IBM® WebSphere® Partner Gateway V6.0 Advanced and Enterprise Editions

EDI (Electronic Data Interchange) Basics

This presentation covers the basics of EDI document and its structures.

Most of the material in this presentation has been extracted from the IBM provided online course SW 700 provides more details on EDI. It is recommended to take the SW 700 course for a more in-depth understanding of EDI.

Agenda

- What is EDI

- EDI data hierarchy

- EDI control segments

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The agenda for this presentation is as shown.

Section

What is EDI ?
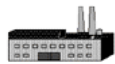
Source: SW 700 Course

The next section will provide the answer to what EDI is all about and the importance of EDI.

What is EDI

- The process of electronically exchanging business documents in a standard format
  - ▶ Exchange of document may not be automated - The essence of EDI is the standard format of the data

	USA	International
FITS ALL Generic	ANSI ASC X12	UN/CEFACT UN/EDIFACT
Industry	AIAG, UCS, WINS, VICS, EIDX, CIDX, PIDX, etc.	ODETTE, EIJA, EDIMAN, EDICON, etc.

- Formally started in 1960 - Standards primarily defined by American National Standards Institute (ANSI) X12 committee and the UN/EDIFACT Board
  - ▶ Defines business document, like, Purchase Order is document type 850 in X12, Invoice is document type 810, etc.

EDIFACT is an acronym for "EDI For Administration, Commerce, and Transport".

Characteristics of Business with EDI:

•EDI automates the exchange of standard business data, regardless of the type of computer, location of the company, or the original application format of the data.

•EDI changes the way you do business.

•EDI streamlines cumbersome proprietary files or manual paper documents or both.

•EDI accommodates rapid response to customer demands.

•EDI can be implemented numerous different ways.

•The 1960s offered one standard and one method of doing EDI. Now there are multiple standards and methods of doing EDI.

More on the generic standards:

U.S. - ANSI ASC X12

•Chartered in 1979 to develop uniform standards for the electronic exchange of business documents

•ANSI - American National Standards Institute

•ASC - Accredited Standards Committee (X12 Committee)

International - EDIFACT

•EDI for Administration Commerce and Transport

•Internationally agreed upon standards

•Developed under the auspices of the United Nations

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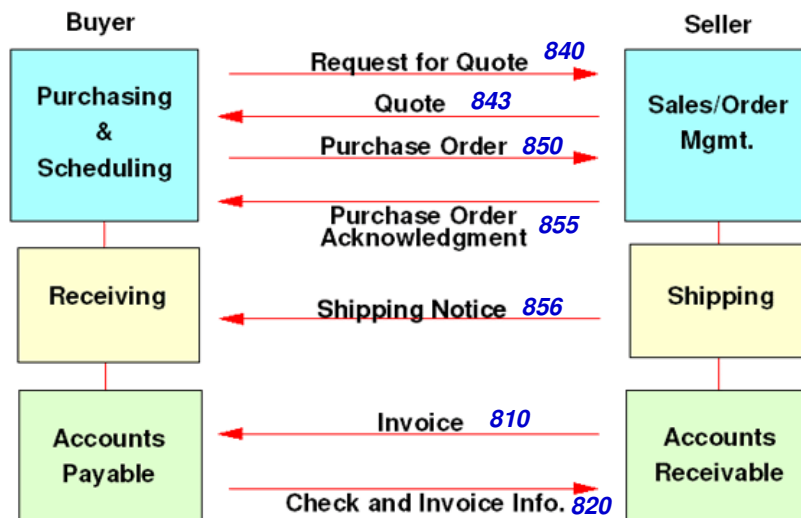
Numbers like 840, 850, etc. represent EDI X12 Transactions standards

Other examples of industry specify EDI transactions:

Examples of Healthcare Specific EDI Transactions
- 270 - Eligibility, Coverage or Benefit Inquiry
- 271 - Eligibility, Coverage or Benefit Information
- 272 - Property/Casualty Loss Notification
- 273 - Insurance/Annuity Application Status
- 274 - Health Care Provider Information
- 275 - Patient Information
- 276 - Health Care Claim Status Request
- 277 - Health Care Claim Status Notification
- 278 - Health Care Services Review Information
- 279 - Health Care Services Review Request
- 834 - Benefit Enrollment/Maintenance
- 835 - Claim Payment/Advice
- 837 - Healthcare Claim

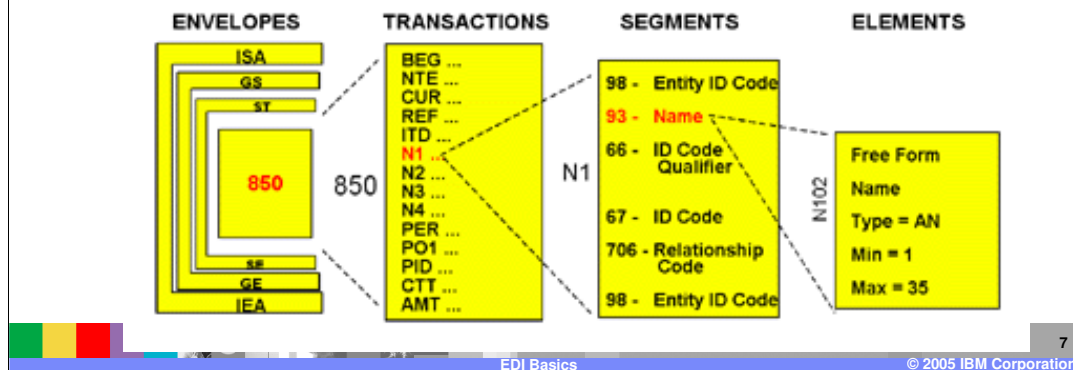# Section

EDI Data Hierarchy

Source: SW 700 Course

The next section will give some examples of resource security within WebSphere Application Server V6.

URL for SW 700 course:
https://www6.software.ibm.com/developerworks/education/websphere/wbt/sw700/index.html?

EDI Data Hierarchy - Interchanges

- An EDI Interchange is a collection of Groups or Transactions (EDIFACT Messages) or both, destined for one trading partner
  - ▶ EDI Interchange = EDI document = EDI Envelope

- Each interchange is enclosed in a pair of segments known as the *interchange envelope*
  - ▶ For X12, the group envelope is defined by ISA and IEA segment pair
  - ▶ For UN/EIDFACT, the group envelope is defined by UNB and UNZ segment pair

ENVELOPES | TRANSACTIONS | SEGMENTS | ELEMENTS

ISA	BEG ...	98 - Entity ID Code	Free Form
GS	NTE ...	93 - Name	Name
ST	CUR ...	66 - ID Code Qualifier	Type = AN
850	REF ... ITD ... N1 ... N2 ... N3 ... N4 ... PER ... PO1 ... PID ... CTT ... AMT ...	67 - ID Code / 706 - Relationship Code / 98 - Entity ID Code	Min = 1 Max = 35
SE GE IEA			

850   N1   N102

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For X12, the ISA segment, called the Interchange header segment, is of fixed length, 106 bytes

In EDI just about everything is a segment, but there are different types of segments. Elements represent a data value. A group of elements make up a segment.

A Transaction represents a business document such as a purchase order. A transaction consists of multiple "element" segments. There is a segment that indicates the start of a transaction, the "element" segments that make up the data values of the transaction, and a segment indicating the end of a transaction.

There are group segments that contain multiple Transactions of the same type. There is a segment that indicates the start of a group, the transaction segments, and a segment indicating the end of a group.

Multiple group segments are put into an Interchange Envelope segment. There is a segment that indicates the start of an Interchange, the group segments, and a segment indicating the end of the Interchange.

There is only one Interchange in an EDI document. The individual Transactions within the Interchange actually comprise the various business documents.

EDI Interchanges and the transactions within them can have acknowledgments, known as Functional Acknowledgments (FA), returned to the sender of the EDI Interchange. An FA itself is a transaction and can cover all of the transactions that were part of a group within an Interchange. That means that if there are several groups within an Interchange then several FAs will be generated.

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EDI Envelopes

- Envelopes are pairs of segments that enclose:
    - A series of segments that defines a transaction - Transaction Envelope
    - A group of transactions of the same type - Group Envelope
    - A number of groups destined for a particular trading partner - Interchange Envelope
- The Interchange Envelope is optional for the UN/EDIFACT standard. Also remember that EDIFACT uses the term "messages" not "transactions" for business documents.

This page shows the general structure of the EDI Interchange or envelope in a different form. Interchange contains groups and group contains transactions.

EDI Transmission

- **Data Elements** or fields - a single piece of information, for example, last name;

- **Segments** or records - a collection of data elements, for example, a person's demographic information;

- **Loops** or repeating groups - a group of segments, for example, courses taken during the Fall of 1995;

- **Transaction Sets** - a collection of segments in a predefined sequence, for example, a business document;

- **Functional Group** - a group of transaction sets of the same type, for example, a stack of employment applications; and

- **Interchange Control Group** - a collection of one or more functional groups, for example, your in basket after being on vacation for a week

This page gives a brief summary of the contents of EDI document. Starting with the data elements to segments which is a collections of data elements. Loops are group of elements that can be repeated. An EDI transaction is a group of segments in a predefined sequence with a transaction start and end segments. The EDI transaction represents a business document. For example, EDI 850 transaction defines the purchase order.

Multiple transactions of the same type can be included in a functional group that has a group start and end segment. Lastly, the multiple functional group resides in an EDI interchange or envelope.

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EDI: X12 and EDIFACT Envelopes
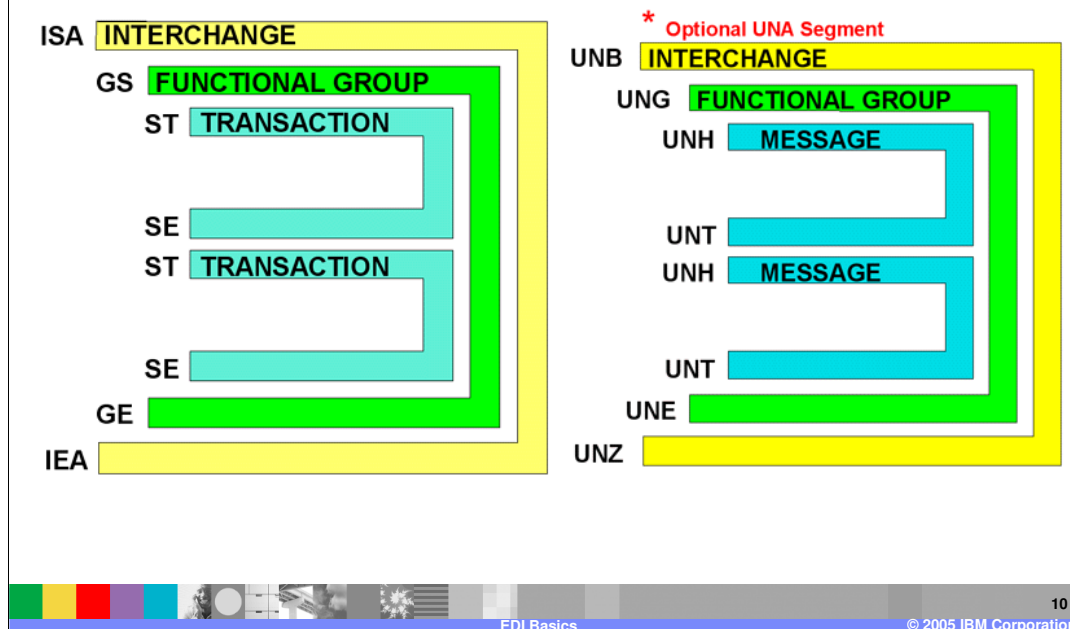
For an EDI X12 ISA:

•Each transaction is contained in a transaction envelope within ST and SE segments

•The transaction envelope provides the transaction ID, transaction control number, and a count of the number of segments in the transaction (including the transaction envelope segments).

•One or more transactions are enclosed in group envelopes within GS and GE segments

•Key information in the group segment includes the group ID, the group control number, the application sender and receiver IDs, the transaction standard version and release, and a count of the number of transactions in the group.

•Interchange envelope's primary purpose is probably the identification of the receiver

•Other key information is also included such as the sender, date stamp, time stamp, test/production/information indicator, count of the number of groups, and interchange control numbers.

EDI – Functional Acknowledgement (FA)

- EDI Interchanges and transactions can have acknowledgments, known as Functional Acknowledgments (FA), returned to the sender of the EDI Interchange
  - ▸ FA is sometimes referred as EDI document type 997
  - ▸ Must be coordinated with Trading Partner

- FA itself is a transaction and can cover all of the transactions that were part of a group within an Interchange
  - ▸ If there are several groups within an Interchange, then several FAs will be generated

- FA identifies:
  - ▸ Functional Group
  - ▸ Transaction Set
  - ▸ Segment Errors
  - ▸ Element Errors
  - ▸ Transaction Set Errors
  - ▸ Functional Group Errors

Functional acknowledgements (FA) are permitted for EDI transactions, and is send to the sender of the EDI document. The incoming EDI has no flag that indicates to the hub whether a FA is to be generated or not. It is based on the mutual understanding between the sender and the receiving trading partners.

FA identifies the functional group and transaction sets in the incoming EDI and errors within them in the group, transaction, segment or element.

FA itself is an EDI transaction, namely 997. The hub will envelope the FA transaction into an EDI Interchange before transmitting back to the sender.

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EDI – Control Segments

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The next section will give some examples of resource security within WebSphere Application Server V6.

EDI – X12 Interchange Start/End Segments

REF	ELE ID	NAME	ATTRIBUTES		
01	I01	Authorization Information Qualifier	M	ID	2/2
02	I02	Authorization Information	M	AN	10/10
03	I03	Security Information Qualifier	M	ID	2/2
04	I04	Security Information	M	AN	10/10
05	I05	Interchange ID Qualifier	M	ID	2/2
06	I06	Interchange Sender ID	M	AN	15/15
07	I05	Interchange ID Qualifier	M	ID	2/2
08	I07	Interchange Receiver ID	M	AN	15/15
09	I08	Interchange Date	M	DT	6/6
10	I09	Interchange Time	M	TM	4/4
11	I65	Repetition Separator	M		1/1
12	I11	Interchange Control Version	M	ID	5/5
13	I12	Interchange Control Number	M	N0	9/9
14	I13	Acknowledgment Requested	M	ID	1/1
15	I14	Usage Indicator	M	ID	1/1
16	I15	Component Element Separator	M		1/1

ISA
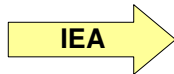
REF	ELE ID	NAME	ATTRIBUTES		
01	I16	Number of Included Functional Groups	M	N0	1/5
02	I12	Interchange Control Number	M	N0	9/9

IEA

M indicates that all of those elements are mandatory.

The attribute types include:

•ID (Identifier)

•AN (Alphanumeric)

•DT (Date)

•TM (Time)

•N0 (Numeric with 0 decimal positions assumed)

The last column indicates the min/max length of the element. This gives ISA a fixed size of 106 bytes (includes the element separators and the end separator).

Examples:

    ISA*00* *00* *01*463127937 *12*2616302611 *030102*1645*&*00403 *000000097*0*P*}~

    ...

    IEA*2*000000097~

Some Important fields for ISA

- Sender and Receiver IDs (elements I06 and I08)

- Interchange Control Number (Element I12)
  - ▸ Originated by the sender and is usually sequential - Together with Sender ID, this number uniquely identifies this interchange

Some important fields are the Sender, Receiver business IDs. These are compared with the trading partners business IDs to find the source and target business IDs.

Another important field is the Control numbers. This along with the sender ID provides a unique identifier to identify incoming EDI data from a sender.

EDI – X12 Group Start/End Segments

REF	ELE ID	NAME	ATTRIBUTES		
01	479	Functional Identifier Code	M	ID	2/2
02	142	Application Sender's Code	M	AN	2/15
03	124	Application Receiver Code	M	AN	2/15
04	373	Date	M	DT	8/8
05	337	Time	M	TM	4/8
06	28	Group Control Number	M	N0	1/9
07	455	Responsible Agency Code	M	ID	1/2
08	480	Version/Release/Industry Identifier Code	M	AN	1/12

GS
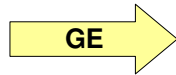
REF	ELE ID	NAME	ATTRIBUTES		
01	97	Number of Transaction Sets Included	M	N0	1/6
02	28	Group Control Number	M	N0	1/9

GE

EDI – X12 Transaction Start/End Segments

The ST elements are as follows:

•ST01 - The transaction set identifier code - For example "850" indicating a purchase order

•ST02 - The transaction set control number - A unique, normally sequential, number assigned by the sender

•ST03 - A reference assigned to identify an Implementation Convention (not in common use)

The SE elements are as follows:

•SE01 - The number of segments in the transaction, including the ST and SE segments

•SE02 - The transaction set control number matching the one specified in ST02
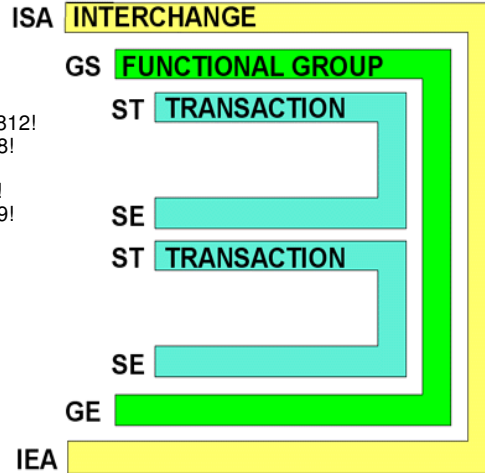
Section

EDI Example

The next section will give an example of EDI.

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EDI X12 ISA Example

```
ISA*00*     *00*     * *000000001    * *000000099    *930419*0021*U*00200*000000004*0*T*:!
GS*PO*D53TSA2*KIRKWOX*930419*0021*4*X*002010!
ST*850*0004!
BEG*00*00*PONBR00001*RELEASE001**920701!
N1*BT*MANUFACTURER*01*05441205!
DTM*002*920708!
PO1*001*300*EA*55.75**BP*15776!
J2X***WIDGET BASE!PO1*002*300*EA*21**BP*29599!
J2X***WIDGET STAND!PO1*003*100*EA*122.31**BP*31812!
J2X***WIDGET CLAMP!PO1*004*1000*EA*1.8**BP*34418!
J2X***WIDGET RING!PO1*005*100*EA*342**BP*35514!J
2X***WIDGET FILLER!PO1*001*600*EA*6.55**BP*11590!
J2X***GADGET BASE!PO1*002*1000*EA*2.44**BP*19019!
J2X***GADGET STAND!
PO1*001*800*KT*8.25**BP*00883!
J2X***WIDGET BASE!
CTT*22*348300!
SE*50*0004!
GE*1*4!
IEA*1*000000004!
```

ISA INTERCHANGE

GS FUNCTIONAL GROUP

ST TRANSACTION

SE

ST TRANSACTION

SE

GE

IEA

Section

References and Summary

EDI Basics

The next section provides references and summary.

Reference

- SW 700 online course:
  - http://www.ibm.com/developerworks/websphere/library/tutorials/dl/sw700/

- EDI Standards at IBM web site
  - http://www.ibm.com/software/integration/wdi/downloads/wdi_client31_std.shtml

- EDI document
  - http://nces.ed.gov/edi/AnatEDI.asp#FuncGrp

You may want to visit the SW 700 online course on EDI basics. Other links provide more information on EDI.

IBM

Summary

- This presentation covered the basics of EDI structures

This presentations provides the bare minimum basics of EDI and its structure. This is needed to understand the new functions and EDI flows in WebSphere Partner Gateway V6.0.

Appendix

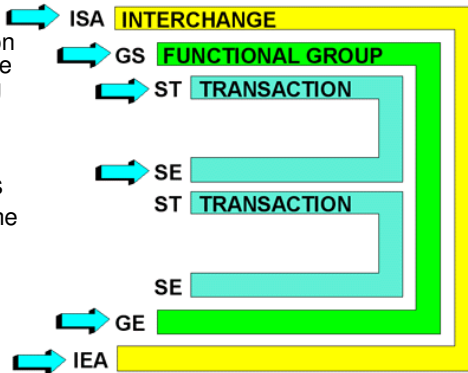## *Extra Slides*

The next section will give

EDI Envelope – Additional Information

- In addition to transaction and messages, EDI envelope may contain:
  - ▸ Basic Interchange Acknowledgment (TA1) which reports receipt by the recipient of an interchange and syntactical analysis of the interchange control header and trailer only
  - ▸ Grade of Service Request (ISB) which requests a priority higher or lower than normally provided
  - ▸ Deferred Delivery Request (ISE) which specifies the earliest time the interchange can be delivered
  - ▸ Interchange Delivery Notice (TA3) which reports the successful or unsuccessful delivery and retrieval of Interchanges between Service Request Handlers (ex: Service Provider, VAN or other intermediate handler of the interchange)

EDI Basics

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Quick Summary of X12 Interchange Envelope

- Each transaction is contained in a transaction envelope within ST and SE segments
  - ▸ The transaction envelope provides the transaction ID, transaction control number, and a count of the number of segments in the transaction (including the transaction envelope segments).

- One or more transactions are enclosed in group envelopes within GS and GE segments
  - ▸ Key information in the group segment includes the group ID, the group control number, the application sender and receiver IDs, the transaction standard version and release, and a count of the number of transactions in the group.

- Interchange envelope's primary purpose is probably the identification of the receiver
  - ▸ Other key information is also included such as the sender, date stamp, time stamp, test/production/information indicator, count of the number of groups, and interchange control numbers.

ISA **INTERCHANGE**

GS **FUNCTIONAL GROUP**

ST **TRANSACTION**

SE

ST **TRANSACTION**

SE

GE

IEA

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EDI Data Hierarchy - Groups

- When several to many of the same transaction are sent to a trading partner, they may be grouped in a pair of segments identified as the "Group Envelope"

- Transactions that may be grouped are identified in the standard documentation as having the same "Group ID"

- Each group is enclosed in a pair of segments known as the *group envelope*
  - For X12, the group envelope is defined by GS and GE segment pair
  - For UN/EIDFACT, the group envelope is defined by UNG and UNE segment pair

EDI Data Hierarchy – Transaction/Message

- Transaction (in X12) or Message (in EDIFACT) represents a business document such as a purchase order
  - They contain multiple segments

- Each transaction is enclosed in a pair of segments known as the *transaction envelope*
  - For X12, the group envelope is defined by ST and SE segment pair
  - For UN/EIDFACT, the group envelope is defined by UNH and UNT segment pair

Transaction/Message

Segments

Elements   **Composite Element**

Component Element   **Component Element**

Each record in a standard transaction or message is a "segment", identified with a 2 or 3 character identifier at the beginning

Some elements are defined as "composite elements" consisting of "component elements" or sub-elements

Individual data fields within each segment are called "elements."

EDI Basics

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EDI standards organize documents as transactions or messages.

A transaction or message is a collection of segments defining the transaction. The standards bodies assign segments as required in a set order. Segments or groups of segments (loops) may be identified as repeating. In the ANSI X12 standard, segments are also designated as mandatory or optional. Mandatory segments must be present as specified to meet the requirements of the standard. The use of optional segments is determined by the requirements of the trading partners. UN/EDIFACT uses the term "Conditional" for optional segments.

One transaction may use a segment in multiple locations throughout the segment. The same segment may be used in multiple transaction set definitions.

Composite elements are used infrequently in X12 transactions, but to a very great extent in EDIFACT messages.

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EDI –Separator characters within a Segment

- Separator characters are used to delimit elements and component elements within a segment

- Segment terminator is used to identify the end of a segment

- These characters have ISA (Interchange) scope
  - They are the same for all the segments within an ISA

- For X12, the delimiter characters are identified in ISA segment (Interchange header)

- For UN/EDIFACT, the delimiter characters are either established by default or specified in an optional UNA control segment preceding the UNB (Interchange control header) segment

For X12, Delimiter characters for this interchange will be the same as those used in the ISA segment. For the ISA segment shown below:

ISA\00\ \00\ \01\935154301 \01\123456789 \031202\1046\ \ \000000001\ \P\:>

The delimiter characters are:

- Element separator - The character in position 4, immediately following the "ISA" segment ID. In this example a backslash "\" is used as the element separator character.
- Segment terminator - The last (106th) character in the ISA. To facilitate this, the ISA must be fixed-length. Therefore all the elements in the ISA are fixed length by X12 standard definition.
- Sub-element (component element) separator - Character 105 of the ISA.

For UN/EDIFACT, the default characters may be used:

- Component element separator - Colon (:)
- Data element separator - Plus (+)
- Segment terminator - Apostrophe (')

If a UNA segment (preceding the Interchange control header segment UNB) is used, the control characters in the UNA are as follows:
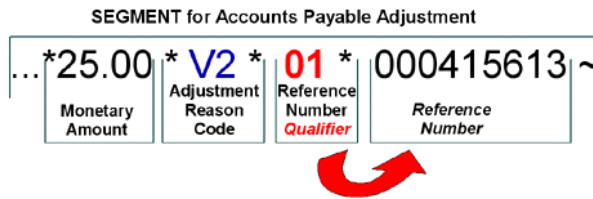
- Component Data Element Separator
- Data Element Separator
- Decimal Notation Character
- Release Indicator – it is a control character that indicates that the following character is to be processed as data, used when a control character appears in data and is not to be processed as a control character
- Reserved
- Segment Terminator

Following example as the UNA segment followed by UNB (header) segment.

UNA:~.?*> UNB~UNOA:3~987654321:01~123456789:01~270303:1022~000000002>

- Component Data Element Separator is ':'
- Data Element Separator is '~'
- Decimal Notation Character is '.'
- Release Indicator is '?'
- Reserved for later use is '*'
- Segment Terminator is '>'

EDI - Qualified and ID Type Elements

SEGMENT for Accounts Payable Adjustment

...*25.00 * V2 * 01 * 000415613 ~

Monetary Amount | Adjustment Reason Code | Reference Number *Qualifier* | Reference Number

- Qualifiers further define and specify how the next element is to be interpreted

- Qualifiers are "ID" data types and come from a list of codes
  - ▸ Codes are typically provided by standard but may come from other sources

- All "ID" type elements are not qualifiers as in "V2" example above

- Some other qualifiers that may have been used include:
  - ▸ VA qualifier indicating the reference number is a Vessel Agent number
  - ▸ 01 qualifier indicating the reference number is an ABA Routing number
  - ▸ 1A qualifier indicating the reference number is a Blue Cross Provider number

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EDI – Record/Field - Segment/Element Analogy

- The terms "records" and "fields" as applied to application data are essentially the same concept as "segments" and "elements" in EDI data

- Example of data in an application file and formatted as an EDI segment

Record for Mortgage Closing Data

135000.00	20031127	27000.00	Ed D. Aye
Monetary Amount	Date	Monetary Amount	Name
Field	*Field*	*Field*	*Field*

Above data as an EDI segment:

SEGMENT for Mortgage Closing Data

MCD*135000.00*20011231*27000.00*Ed D. Aye~

| *Element* | *Element* | *Element* | *Element* |

MCD = Segment Identifier
* = Element Separator
~ = Segment Terminator

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