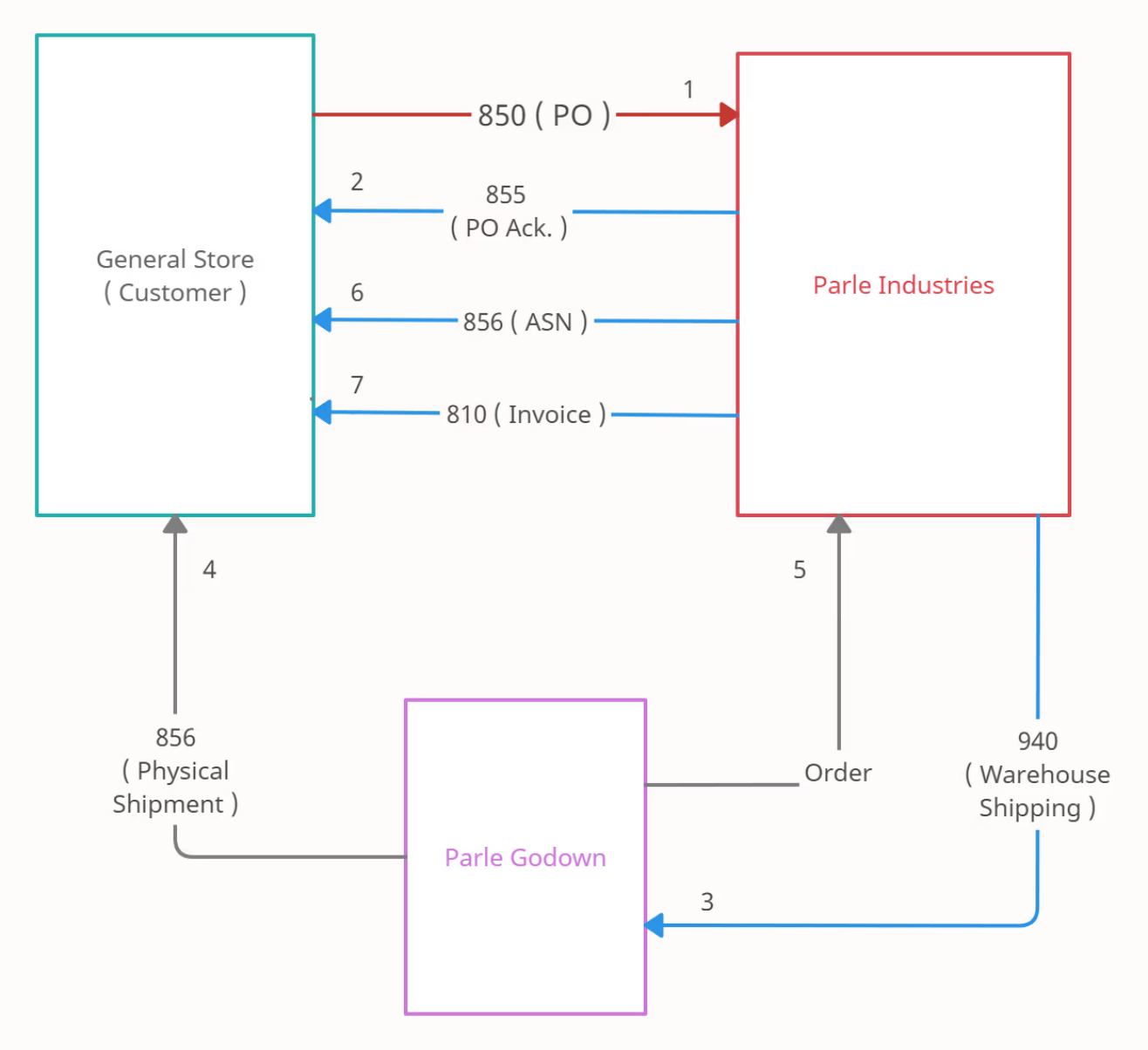
- Sterling Integrator
- Seeburger
- Web methods
- Dell Boomi
- AxWay
- Customized tools (Amazon, OpenText, GXS)

- SAP SD (Sales and Distribution)
- SAP WMS (Logistics)
- SAP HANA
- ERP (Enterprise Resource Planning) ERP is used by businesses/organizations to manage key parts such as accounting, manufacturing, sales, and marketing. It is used for backend operations such as order creation. ERP is used by businesses/organizations to manage key parts such as accounting, manufacturing, sales, and marketing. It is used for backend operations such as order creation.



(Source: Google) Process Flow Diagram

Let’s understand this flow with the example:



EDI Process Flow Diagram

EDI Messages and Their Flow

For General Store (Customer):

Inbound Messages	Outbound Messages
855, 856, 810	850

For Parle Industries:

Inbound Messages	Outbound Messages
850, 945	855, 856, 810, 940

For Parle Godown:

Inbound Messages	Outbound Messages
940	856, 945

Difference between X12 and EDIFact

X12 and EDIFACT have the same messages and same documents, just that their notation is different.

following are the differences between X12 and EDIFACT

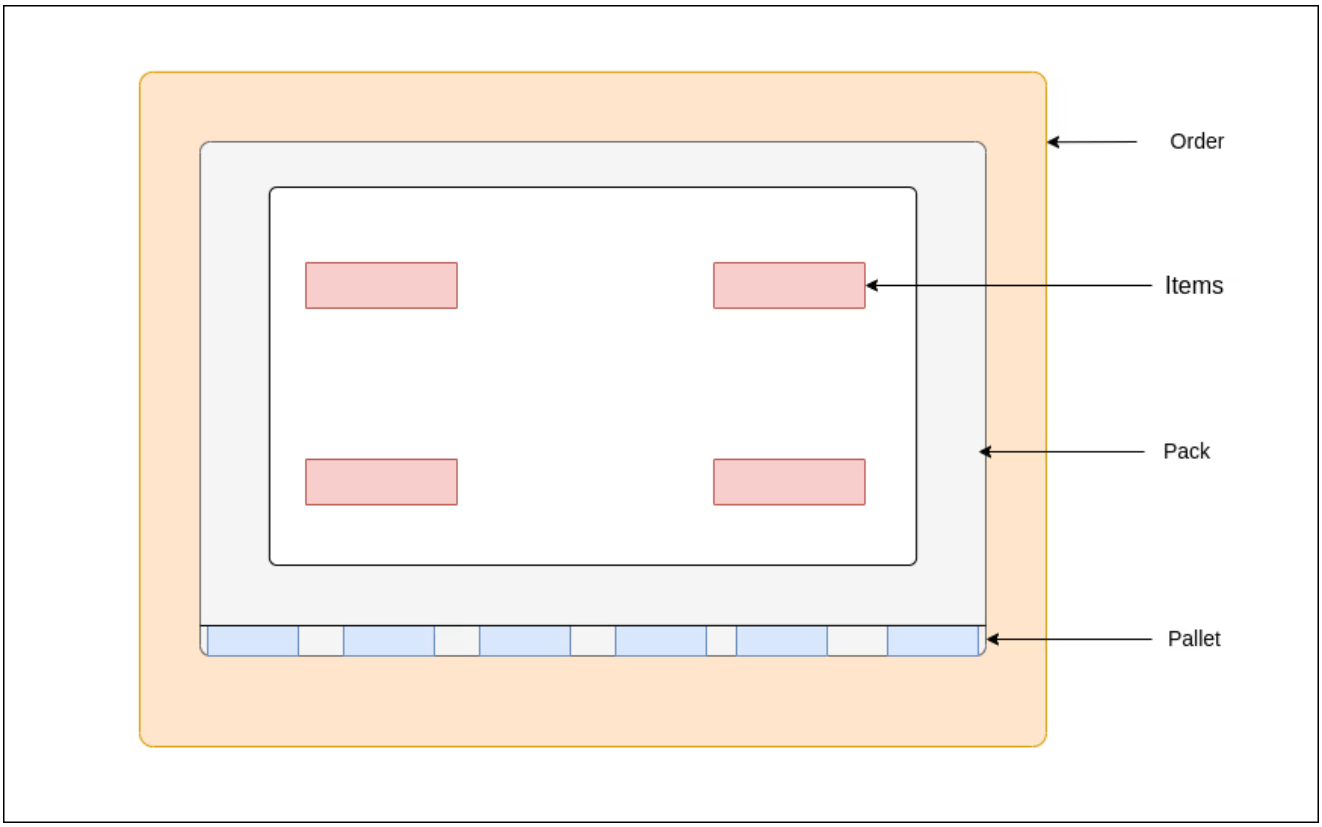
X12 messages are numeric

Example: 850 (Purchase Order), 855 (Purchase Order Acknowledgement), 810 (Invoice), 940 (Warehouse Shipping Order) and many more.

EDIFACTs are alphabetic

Example: ORDER, ORDRSP (Order Response), DISADV (Disadvice), INVOIC, ORDCHG (Order Changed)

Package Structure



EDI Shipment Structure

Identifying File Formats

- **X12 File Structure -** The X12 file starts with ISA and ends with IEA.
- **EDIFACT File Structure -** The EDIFACT file starts with UNA and ends with UNZ.
- **IDOC File Structure -** IDOC files start with IDOC. These are the positional files. ERP only understands the IDOC format. So we have to convert the given file into IDOC Format.

Document Envelope Structures

- **ISA/IEA - Interchange Control:** It shows the total number of functional groups present in the transaction set.
- **GS/GE - GROUP CONTROL/ FUNCTION GROUP:** It shows the total number of transaction sets.
- **ST/SE - TRANSACTION:** It shows the total number of lines present in the transaction set.

X12 Message	GS01
850	PO
855	PR

X12 Message	GS01
856	SH
810	IN

ISA Segment Structure

```
ISA*00* _00_ *12*6194537845 *12*8997372426 *051101*0306*U*00401*100000799*0*P*>
```

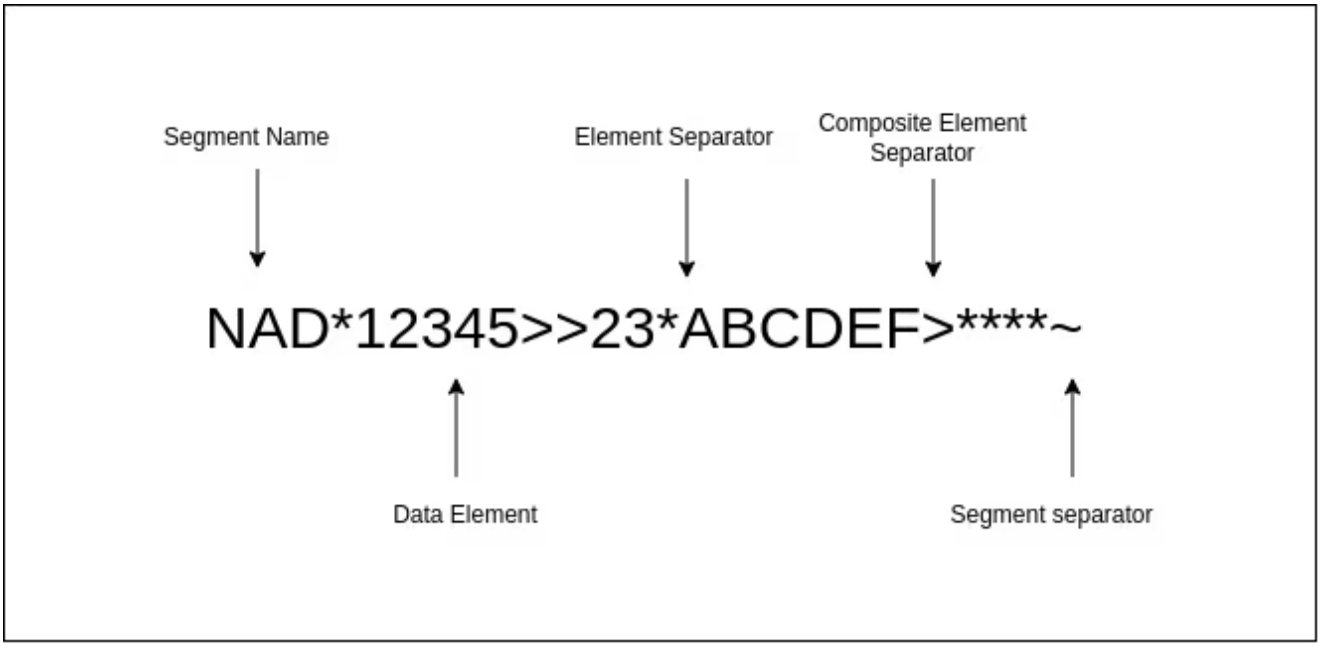
- **ISA-06 -** In the above example, the ISA-06 field is the sender ID.
- **ISA-08:-** This field holds the receiver's ID.
- **ISA-12:-** This field holds the Interchange version number.
- **ISA-13:-** This field contains the control number used for tracking purposes.
- **ISA-15:-** This field indicates whether data is for “T”(Testing) purpose or for “P”(Production) purpose or “I” (information).

Delimiters:

★ **(Star) Element/ Field Separator –** It separates elements.

~ (Tilde) Segment Separator – It is used to separate segments.

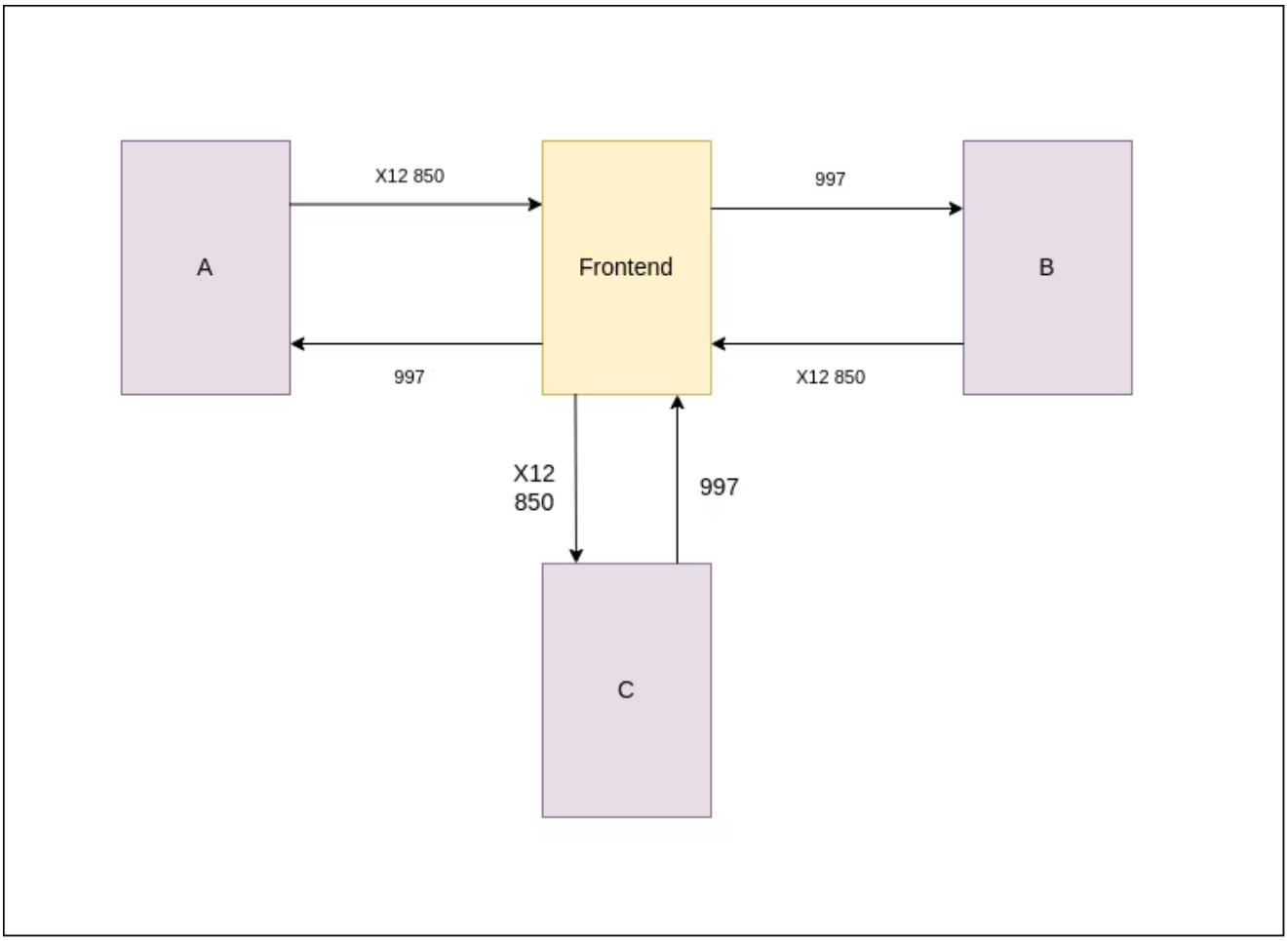
> Composite Element Separator - It is used to make a group. It is not a field or element separator. Example:-



EDI segment delimiters

EDI Transactions

Let's understand the EDI transactions with an example, refer the image below:



EDI Document Exchange Flow

Here the Front End converts the given document in IDOC. ERP is at the backend, which only accepts IDOC format. In X12 File Format, 997 is a Functional Acknowledgement.Whereas in EDIFACT, 997 is a Control Message i.e. it is a confirmation message. Example:- If A sends a document to B, then B will send 997 i.e. acknowledgement to A that confirms B has received the document.

Errors in EDI Transactions

- Syntax Error – This segment is valid only when both fields are present.
- Code Error – This error occurs when the code is not as per the respected version or provided version.

Acknowledgement Segments and Elements:

****AK1*PO*1421** Segment**

GS01 along with Functional group control number.

- AK1 – Functional Group Response Header
- 01 – Functional Identifier (GS01)
- 02 – Group Control Number (GS06). It is unique.

****AK2*850*000000010** Segment**

Transaction set identifier ST01 along with transaction set control number.

AK9: Functional Group Response

****AK9*A*000003*000003*000002** Segment**

- 01 – Functional group acknowledgement. It shows the status of the transaction set, whether it is accepted or rejected. In the above segment, the transaction set is accepted.
- 02 – Number of Transactions. In the above segment, there are 3 transaction sets.
- 03 – Number of Received Transaction Set. In the above segment, all the 3 Transaction Sets are received.
- 04 – Number of Accepted Transaction Set. In the above segment, only 2 Transaction Sets are accepted among 3.
- 05 – Functional Group Syntax Error Code.
- 06 – Functional Group Syntax Error Code.
- 07 – Functional Group Syntax Error Code.
- 08 – Functional Group Syntax Error Code.
- 09 – Functional Group Syntax Error Code.
- The **AK1** and **AK9** are paired and refer to the Group level.
- The **AK2** and **AK5** are paired and refer to the Transaction level.
- The **AK3** and **AK4** are **not** paired and refer to any errors received in the Transaction being acknowledged.

EDI Order Types

There are several Types of Orders in EDI, StandAlone orders, Bulk orders, and Release orders are B2B orders as they may contain resellers.

- **StandAlone Order (SA)**:- When anyone places an order, and it ships the given order. For Example:- Veena is placing an order at Amazon, then it is a StandAlone order.
- **Bulk Order (BK)**:- When an order is placed in advance or bulk quantity. For Example:- On the occasion of Diwali reseller places an order to the manufacturer in advance telling the manufacturer the quantity of goods required of them.
- **Release Order (RL)**:- This releases some quantity of order in reserved order. For Example:- If Aptronix (Reseller for Apple) placed a bulk order to Apple (Manufacturer or sender) and if Aptronix ordered some quantity of iPhones now, then this type of order is used to order some quantity of phones in bulk order.

- **Drop-ship Order (DP/ D)**:- It is a Direct Customer Order. For Example:- Ordering a Realme phone from the Realme website directly. It doesn't contain any 3rd person or reseller.
- **SDQ Order**:- It is used to place orders at once for multiple locations. For Example:- SQD order segment P01 contains Item Details such as, example: `SDQ*001*10*002*8*003*13*004*2~`

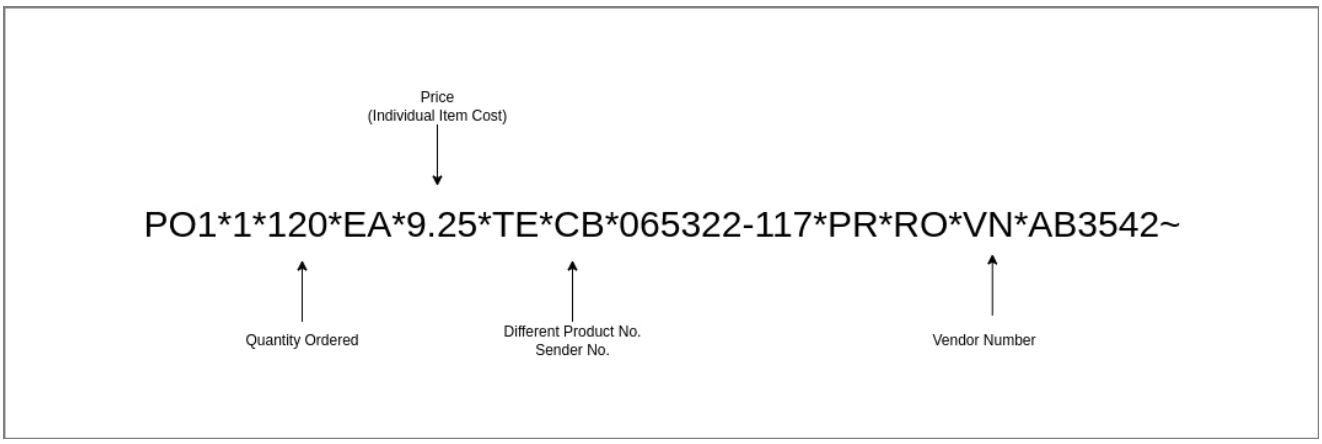
Consider the corelation between the following table, it states that for **store 001**, the **No. of Quantities required** are 10

For Store	quantities required
001	10
002	8
003	13
004	2

In CTT – This tells that while shipping, use the carrier mentioned in CTT. For example:- UPS.

PO (850) Segment

Following is the Structure breakdown of 850 i.e. Purhcase Order Segment



850 segment structure

Hierarchical Level

1. HL ~ 1 ~ 0 ~ S
2. HL ~ 2 ~ 1 ~ O
3. HL ~ 3 ~ 2 ~ P
4. HL ~ 4 ~ 3 ~ I

- HL 01 - Sequence no of HL segment
- HL 02 - Parent HL sequence ID
- HL 03 - HL type (Packing type)

HL Structures

S - Shipment level

O - Order level

P - Pack/Carton level

I - Item Level

SOI Structure

- S - Shipment level
- O - Order level
- I - Item Level

SOTPI Structure

- S - Shipment level
- O - Order level
- T - Tare/Pallet level
- P - Pack/Carton level
- I - Item Level

Where ACK is Item acknowledgement

X12 Message	Beginning Segment	First Field/Element
850	BEG	PO
856	BSN	SH
855	BAK	PR
810	BIG	IN
997	AKI/AK5	FA

855:- In this only acknowledgement there rest is the same as 850.
ACK01 - Code

EDI FACT

- **UNH-UNT - Transaction Set**

- **UNH 01 -** Type of Information (Eg: DESADV - Shipping Information)
- **UNH 02 OR 03 -** Version
- **NAD Segment -** Address Information
- **UNG-UNE (optional) - Functional Group**
- **UNA&UNB-UNZ - Interchange**: **UNB** holds the Sender and Receiver ID.
- In EDIFACT the BGM is unique all the time.

Customer Specifications

In customers' specifications, we have some codes by looking at those we can consider. E.g. - Cancel after, ship not before.

- 00 - Original
- 07 - Duplicate - To resend the order if we made any mistake in the original order.

EDI FACT Message	X12 Message
ORDER	850
DESADV	856
INVOICE	810

- **INVOICE** Its beginning segment is BIG
- **IT1** - Item Information includes prices, quantity, and discounts (same information in 850, 856) shipping numbers, payment terms