



WHAT IS EDI AND HOW DOES IT WORK?

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INTRODUCTION

Purpose of this Whitepaper

Most technology whitepapers are written by vendors attempting to persuade the reader to choose their products. As a result, readers often view these whitepapers with some level of scepticism, perceiving them to be too one-sided. Whitepapers written by a third party tend to be more acceptable because of their independent viewpoint. As a third party, we have written this whitepaper in an unbiased manner with the best interests of the reader in mind.

The purpose of this whitepaper is to educate you on Electronic Data Interchange (EDI). It has been written with the novice end user in mind but will also benefit those who are technically minded. Regardless of your line of business or job function, we hope to teach you something valuable that you can apply to your next EDI project.

Who should read this whitepaper?

New EDI Users
Business Application Managers
EDI Co-ordinators
EDI Managers
IT Managers
Software Resellers
Systems Integrators

About Vantage Point & Associates

Vantage Point & Associates is an independent source for E-commerce and EDI resources, news and vendor information. We bring sellers of the technology together with buyers for mutual benefit. Our brand is 'EC►EDI Vantage Point™' and our tag line is "Covering Your E-bases™". We provide information to help buyers educate themselves and make informed decisions while at the same time offering advertising, promotional and marketing support to sellers to help get their message out to buyers.



We pride ourselves on our knowledge of E-commerce and EDI technology and the industry as a whole. We understand how buyers and sellers of technology have different motivation and needs and we always have our customers' best interests in mind. Buyers and sellers may engage our expertise for a fee, but we do not accept a commission from any vendor for recommending their product. Our customers can rely on Vantage Point & Associates to conduct ourselves in a professional manner with honesty, integrity and confidentiality.

EC►EDI Vantage Point web site – www.ec-edi.biz

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EDI CHRONOLOGY

Various forms of electronic file exchange have been in use since the 1960s. In the mid-1980s, what's now known as Electronic Data Interchange (EDI) was first introduced. It formalized the process of exchanging files in a structured, standard format. Over time, EDI has evolved to include a broader range of technologies under the umbrella of Electronic Commerce (EC).¹

EDI is used to some degree in nearly every industry. It has become widely adopted because it offers companies the ability to become more efficient and productive, and thereby more competitive. EDI gained wide acceptance during the 1990s, backed by strong mandates from the retail, manufacturing and transportation industries. Some industries have forced EDI compliance on their trading partners, while others are more casual about adopting the technology. Today's global economy is putting more pressure on everyone to bring their costs down, and EDI is one way to reduce those costs. While EDI is the backbone of EC technology, it is by no means the only technology available for increasing productivity.

EDI throughout the decades

- | | |
|-------------|--|
| Pre 1980s | - Exchanging files electronically only realistic for large companies |
| Mid 1980s | - PC technology makes EDI possible for any sized company |
| Early 1990s | - E.D.I. or D.I.E. |
| Late 1990s | - The Internet changes everything |
| Early 2000s | - EDI thrives once again |
| Today | - Still more to come |

Pre-1980s – Before there was EDI

Prior to the mid-1980s, electronic computer file exchange was realistic only for large companies with mainframe computers and knowledgeable IT staff. It only made economic sense to exchange files electronically if you had large trading partners with high volumes of data. Data-transmission lines were expensive, which made reel-to-reel tapes the most practical medium. The structure of the files being exchanged was determined by one or both parties, with no standards as a guide.

For all other companies who didn't have the computing power, expertise, or resources to exchange files electronically, paper was the only option for conducting business.

¹ The term 'E-Commerce' has widespread meaning. In the Business-to-Business world, it's a catch-all term for doing business electronically in any format, including EDI. In the Business-to-Consumer world, E-Commerce tends to mean paying for products and services on the Internet using a credit card.

Mid-1980s – EDI attracts attention

The first EDI standards emerged in the early 1980s. The advent of the personal computer (PC) made EDI a possibility for companies of any size. The first EDI translation software vendors and Value Added Networks began offering services to help large companies bring their smaller suppliers onto EDI. It seems trivial today, but using a PC, modem, EDI translation software and an electronic mailbox instead of paper was a drastic step. The start-up cost for suppliers easily reached \$10,000 or more. Most ended up doing ‘rip and read’ EDI, which entailed receiving a document electronically, printing it on paper, and re-keying it into their business application. To send a document back to a customer, the data would then be keyed into the EDI translation software. This process turned EDI into a glorified fax machine, and integrating EDI into a company’s business application was the furthest thing from anyone’s mind.

Early to mid-1990s – E.D.I. or D.I.E.

Various industries, especially retail, continued to drive the adoption of EDI. Retailers were hungry for more, and their suppliers reluctantly complied. The phrase “E.D.I. or D.I.E.” was coined as a warning for companies to adopt EDI technology or face the consequences of losing customers and falling behind their competitors.

Large companies who had integrated EDI with their business applications from the outset were growing weary of the ‘rip and read’ habits of smaller companies. As the number of transactions made by small companies increased, thoughts of integrating EDI surfaced, and new vendors offering software and services began to emerge.

Late 1990s – The Internet changes everything

EDI was no longer viewed as the only technology for doing business electronically. It had become a ‘bad word’ to some, and was perceived as overly complicated and costly for small companies. The Internet and the dot-com era spawned hundreds of new companies that were developing revolutionary applications for the Internet, some of which were going to replace ‘old’ technologies like EDI with XML.² These applications were touted as drastically changing the way companies would do business.

The reality was that the companies who invested heavily in EDI were not about to throw away their investment and start all over again because of XML. Instead, new options—including XML—emerged from the Internet, and made it possible for companies to achieve 100% adoption of E-commerce with their trading partners. Files could be transported via the Internet, and web forms were an economic alternative available to small companies.

Two significant developments in the late 1990s were: 1) the realization that integrating EDI into business applications was a necessity, and 2) the development of HIPAA EDI standards. Large customers in the retail industry started imposing fines on their suppliers who made re-keying or other errors in their EDI data. This affected the profit margins of suppliers, and one way to reduce errors was to integrate EDI.

² eXtensible Markup Language (XML) is a flexible way to define document structures and exchange data between Internet applications.

The Health Insurance Portability and Accountability Act (HIPAA) of 1996 resulted in a set of EDI transactions being developed for the large healthcare industry. This had a significant impact on the adoption of EDI in healthcare.

Early 2000s – EDI thrives once again

EDI survived the dot-com crash, and showed no signs of going away anytime soon. The Internet helped take EDI to a new level, much as the PC did in the 1980s. Initiatives such as web EDI, EDI-INT and integrating EDI made significant gains. The developers of the most popular business applications also recognized the importance of allowing EDI and other data formats to be integrated with their products.

A new service that developed during this time was EDI outsourcing. Some companies had become increasingly frustrated with EDI because they were always playing catch-up with new developments and demands from their trading partners. Costs were escalating, and as a result, EDI outsourcing grew in popularity. Companies preferred to pay someone else to deal with their EDI headaches.

Today – Still more to come

The EC/EDI technology developments of the past two decades have made it possible to conduct business in ways that couldn't have been imagined prior to the 1980s. The Internet had the greatest impact, making it possible for a company of any size to do business anywhere in the world. With the number of technology options available, there is no reason why any company, large or small, can't use EC/EDI technology in their business. In fact, it has become mandatory if a business is going to survive.

WHAT DOES EDI LOOK LIKE?

An EDI document is the electronic equivalent of a paper document such as a purchase order or invoice. Standards govern how EDI documents are structured, and define the rules for their use. North American companies follow the X12 standard, while other parts of the world follow the EDIFACT standard.

The X12 standard is made up of hundreds of documents called ‘Transaction Sets.’ Transaction sets are made up of ‘Data Segments’ and ‘Data Elements,’ of which there are hundreds, and thousands respectively, in the standards dictionary. By putting various combinations of data segments and data elements together in a structured format, you end up with a transaction set that has meaning.

Transaction Sets

The following table shows a portion of X12 transaction sets from the 800 and 900 series.

Set Number	Description
810	Invoice
820	Payment Order/Remittance Advice
830	Planning Schedule with Release Capability
832	Price/Sales Catalog
833	Mortgage Credit Report Order
834	Benefit Enrollment and Maintenance
835	Health Care Claim Payment/Advice
837	Health Care Claim
840	Request for Quotation
843	Response to Request for Quotation
850	Purchase Order
855	Purchase Order Acknowledgment
856	Ship Notice/Manifest
857	Shipment and Billing Notice
858	Shipment Information
859	Freight Invoice
860	Purchase Order Change Request - Buyer Initiated
862	Shipping Schedule
865	Purchase Order Change Acknowledgment/Request - Seller Initiated
869	Order Status Inquiry
870	Order Status Report
940	Warehouse Shipping Order
943	Warehouse Stock Transfer Shipment Advice
944	Warehouse Stock Transfer Receipt Advice
945	Warehouse Shipping Advice
947	Warehouse Inventory Adjustment Advice
997	Functional Acknowledgment

Data Segments and Data Elements

This example shows what an 850 purchase order looks like. Each line is called a *Data Segment* and begins with the *Segment Name*. For example, 'N1' represents name and address line 1 while 'PO1' represents purchase order line 1.

Following the Segment

Name is a number of *Data Elements*.

In the N1 segment, the code 'BT' means it's a bill-to name and address. Data elements are separated by a single character, usually an asterisk (*). A segment ends with a single character— in this example a tilde (~).

Other EDI documents such as an 835 Health Care Claim will have their own sets of data segments and data elements. Segments such as the N1 overlap many transaction sets, but an 835 will have its own segments and elements that are unique to healthcare.

Any number of data segments come together to form a transaction set. In this example there are 32, as shown in the control counter stored in the very last segment (SE). You will notice that the PO1, PID and PO4 segments repeat multiple times, just as they would on a paper-based purchase order.

There is flexibility in how an industry or company uses the EDI standards. For example, a purchase order going from a retailer to its supplier will look very different from a purchase order going from a mining company to its supplier. The drawback is when one supplier receives purchase orders from five different customers, and they each structure their 850s differently. The supplier is burdened with the task of handling the five different 850 layouts.

Example of an 850 Purchase Order

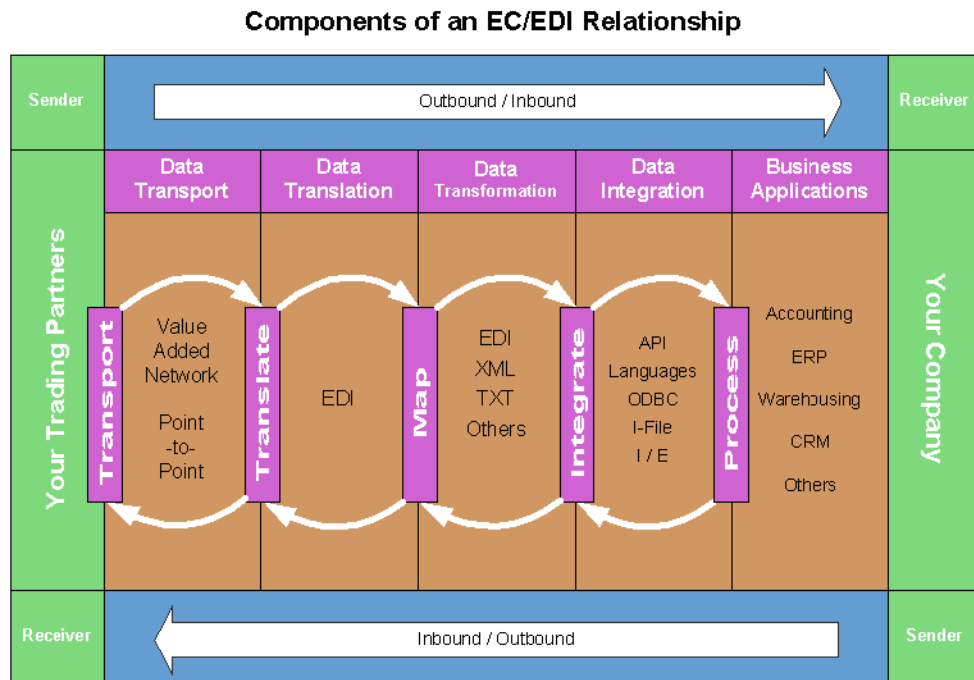
- ① Each line is called a Data Segment
- ② Each Segment begins with a Segment Name
- ③ A number of Data Elements follow the Segment Name
- ④ Data Elements are separated by a single character such as '*'
- ⑤ A Segment ends with a single character such as '~'

```

BEG*00*SA*A14578**20070112~
REF*VR*54863~
ITD*01*3*1**15**16~
DTM*002*20070131~
N1*BT*Buy Snacks Inc.*9*3456Main St.~
N4*Temple*TX*76503~
N1*ST*Buy Snacks Inc.*9*1000Highway27N.~
N3*Regional Distribution Center~
N4*Athens*GA*30603~
PO1**16*CA*12.34* *CB*000111111*UA*00284002222~
PID*F***Crunchy Chips~
PO4*48*7.89*LB~
PO1**13*CA*12.34* *CB*000555555*UA*00284003333~
PID*F***Nacho Chips~
PO4*48*8.9*LB~
PO1**32*CA*12.34* *CB*000666666*UA*00284004444~
PID*F***Potato Chips~
PO4*72*6.78*LB~
PO1**51*CA*12.34* *CB*000874917*UA*00284005555~
PID*F***Corn Chips~
PO4*48*8.9*LB~
PO1**9*CA*12.34* *CB*000874958*UA*00284006666~
PID*F***BBQ Chips~
PO4*48*4.5*LB~
PO1**85*CA*12.34* *CB*000874990*UA*00284007777~
PID*F***Large Bag Chips~
PO4*48*4.56*LB~
PO1**1*CA*12.34* *CB*000875088*UA*00284008888~
PID*F***Small Bag Chips~
PO4*48*4.56*LB~
CTT*7~
SE*32*000000001~
    
```

HOW DOES EDI WORK?

There are many components involved in an EC/EDI relationship between two trading partners. This diagram depicts the flow of data between components, and the remainder of this whitepaper explains each step.



Sender and Receiver

EDI is a batch process in which transactions are grouped together into one or more files and all transmitted at the same time. One trading partner is the *sender* (outbound) and one trading partner is the *receiver* (inbound). Both trading partners become senders and receivers throughout the relationship.

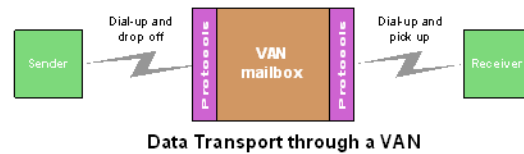
In most situations one trading partner is the *driver* of the EC/EDI relationship and the other trading partner is the *follower*. The driver can be a customer, industry association or government department, while the follower is a supplier, member of an association, or an organization that deals with the government.

The driver will publish an implementation guide, companion guide or web site portal that describes its EDI program, procedures and expectations. Someone who is a supplier or deals with the government must become compliant by following the instructions set out in the guide. Members of an industry association are not mandated to use EDI, but they must follow the guide if they are going to implement EDI.

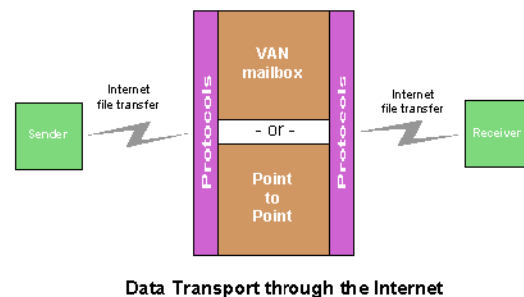
Data Transport

Data Transport is the process of electronically transferring files to/from your trading partners.

Traditionally a **Value Added Network (VAN)** is used as the go-between for trading partners. The sender's computer dials-up and drops off a file to the VAN, which in turn stores the file in an electronic mailbox. When the receiver's computer is ready, it dials-up the VAN to pick up the files from the mailbox. Protocols such as Async and Bisync are used to securely transmit files to/from the VAN.



Nowadays the Internet is used to make the connection to the VAN. It is also used to connect **Point-to-Point** to a trading partner, thus bypassing the VAN entirely. The computer dial-up step isn't necessary if the Internet connection is always active, although some small businesses still use a dial-up Internet connection.



These are the most common protocols used to transmit files to/from a VAN or Point-to-Point:

File Transfer Protocol (FTP) – is initiated by *either trading partner* to transfer files to/from the VAN's computer, or Point-to-Point on the trading partner's computer. It usually requires a log-in to gain access, but it is not fully secure because files are sent in clear text and could be intercepted and deciphered. **File Transfer Protocol Secure (FTP/S)** solves the problem by adding a level of security to thwart eavesdropping.

Hyper Text Transfer Protocol (HTTP) – is initiated by *one trading partner* to request files to be transferred from the VAN's computer, or Point-to-Point from the trading partner's computer. The receiver's computer must acknowledge the request before sending the file. **Hyper Text Transfer Protocol Secure (HTTP/S)** is the same as HTTP, with an added level of security to encrypt files.

EDI-INT – is a set of standards for transferring EDI files through the Internet more securely than e-mail, FTP/S or HTTP/S. **Applicability Statement 1 (AS1)** defines the standards for using e-mail to transfer files, **Applicability Statement 2 (AS2)** defines the standards for using HTTP to transfer files and **Applicability Statement 3 (AS3)** defines the standards for using FTP to transfer files. While FTP/S and HTTP/S offer security, EDI-INT adds another layer of security involving public and private keys.

Which Data Transport Method should you use?

There are various factors surrounding cost, security and compliancy that will determine which Data Transport method you should use. *If you are the follower in a trading relationship, the Data Transport method will most often be determined by the driver.* Followers have little say in the matter, and will have to bear any added costs to comply.

If your trading partner is indifferent to the Data Transport method, choose a protocol that offers an acceptable level security for your data. FTP and HTTP would not be considered secure, FTP/S and HTTP/S are considered secure, and EDI-INT is considered very secure.

Taking into account all your trading partners, it is likely that you will end up using a mix of Data Transport methods.

How much does Data Transport Cost?

Value Added Network

Many of the VANs have different pricing structures which make it difficult to compare prices when shopping around. Generally, you can expect to pay a setup fee, monthly subscription fee and transaction fee. The setup fee can be hundreds of dollars; the monthly subscription fee ranges from \$25 to \$100; and the transaction fee will vary depending on volume in kilo-characters (KC). A kilo-character is 1,000 characters of data transmitted at a cost ranging from 5¢ to 25¢ or more per KC. Some VANs charge by the number of documents transmitted instead of kilo-characters. Pricing from VANs is very competitive, and some will offer a low monthly flat rate for guaranteed volume under a multi-year contract.

1 KC=1,000 characters of data

The VAN will determine the protocol to use, and will provide the parameters to login to your mailbox on their network. Most VANs interconnect with each other, meaning you only subscribe to one VAN. However, it is common to subscribe to more than one VAN because your trading partners will not allow the exchange of files using an interconnection.

Point-to-Point

Point-to-Point connections eliminate the need for a VAN and its associated costs.³ If security is not an issue, then the FTP or HTTP protocol can be used. FTP/S or HTTP/S should be used to keep the contents of your files secure. Using FTP/S requires software that can be purchased for a few hundred dollars or less. Using HTTP/S does not require additional software, but you must know how to program in the HTTP language.

³ Unless all your trading partners are willing to go Point-to-Point, you will still need a VAN.

EDI-INT

The EDI-INT protocols (AS1, AS2, and AS3) are used by companies seeking the most secure Point-to-Point connection to their trading partners. While there are no transaction fees associated with EDI-INT, you will have to purchase software that can cost \$500 - \$5,000 or more for a standard PC installation. The cost is usually scaled to the number of trading partners, with some 'lite' versions being available at a lower cost if you use EDI-INT with only one or two trading partners.

Data Translation

If you look at an EDI transaction in its raw format, most of the data is meaningless until it is passed through an EDI translator. **Data Translation** is the process of interpreting EDI data to ensure it conforms to the EDI standards (X12 or EDIFACT), as well as performing checks and balances before the data reaches the intended business application. An EDI translator performs the following functions:

Compliance Checking

Each EDI transaction is checked against the EDI standards dictionary to ensure it conforms to formatting rules. The term for this is called 'compliance checking.' If an EDI transaction does not comply with the rules, the translation fails and the transaction should not reach the business application. The following are some examples that would cause a transaction to fail EDI translation:

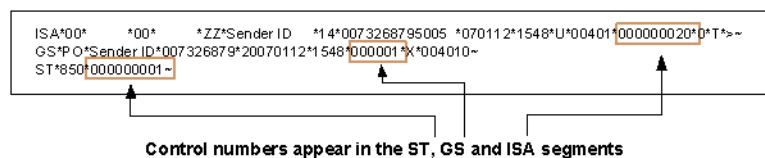
PO1**51*CA*12.34* *CB*000874817*UA*002840055555~

Every segment must be formatted properly

- a) A line item on a purchase order has no number in the 'Qty Ordered' field
- b) The date on an invoice is formatted as 'DDMMYYYY' when it should be 'YYYYMMDD'
- c) A shipping manifest is missing the 'Total Weight' field
- d) A trading partner's business application underwent an upgrade and caused a field to be formatted incorrectly

Control Number Checking

The purpose of control number checking is to track the transmission of EDI documents, to ensure duplicates are not sent or received. Sequential numbers are assigned to each transmission (ISA segment), each group of documents (GS Segment) and each transaction set (ST segment). When a transmission is sent or received and a control number is duplicated or out of sequence, it indicates a problem that requires immediate action. This safeguard ensures that missing transmissions are noticed, and duplicate transactions don't reach the business application.



Trading Partner Management

It would be difficult to manage EDI trading relationships without a trading partner management function. This function keeps track of the attributes that differ from one trading partner to the next. The following are some examples:

- Contact information for the business person responsible for EDI.
- Contact information for the technical person responsible for EDI.
- Data transport method used, and account information to connect to a VAN or Point-to-Point.
- The severity level (critical or warning) if control numbers are out of sequence.
- E-mail address of the person to alert when errors are found.
- EDI standards version number being used.

Tracking and Auditing

Problems will arise no matter which form of electronic commerce is used. With EDI, trading partners need the ability to track the whereabouts of an EDI transaction that did not make it to the business application. EDI translation software provides various logs and reports to trace a transaction throughout the process.

An inherent audit feature in EDI translation software is the functional acknowledgement, which is known as the 997 transaction. Every EDI transaction that is sent by a trading partner requires an acknowledgment of receipt from the other trading partner via the 997. A positive 997 means the original transaction was received and passed EDI translation. A negative 997 means the original transaction failed translation. Not receiving a 997 means there was a transmission problem between the two trading partners.

Document Repository

A document repository is a place to store all incoming and outgoing EDI and non-EDI transactions. Transactions are stored in a database in their original form, and all activity against each transaction is logged. This makes it possible to trace a transaction from all points between Data Transport and Data Integration into the business application. When it becomes necessary to re-send a transaction due to operational problems, the original can be retrieved from the repository.

Another function of the document repository is to facilitate an EDI document 'turnaround.' Many business applications do not have a home in their database for fields that arrive on an incoming EDI document. The trading partner expects the data in those fields to later be sent back in another EDI document. An example is a purchase order (850) that is 'turned around' into a purchase order acknowledgement (855). Since the business application does not store some of the EDI data, the original 850 document can be retrieved from the repository to select data to place into the 855.

How much does Data Translation cost?

The cost for EDI translation software will vary depending on your computing platform. A low-end, PC-based translator that can handle a few trading partners will cost \$1,500 - \$3,500. A mid-range PC or server-based translator costs \$4,500 to \$15,000. An enterprise system that includes Data Transport, Data Transformation and Data Integration modules in one product will cost \$25,000 to \$150,000 or more.

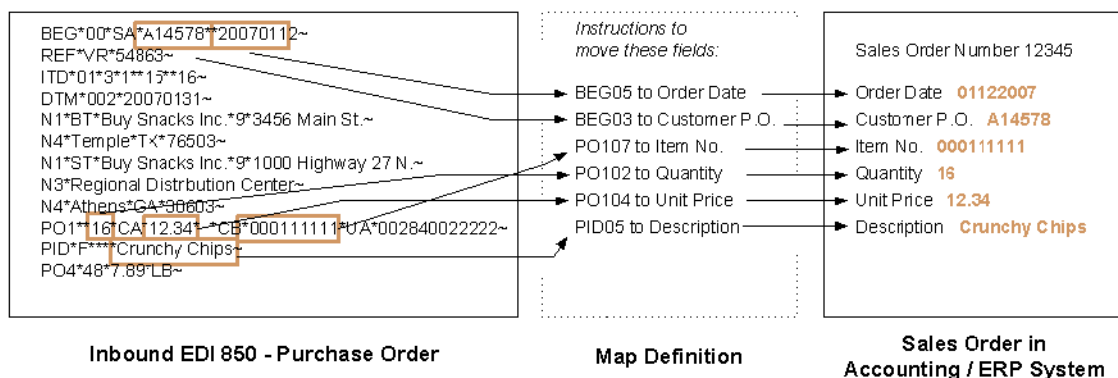
EDI translation software vendors may charge extra for trading partner kits, the cost of which ranges from \$250 to \$1,000. (See 'Sender's Layout #1' on page 13 for more information on kits.)

Annual software maintenance is 15% - 20% for support and upgrades. EDI education and software training is extra if you require it. The cost can be an hourly rate (up to \$150 per hour) or a flat rate per workshop, per student.

For more costs associated with Data Translation, see the section at the end of 'Data Transformation' (page 14) and the section at the end of 'Data Integration' (page 16).

Data Transformation

Data Translation and **Data Transformation** sound similar but are not the same thing. As explained earlier, Data Translation is the process of interpreting EDI data to ensure it conforms to the EDI standards. Data Transformation is the process of taking data from an inbound record layout and moving it to an outbound record layout. Another term for this is called 'mapping.' Any data format (EDI, XML, TXT, etc.) can be transformed but only EDI data is mapped. The layout of the inbound/outbound record for mapping is determined by the application that created or uses the data. This diagram illustrates how mapping works:

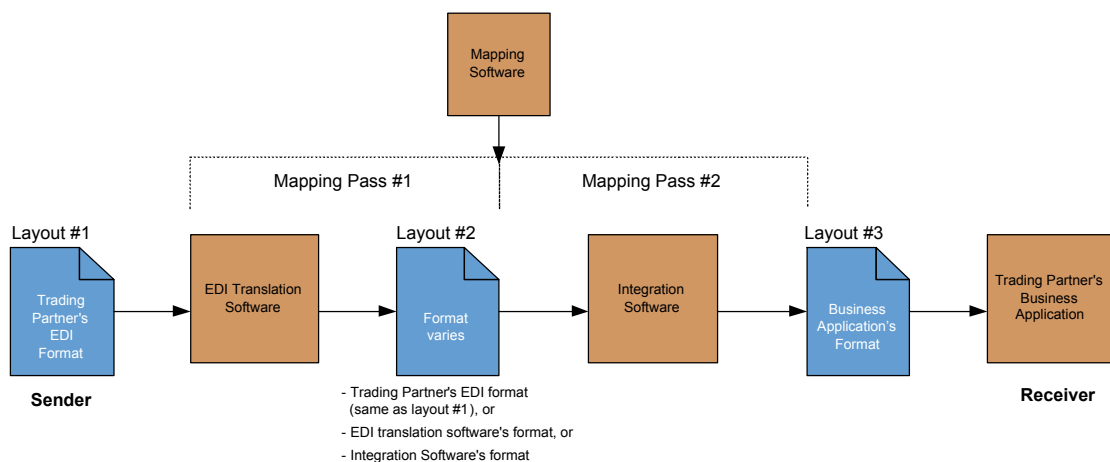


The inbound layout appears on the left-hand side, and the outbound layout on the right-hand side. The layouts on either side can be in any format. In this example, an EDI 850 is being mapped to a sales order in the accounting system. A map definition sits in the middle and defines where to move each piece of data, left to right. If necessary, the map can alter the data before moving it. For example, the Order Date was changed from YYYYMMDD format to MMDDYYYY when creating the sales order.

The Mapping Process

Receiving a transaction in EDI or any other format is of little use unless you can map it to something else. Even a 'rip and read' scenario requires a map to define where to put the data on a piece of paper. Mapping is an essential component of integrating EDI into a business application. One anomaly in the process is that mapping must take place more than once before a transaction is successfully integrated.

This diagram illustrates the flow of an EDI transaction once it has been received by a trading partner. A transaction must pass through one or two mapping steps before it reaches the business application.



Sender's Layout #1

EDI translation software comes with a full set of EDI standards stored in a dictionary that contains hundreds of transaction sets, hundreds of data segments and thousands of data elements. A trading partner will only use a small percentage of the dictionary in their adaptation of the standards. Therefore, most EDI translation software vendors will offer kits that match the trading partner's use of the standards. There is one kit for every trading relationship that contains several transaction sets.

Mapping Pass #1 and Layout #2

Each EDI translation software product in the marketplace will have its own way of doing things. In order to get a transaction into your business application, you first have to get it out of the EDI translation software's database. The simplest method is to export a transaction in EDI format (layout #2) exactly as it looked when it arrived in layout #1. Some products will only allow exporting to a layout that is predetermined by the EDI translation software. In other software, you can map a transaction to a layout of your choice, which might as well be the integration software's format (layout #3).

Mapping Pass #2 and Layout #3

Each integration software product in the marketplace will have its own way of doing things, as well. To ultimately get a transaction into your business application, it has to pass through the integration software. If the integration software requires its own layout (#2), the transaction can be mapped during pass #1, or it will have to be mapped again in pass #2. Regardless of where it is mapped, the end result is the creation of layout #3 that your business application expects.

Why is there so much mapping going on?

The reason there is so much mapping going on is that EDI translation, mapping and integration software could all be purchased from different software vendors. This creates confusion, as there are hundreds—possibly thousands—of combinations of products that could be used together. This doesn't even take into account the Data Transport software discussed earlier—or software add-ons discussed later—that can add hundreds more combinations. The only realistic way for all these products to 'talk' to each other is through mapping.

Who provides the Mapping Software?

Mapping software can be purchased from: 1) the EDI translation software vendor; 2) the integration software vendor; 3) an independent mapping software vendor. It is common for EDI translation and integration software vendors to sell mapping software, but it is uncommon to have EDI translation software, integration software and mapping software all rolled into one product—the exception being large enterprise applications that combine Data Translation, Data Transformation and Data Integration into one product that is expensive to purchase.

How much does Data Transformation cost?

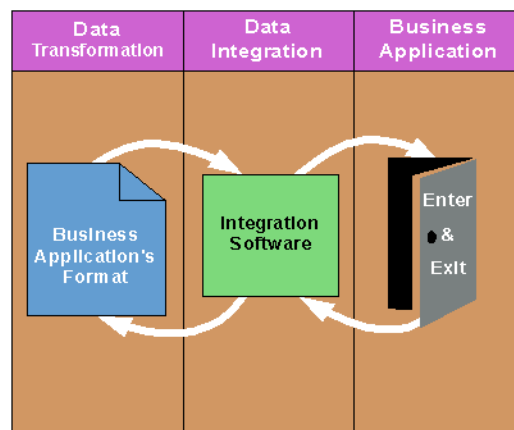
Mapping software has similar cost patterns to EDI translation software reviewed on page 12, including the initial purchase, annual maintenance, education and training.

An added cost involving Data Translation and Data Transformation is professional services. Unless you have an IT staff that is trained and prepared to use the software, you will incur an expense for someone to do all the mapping. At a cost of up to \$250 per hour, the total outlay for professional services could equal or surpass the one-time purchase of the software. Every time you add a new trading partner or a new transaction set for an existing trading partner, there is a cost.

If you have purchased low-end EDI translation software that works with one or two trading partners, it is possible that there will be no additional costs for professional services.

Data Integration⁴

Few, if any, business applications will accept an EDI transaction in its raw format for processing. This means there has to be integration software in the middle that will map the EDI transaction into the format that the business application will accept. (Review the section ‘The Mapping Process’ on page 13.) This diagram illustrates the integration process using a doorway analogy.



The business application will provide the ‘doorway’ to allow a transaction to ‘enter’ in one of two ways: 1) the integration software will ‘walk through the door’ and interact with the application directly; 2) the integration software will hand off the transaction at the ‘door’, and the business application will take over. Both methods are acceptable, but the business application ultimately decides which one must be used.

Additional Considerations

Inbound and outbound processing. Integration is a two-way process. While posting an EDI transaction, such as an order, into an accounting / ERP system (inbound) is most common, there is a necessity to retrieve a transaction such as an invoice out of the application (outbound), as well.

Any data format will work. While EDI is the primary format discussed here, the integration principles apply to other data formats such as XML and TXT, too. If your company has a web site that accepts orders from customers, the same principles and technology can be used to integrate your web site with the accounting / ERP software.

Using EDI Outsourcing. Regardless of whether you have an EDI operation in-house, or use a third party for EDI outsourcing, the integration process is the same.

Do-It-Yourself versus buying integration software. If you have IT personnel who are proficient in EDI *and* the business application, they can do the integration without purchasing integration software. For most companies, it is more economical to purchase software than to do it yourself.

Home-grown business application. If you have a business application that was developed by your IT staff, the integration process is the same. The only difference is that you, instead of the software publisher, determine how EDI will be integrated into your system.

⁴ To learn more about integrating EDI, visit www.ec-edi.biz to download a free copy of the the B2B Series Whitepaper: “Integrating EDI into Accounting and ERP Systems” published by Vantage Point & Associates.

How much does Data Integration cost?

Integration software has similar cost patterns to the Data Transformation software reviewed on page 14, including the initial purchase, annual maintenance, education and training.

The initial purchase price will vary, and is often relative to the complexity and cost of your business application. Integration software for use with small business applications can cost less than \$1,000, but ironically costs more than the business application itself. Integration software for the mid-range business applications costs \$2,500 to \$10,000 or more.

There will be a cost for professional services to do the integration. The costs might be included in the Data Translation or Data Transformation tasks rather than here, but not in more than one place.

ADD-ON TECHNOLOGIES FOR COMPANIES INVOLVED IN THE SUPPLY CHAIN

If your company is not a manufacturer or distributor involved in the supply chain of your industry, you can ignore this section. Otherwise, you should read about these 'add-on' EC/EDI technologies that may become necessary to purchase if mandated by your trading partners.

Advanced Ship Notice

The most complicated EDI transaction used in the supply chain is the 856—Advanced Ship Notice (ASN). Companies use the ASN to manage just-in-time deliveries from their suppliers. An ASN is sent by the supplier to the customer, and tells them exactly what to expect in the shipment when it arrives. Creation of the ASN occurs on the warehouse floor where the goods were packed, which is a different location from where the EDI operations take place. Using a third-party logistics company for warehousing and shipping makes the distance between the two locations even greater.

EDI translation, mapping and integration software vendors handle the complexity of the ASN with software that is an 'add-on' to their base product. This module is accessed in the warehouse where the actual packing and shipping takes place. The base software located in the EDI operations department takes the data, builds the ASN and sends it to the trading partner.

Bar Code Label Printing and Radio Frequency Identification (RFID)

Many customers expect their suppliers to label packages, cartons and skids according to the customer's specifications when shipping orders. Since much of the data originates from an order placed through EDI, it makes sense to have the EDI translation, mapping or integration software facilitate the creation of the labels.

EDI translation, mapping and integration software vendors facilitate the printing of labels within their base product, or through an add-on. Their software provides the data that goes on the label, but it does require another piece of software from a third party to actually format and print the labels. A label printer is necessary, although some products allow the labels to be printed on 8½ x 11 sheets using a laser printer.

RFID is a technology that allows miniature transmitters to be embedded in shipping labels. It's very similar to a bar code label but doesn't require scanning by hand. When a shipment arrives at the customer's warehouse, scanners read the labels on packages and skids as they pass through the doors. The scanned data is then uploaded to the host computer for processing. Large skids with multiple packages can be scanned in one pass, compared to scanning one package at a time by hand.

Global Data Synchronization

One of the inefficiencies in global trade is that a single product could have hundreds of different numbers to identify it. A company in North America could identify a product as number 123, while another company in Europe could identify the same product as 456. Both companies purchase the product from a supplier in Asia who identifies it as 789. Global Data Synchronization (GDS) is a process that companies anywhere in the world can use to identify a product consistently and share that data throughout the supply chain.

GDS is accomplished by assigning a Global Trade Identification Number (GTIN) to every product manufactured, and making it accessible through the Global Data Synchronization Network (GDSN). The GDSN allows companies to quickly and efficiently exchange product data that is accurate, up-to-date and compliant with universally-supported EAN.UCC standards.

How much do Add-on Technologies cost?

Depending on the vendor, the cost for ASN software might be included with the Data Translation, Data Transformation or Data Integration software. For a PC-based installation, the add-on will range from a few hundred dollars to several thousand dollars.

For bar code label printing, you will have to purchase software at a cost of up to \$1,500, plus a label printer for \$1,500 to \$3,000. The Data Translation, Data Transformation or Data Integration software vendor should be able to recommend a vendor for the label printing software and printer.

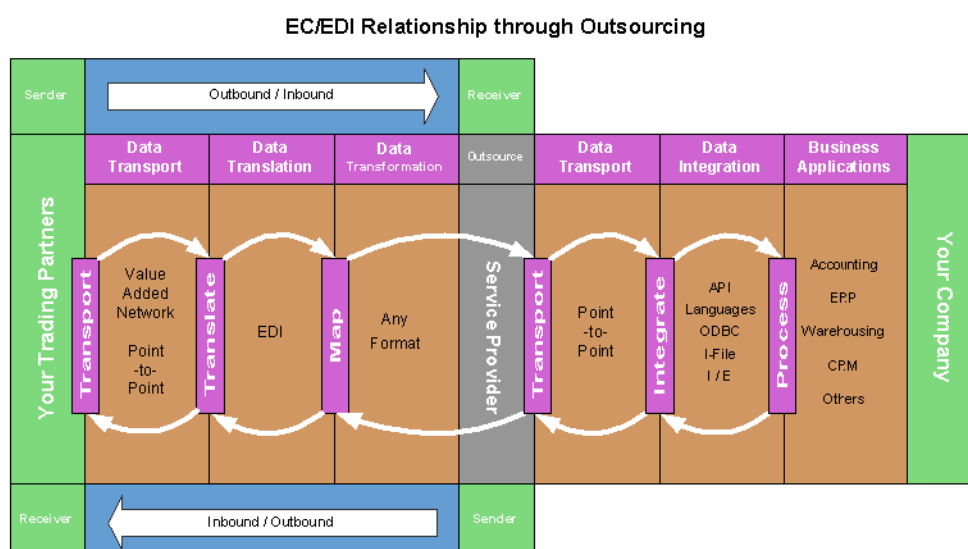
A pricing model for GDS is too varied to present in this whitepaper at this time.

EDI OUTSOURCING: AN ALTERNATIVE TO DATA TRANSPORT, DATA TRANSLATION AND DATA TRANSFORMATION

An EC/EDI relationship with your trading partners can be overwhelming and complex. With global trade and technology changing so rapidly, it can be difficult to keep up, and will likely become more complex over time, not less. The alternative for many companies is to outsource their EDI operation.

EDI outsourcing is growing in popularity. Outsourcing service providers are in direct competition with vendors who offer software and services for Data Transport, Data Translation and Data Transformation. Both approaches are viable, but it is beyond the scope of this whitepaper to delve into the pros and cons of one method versus the other⁵.

This diagram shows how the flow of data changes through EDI outsourcing:



The service provider assumes responsibility for managing the Data Transport, Data Translation and Data Transformation components of the relationship with your trading partners. You only have to maintain one Point-to-Point connection with the server provider.

You don't have to understand how these components work, or worry about day-to-day operations. You must still operate the Data Integration component alongside your business application, however.

⁵ To learn more about EDI outsourcing, visit www.ec-edi.biz to download a free copy of the B2B Series Whitepaper: "Outsourcing Your EDI Operation" published by Vantage Point & Associates.

How does EDI Outsourcing Work?

In an EDI outsourcing scenario, the service provider acts as your IT department and EDI operations department all in one. You interact with the service provider, and they deal with your trading partners at the operational level. You are still responsible for managing the business relationship with your trading partners.

Integrating EDI with your business application works in the same manner as a non-outsourced solution. Files are exchanged between you and the service provider using a Point-to-Point connection (Data Transport), and you integrate the data with your application.

Many EC/EDI vendors in North America offer 'web EDI', which is a method of EDI outsourcing. It is ideal for companies who have low-to-medium EDI activity and no resources to handle the complexities internally. The service provider acts as your IT department and the EDI operations are somewhat shared. They provide you with access to their system through a web browser, to process EDI transactions in real time. After your activities are completed, the service provider will translate and transport files to/from your trading partners.

With web EDI, integrating EDI with your business application works in the same manner as a non-web EDI solution. Files are exchanged between you and the service provider using a Point-to-Point connection (Data Transport), and you integrate the data with your application.

How much does EDI Outsourcing cost?

There are many EC/EDI vendors who offer outsourcing services in North America. Their pricing models are too varied to discuss in this whitepaper. You can assume that the overall costs will be less than what it would cost to manage an in-house EDI operation. These are some considerations when evaluating the cost for EDI outsourcing:

1. You will not have to purchase any Data Transport or Data Translation software.
2. You will have to purchase Data Integration software and possibly Data Transformation software.
3. The costs to integrate EDI with your business application will be the same whether you outsource your EDI operation or not.
4. There is still a cost associated for someone in your organization to manage the business relationship with your trading partners and the relationship with your service provider.
5. If you require bar coded labels to be printed, you still have to purchase software at a cost of up to \$1,500, plus a label printer for \$1,500 to \$3,000.

6. The fee structure from the service provider will include a combination of the following:
 - One-time setup fee
 - Monthly management fee
 - Transaction fees
 - VAN charges
 - New trading partner or transaction setup fees
 - Mapping fees (for integration)

With the web EDI outsourcing method, the pricing model is similar among vendors, and these are some considerations when evaluating the cost:

1. Points 1 to 5 above also apply to web EDI
2. The fee structure from the service provider will include a combination of the following:
 - One time setup fee – flat rate or up to \$750 per trading partner
 - Subscription fee – \$25 to \$75 per month
 - Transaction fees – \$1 to \$3 per transaction, based on volume
 - VAN charges – If your trading partner still uses a VAN, the service provider will connect to the VAN on your behalf. They will pass the cost on to the customer at a rate of 5¢ to 25¢ or more per KC. Some service providers will bundle the VAN charges into their transaction fees.
 - New trading partner or transaction setup fees – variable \$
 - Mapping fees for integration – up to \$250 per hour