Electronic Data Interchange (EDI) Fundamentals

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Contents

Introduction

This course will introduce you to Electronic Data Interchange, or EDI.

EDI is a set of standards and technologies designed to automate the sending and receiving of routine business documents between trading partners, such as an automotive company and its suppliers. A wide range of documents can be transmitted in EDI format which lowers costs and streamlines operations for companies that implement EDI systems.

The goal of this course is to provide an overview of EDI from an industry perspective. Completion of this course will be helpful if you plan on working with Netscape Electronic Commerce products, such as ECXpert, and will also be helpful for data analysts who will be working with data mapping tools like TSI's Mercator product.

The course is divided into the following modular sections:

EDI Overview

This module provides a brief, high-level overview of EDI and its supporting technologies.

Introduction to Electronic Data Interchange

Electronic Data Interchange and its supporting technologies are defined and discussed . This section provides a discussion of the forces leading to the development of EDI, a "real-world" definition, the historical trends that led to EDI, the basic components of EDI, and trends in electronic commerce.

ANSI X12 Standards

This module describes the ANSI X12 and UN/EDIFACT EDI standards. It describes the ANSI X12 standards documentation and provides a step-by-step instructions in how to read and understand the standards documents. You will learn about the components that make up an EDI transmission and about the differences between the U.S. ANSI X12 standard and the international UN/EDIFACT standard.

Value Added Networks

In this section you will learn about Value Added Networks and the services they provide. Alternatives to traditional VANS, like Netscape's CommerceXpert products, are also discussed.

EDI Hardware and Software

In this module you will learn about the various hardware and software products available to support EDI in a variety of business settings, from very small business to large, multinational corporations.

EDI User Profiles and Key Barriers

This module discusses typical EDI user profiles and examines the barriers that many organizations experience when they begin to implement an EDI system.

Special thanks go to Dan Petrosky at EDI Partners (http://www.edipartners.com) for providing source material used to create this course.

Module 1: EDI Overview

EDI Overview

Electronic Data Interchange (EDI) has been in wide use in industry since the 1970s. Only recently, however, has it become feasible to share business documents electronically over the Internet using EDI.

This module will briefly introduce you to some of the major concepts of EDI.
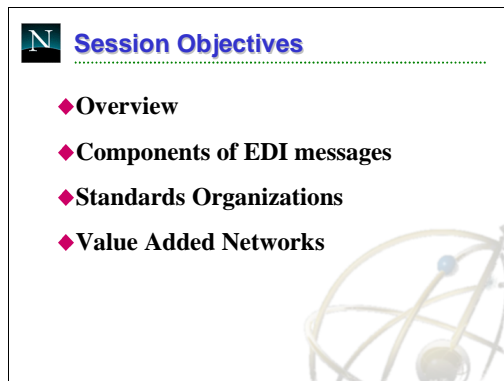
Session Objectives

◆ Overview
◆ Components of EDI messages
◆ Standards Organizations
◆ Value Added Networks

The purpose of this section is to provide a quick overview of EDI and the standards that support it.

This module will cover:

* EDI Overview, describing what EDI is and some of the terminology commonly used in EDI

* Components of EDI, the various EDI documents that are available and can be shared electronically

* Standards Organizations, the ANSI X12 and UN/EDIFACT committees who set the EDI standards in the United States and in Europe

* Value Added Networks, providers of networking, product, and support services for EDI
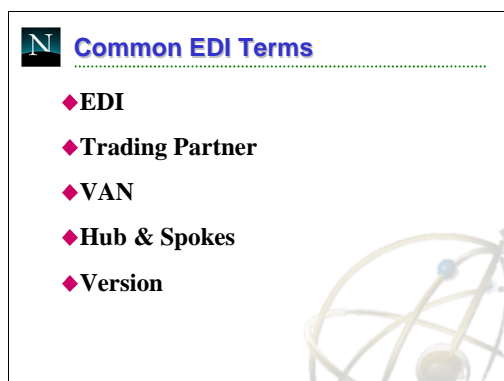
Common EDI Terms

◆ EDI
◆ Trading Partner
◆ VAN
◆ Hub & Spokes
◆ Version

EDI has its own jargon. Here are a few common terms to help you get started:

* **EDI** - Electronic Data Interchange, the computer to Computer exchange of business documents in standardized format

* **Trading Partner** - EDI business participant

* **VAN** - Value Added Network – communications intermediary - eliminates point to point communications

* **Hub & Spokes** - term referring to which partner has the influence over the EDI relationship

- **Version** - each numbered release (upgrade) of the standards

ANSI X12 Transaction Sets

Transaction Set = *Business Document*

Txn Set ID	Document
146	Request for Student Transcript
214	Motor Carrier Shipment Status
810	Invoice
813	Electronic Filing of Tax Return Data
820	Payment Order/Remittance Advice
832	Price/Sales Catalog
837	Health Care Claim
850	Purchase Order
855	Purchase Order Acknowledgment
856	Ship Notice/Manifest
872	Mortgage Insurance Application
997	Functional Acknowledgment

And Many Others

An EDI document is referred to as a *transaction set* in the ANSI X12 standard.

The standards documents specify hundreds of different transaction sets, which are allowable documents in EDI.

The slide shows some of the more commonly used transaction sets. EDI professionals usually refer to documents by their transaction set number, rather than by name. So an EDI professional would refer to an 850, not a Purchase Order.

Note that certain transaction sets apply only to specific industries.

ANSI X12 Components

- ◆ **Transaction Set**
- ◆ **Segment**
- ◆ **Element**

Transaction Set

A transaction set is one electronic document (e.g.., a purchase order). The data included in a transaction set conveys the same information as a conventional printed document.

Segment

A segment is a line of data in a standard EDI transaction. EDI transactions are made up of multiple segments. A segment would contain multiple elements.

Element

An element is the smallest item of information in an EDI transaction and represents line item data of a particular document.

N EDI Advantages

◆ **Advantages of EDI:**
- ♦ Error free data exchange
- ♦ Quick turn-around
- ♦ Lower Operating Costs
- ♦ Ability to do JIT, Quick Response

◆ **Cost Saving Examples:**
- ♦ Food processing company reduced PO admin costs from $70 to $.93
- ♦ Trucking Company can process 200 EDI B/L per hour

The main advantage of EDI is that it reduces costs and improves efficiency in organizations that adopt it. It does by creating an error-free flow of routine documents between a company and its "trading partners".

Cost savings from implementing an EDI system can be dramatic. Cost savings are usually realized only after a significant investment of time and money.

N Leading Industries

◆ **Automotive - Big "3"**

◆ **Retail - Sears, JC Penney, Walmart, Home Depot**

◆ **Transportation - Railroads, Trucking & Ocean Carriers**
- ♦ Union Pacific, Fedex, UPS, Port of Seattle

EDI began in the transportation industry and was quickly adopted by other industries.

Different industries created their own versions of standards for sharing electronic documents, which led to the creation of the ANSI X12 committee to create uniform standards for all industries that use EDI.

ABC Office Supplies Co.	Date: 12/31/ 98	**INVOICE**
1 Market Street		No. 2346
San Francisco, CA 94101		

Bill to:	Ship to:
Major Corp.	Major Corp., Main Receiving
PO Box 2236	1 Park Ave.
Richmond, VA 23220	Richmond, VA 23209

Your Order No. 1123	Cust. Ref. No.	Order Date 8/12/ 97	Terms Net 30 Days

Qty	Unit	Item No.	Description	Unit Price	Total Price
20	DZ	41358	Pencils	9.55	191.00
10	DZ	22211	Ball Point Pens	6.05	60.50

Please Pay This Amount 251.50

This is a sample Invoice.

Purchase orders, invoices, and related documents are among the most common documents to be electronically transmitted in an EDI system.

N ANSI Segment IDs and Names

BIG - Beginning Segment for Invoice
PER - Administrative Communications Contact
N1 - Name
N2 - Additional Name Information
N3 - Address Information
N4 - Geographic Location
➡ **BT - Bill To**
ST - Ship To
ITD - Terms of Sale / Deferred Terms of Sale
IT1 - Baseline Item Data (Invoice)
PID - Product / Item Description
TDS - Total Monetary Value Summary
CAD - Carrier Detail

The ANSI standard breaks up the various components of standard business documents into named segments, and specifies the detailed information that is allowable within each segment.

Thus, the ANSI standard is a complete and comprehensive guide to developing EDI transaction sets that can be used among a wide range of trading partners.

The slide shows how a line item in the purchase order would be expressed as a segment in an EDI transaction set.
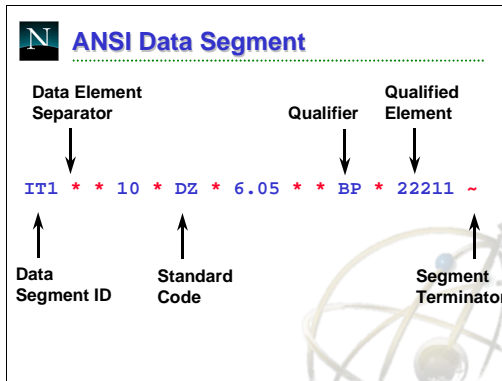
This slide shows the various "data elements" and the separators, or delimiters, that comprise a single segment in a transaction set.

The section of this course on ANSI X12 standards provides much more detail on transaction sets, segments, and data elements and explains how to read the ANSI X12 standard to develop EDI transaction sets.
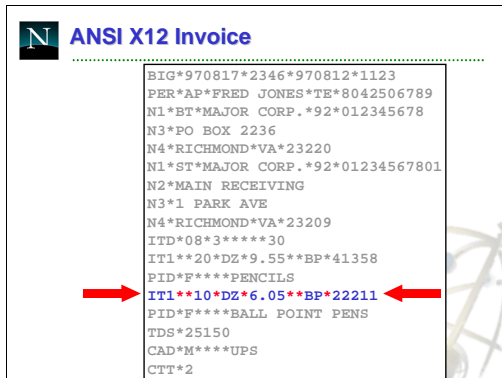
This slide shows a sample invoice expressed as an EDI transaction set.

The highlited segment is the one from the invoice in the earlier slide.
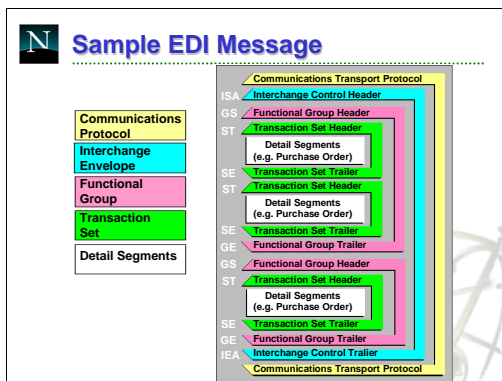
EDI packages transaction sets for delivery over a network.

Individual transaction sets (documents) go into "departmental envelopes" called Functional Groups. Functional Groups, in turn, go into larger "shipping envelopes" called Interchanges.

The Interchange is addressed to a company; the functional groups are addressed to individual departments within an organization; and the transaction sets are the individual documents to

be delivered.

Every EDI transmission has at least one Interchange, Functional Group, and Transaction Set.

N FA and MDN

- ◆ **Functional Acknowledgements - (FA or 997)**
- ◆ **Message Disposition Notification (MDN)**

Functional Ackowledgments - (FA or 997)

After receipt of the EDI message, the EDI software will generate an application acknowledgment back to the trading partner. EDI Messages can be acknowledged on the group level, the document level or on the data segment/element level. Many companies expect 997s within 4 hours; some 24.

Message Disposition Notification (MDN)

ECXpert uses MDN to alert trading partners that an SMTP document was received.

N Value Added Networks
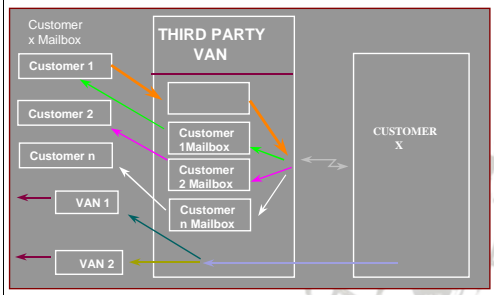
Value Added Networks (VANs) provide networking services between trading partners who send and receive EDI documents.

VANs provide a wide range of services to help companies do EDI over a wide variety of networking systems.

N Multiple Message Standards

- ◆ **ANSI X.12**
- ◆ **UN/EDIFACT**
- ◆ **UCS**

A number of standards are in use throughout the world:

ANSI - (American National Standards Institute) - widely used in North American - also called X.12.

UN/EDIFACT - (EDI for Administration, Commerce and Transport) - used primarily in Europe and Japan, and is managed by the United Nations.

UCS - developed within grocery industry in early 80s.

Summary

- ◆ **EDI documents are called transaction sets**

- ◆ **ANSI X12 committee sets the standards for EDI**

- ◆ **Value Added Networks provide communications and services for EDI**

- ◆ **Different standards organizations exist throughout the world**

This section provided a brief overview and introduction to Electronic Data Interchange.

Module 2: Introduction to EDI

Introduction to Electronic Data Interchange
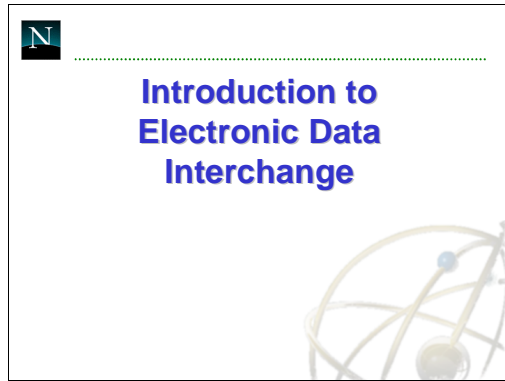
This course provides background in "industry standard" EDI, with additional information on recent products and services that support EDI over the Internet. However it is not a "how-to" guide in implementing an EDI system.

This course is not intended to provide a means to implement an EDI "project" at a company. EDI rather is a business process that is an ongoing activity.

Session Topics

◆ **Forces Leading to EDI**
◆ **A Real-World Definition**
◆ **Historic Overview**
◆ **The Components of EDI**
◆ **Trends**

This module will cover:

Forces Leading to EDI - How business, economic, and technological changes have made EDI possible and necessary on today's business world.

Real-World Definition - How is EDI defined in the theoretical sense and in the real-world sense?

Historic Overview - What are the historical trends that led to the development of EDI?

The components of EDI - what does it take to implement an EDI system?

Trends - Where is EDI now and where is it heading in the future?

Business Phases

◆ **Demand**
◆ **Supply**
◆ **Settlement**
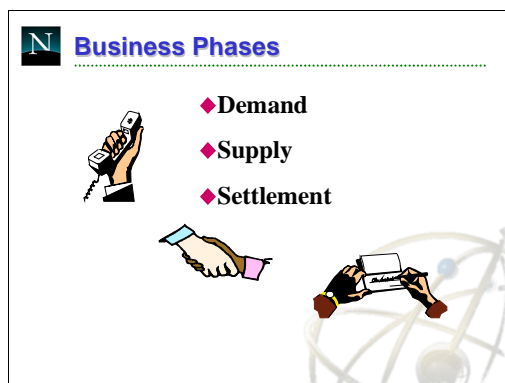
The world of economics is dominated by two words: Supply and Demand.

In the practical world of business, things are a little more complicated. What really comes first in business is Demand, followed by Supply. And there's a critical third component - Settlement - that isn't mentioned at all in the economics textbooks. If you don't have Settlement - that is, a way to get paid for your goods and services - then you go out of business. Economists spend a lot of time on demand and supply curves. From a business perspective it's more valuable to look at the inter-relationships between demand, supply, and settlement.

Understanding the role of settlement is crucial

to understanding how a product makes it's way through the production and distribution chain. For example, a simple box of cereal may be marked up in price four to five times on its way from production to purchase by a consumer. Each markup represents an instance of settlement.

In the real world, business starts with Demand; it creates a Supply of product to satisfy the demand; and manages the process of Settlement as the products make their way through the complex paths of production and distribution.
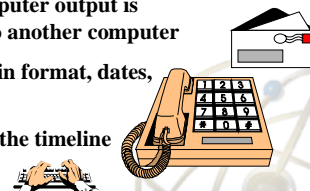
What many companies are doing are re-engineering their business processes to minimize the costs associated with Demand, Supply and Settlement. EDI is a central component in this ongoing process of business re-engineering.

The ultimate goal of an EDI system is to automate the routine flow of documents that support activities related to demand, supply, and settlement.

According to the book *EDI - A Total Management Guide*:

- 55 percent of communication moves by paper

- 35 percent moves by FAX

- 10 percent moves electronically - including E-mail and EFT.

The bulk of our business communication moves by paper or FAX documents.

The problem is that the inconsistent formats between these various forms of communications creates extra work and increases costs for companies that use the "traditional" methods of communication.

Differences in date formats, number formats, etc. can slow down the settlement process at all stages of production and distribution, which in turn drives up costs.

Limitations & Concerns

- ◆ **Timing**
- ◆ **Accuracy**
- ◆ **Handling**
- ◆ **Reconciliation**
- ◆ **Storage**

In paper based systems, organizations that receive business documents from outside have little control over the timing and accuracy of incoming documents. And once they receive paper or FAX documents, there are various handling issues that must be addressed, most notably the need to re-key data into data processing systems.

Reconciliation, or matching incoming invoices against a previously issues PO, can be error prone. Some companies see that it costs up to $10 per piece to reconcile invoices and POs. Some companies automatically deduct the cost of processing when they receive paper POs or invoices, while other companies provide incentives for working with the company's EDI system.

Additionally, for tax and legal reasons companies routinely keep records on hand for years. In a paper-based system the cost of storage can become very high, and it is also possible to lose it in an accident or disaster.

Options

ANSI X12
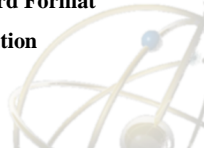
EDIFACT

In today's world companies have tools available to manage the flow of documents more effectively.

Two organizations - ANSI X12 in the United States and UN/EDIFACT in Europe - are there to provide standards for automating the flow of routine business documents between trading partners. This is the beginning of Electronic Data Interchange, or EDI.

EDI Is

- **Electronic Exchange of**
  - ◆ Business Documents
  - ◆ Business Data
  - ◆ Information
- **Using a Public Standard Format**
- **Application-to-application communication**
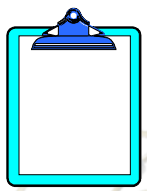
EDI is the electronic exchange of business documents, business data and information using a public, standard format. Increasingly the medium for sending and receiving EDI documents is the Internet. The public standard is ANSI X12.

In practice, EDI is an application-to-application system, where two EDI systems (applications) are communicating with each other *without human intervention*.

A Real World Definition

EDI is the electronic exchange of frequent repetitive "dirty" documents
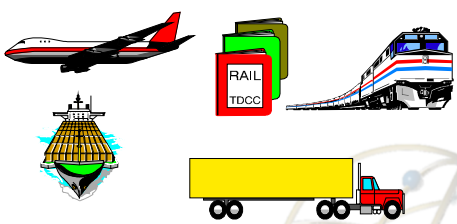
The first industry to put EDI into use was the railroad industry, and the first document used was the waybill. These waybill documents became very dirty as a shipment made is way to its destination.

Moving the waybills electronically would make the process of moving rail cards easier. This is a good example of where EDI worked very well.

Another industry that was in the forefront was the grocery industry, where frequent, repetitive and "dirty" documents were common.

Any document that is repetitive and relatively high in volume is a good candidate for EDI.

1970s Events

EDI began to be used for a wider variety of frequent and repetitive business documents, like purchase orders and invoices. Additionally, more and more industries began to implement early EDI systems. Multiple industries were basically doing their own thing, so the core reason of using EDI began to erode, especially when companies worked across industries. Industries were developing their own standards.

TDCC: Transportation Data Coordinating Committee, which worked from 1968 to 1975 to develop a series of EDI standards documents for Air, rail, truck and ocean. So EDI really began in the transportation industries, but many large fortune 500 companies had in interest in the development of the early EDI standards.

The grocery industry was the next major

industry to begin using EDI, then the Electronics and Chemical industries.

Each industry tended to develop its own standards – nothing was going across industry at the time.

1980s Events
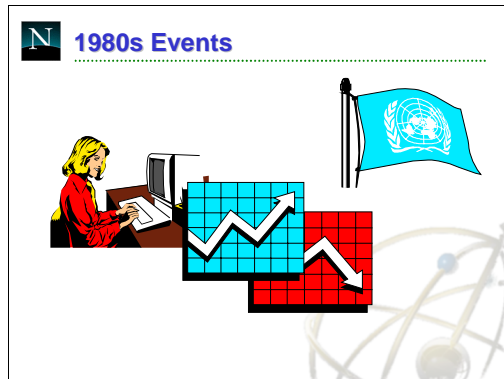
This decade saw the transition from TDCC to ANSI, who took over the management of standards and committed to make the standards work across industries.

Also in the '80s there was a tremendous growth in the number of EDI users fueled by the growth of PCs in business. PCs made it possible for more and more companies and departments within companies to effectively implement EDI-based systems. This made EDI fast and inexpensive.

1990s Events

- ◆ **EDI is 80% business and 20% technical.**
- ◆ **EDI is a relationship opportunity!!!!**
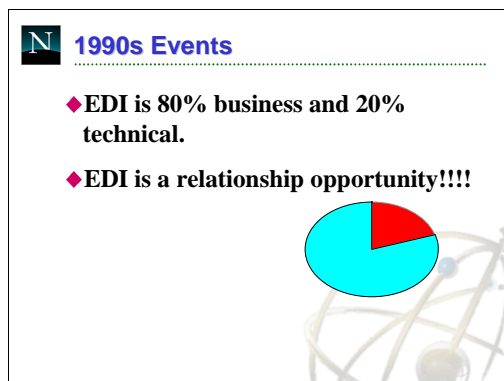
In the '90s, an increasing number of Fortune 500 companies have some kind of EDI program underway, and EDI is growing rapidly throughout all phases of industry.

The major technological advance for EDI has been the advent of the commercial Internet. Companies can now use products, like the Netscape CommerceXpert products, to handle EDI-based transactions over the Internet with a high degree of security and reliability. This is dramatically driving down the costs of doing EDI and is creating further demand for EDI.

It's important to understand that EDI is not a technology itself. Rather, it is essentially a set of technologies designed to allow companies to use the ANSI X12 standards to automate certain aspects of their businesses.

In a larger sense, EDI is a relationship opportunity. Some experts say that EDI is 80 percent business and 20 percent technical, meaning that the business relationship must be crafted along with the new technology to support EDI.

N **Industries**

- ◆ **Transportation**
- ◆ **Finance**
- ◆ **Electronics**
- ◆ **Retail**
- ◆ **Government**
- ◆ **Automotive**
- ◆ **Healthcare**
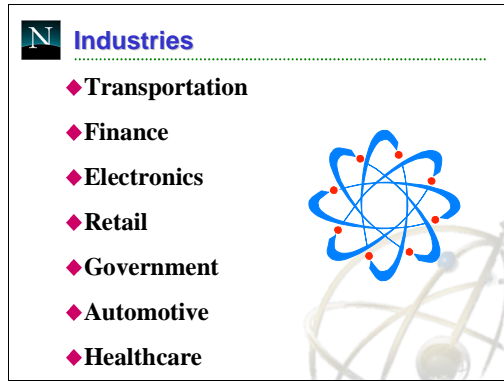
The list shows the various industries that have been in the forefront of EDI implementation.

EDI started in the transportation industry and was adopted in its early stages by the grocery and manufacturing industries. From there it has spread rapidly. Now it touches virtually every aspect of worldwide commerce.

N **Components of EDI**

- ◆ **Standards**
- ◆ **Communication Medium**
- ◆ **Software/Hardware**
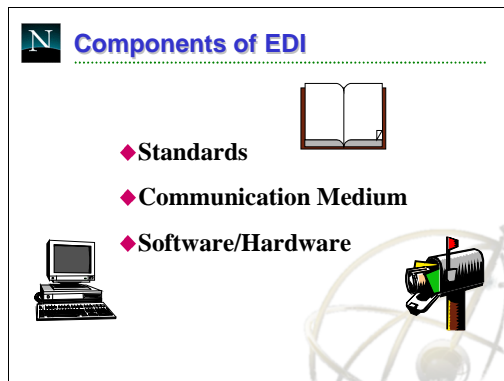
The three major components of an EDI system are:

- **Standards**, which in the United States are defined by the ANSI X12 committee;

- **Communication Medium**, which can be provided by the services of a Value Added Network or, increasingly, Internet;

- **Software**, which handles both the EDI transactions and the transmission of documents over the communication medium.

N **ANSI ASC X12**
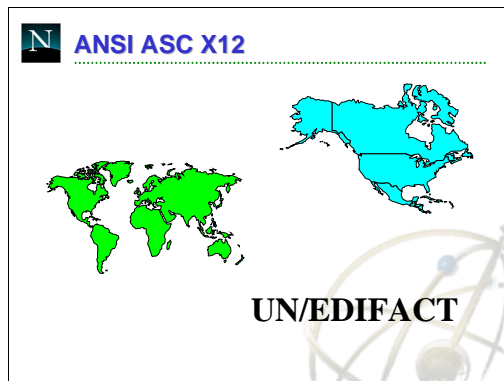
UN/EDIFACT

These are the two major standards used in the world today: ANSI X12 and UN/EDIFACT. From a technical point of view, the differences between these two standards are very small, but how they are managed is very different.

ANSI X12: ANSI stands for American National Standards Institute. Inside of that organization are many Accredited Standards Committees (ASC) that maintain industry standards for a variety of industries. All of the committees that maintain standards have a name, and all of the committees that have anything to do with the topic of communication begin with the letter X. The 12th committee deals with EDI issues. So ANSI ASC X12 is a committee that manages the EDI standard that we use in the United States.

The ANSI X12 standards are maintained in code books. The ANSI X12 book is like an

unabridged dictionary. This is important to understand in designing an EDI system because, like an unabridged dictionary, you are going to use only a relatively small subset of what you find in the ANSI X12 reference books.

EDIFACT: This is the European standards body which acts under the auspices of the United Nations. It stands for Electronic Data Interchange For Administration, Commerce and Transport. UN/EDIFACT is the normal way to refer to this standards body. The US national standard for EDI is ANSI X12; the international standard for EDI is UN/EDIFACT.

While there are some differences in the standards defined by the ANSI X12 and UN/EDIFACT committees, the differences are relatively minor. There is an effort underway to bridge the gaps between ANSI X12 and EDIFACT.

Some other EDI-related terms:

- **GTDI**: In Europe, EDI initially was referred to as TDI or Trade Data Interchange. The UN/EDIFACT committee has published a set of standards for TDI called the Guide for Trade Data Interchange, or GTDI.

- **PAEB**: Pan American EDIFACT Board, our representation (US) back to the United Nations to make sure our business interests are reflected in the UN/EDIFACT committee. Members of the PAEB are the United States, Canada, Mexico, and several nations in South America.

There are 5 additional EDIFACT boards throughout the world. Of all six, ours is the only one that is commercially funded – all others are government funded.

Within ANSI X12 there are various subcommittees:

- **AIAG**: The Automotive standard

- **UCS**: Uniform Communications Standard, the Grocery standard

- **VICS**: Voluntary Inter-Industry

Communications Standard, the retail industry standard.

Other subcommittees for other industry groups also exist.

Value-Added Networks (VAN)

Banks

Service Agents

Carriers

Suppliers

Governments

Customers

* TIME * TECHNICAL * DISTRIBUTION*
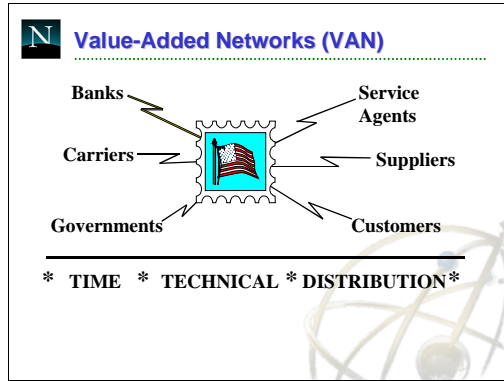
Value Added Networks provide the primary medium for exchanging EDI documents, both in the United States and internationally.

VANs came into being originally to allow personal computers running EDI software to communicate via modem to large mainframe-based EDI systems maintained by trading partners.

Since then, they have greatly broadened their scope and now offer a full range of hardware, software, and services intended to allow companies to do EDI, in addition to the data communications services between trading partners.

Many VANs are now offering Internet-based services. Additionally, many large organizations are duplicating VAN services by implementing their own Internet-based EDI services. Netscape's ECXpert system is at the forefront of the movement to handle a wide variety of electronic commerce tasks, including EDI, over the Internet.

Summary

EDI is 25+ Years Old

Evolutionary

Worldwide

Will Impact All Business Activity
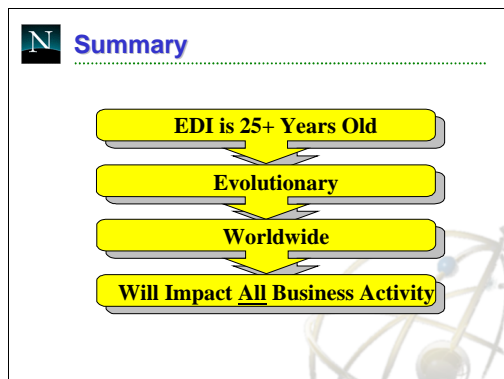
EDI has been around since the late 1970s and continues to grow in popularity today.

It has evolved greatly over the years and has the capability of transforming the way companies do business.

It is a worldwide effort supported by commercially funded standards efforts in the United States and government-funded standards efforts overseas and as part of the United Nations.

Module 3: EDI Components: Value Added Networks

**EDI Components:
Value Added
Networks**
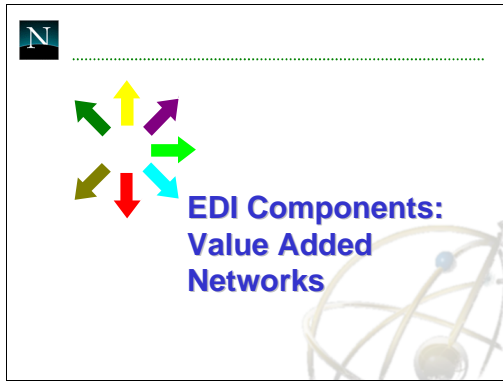
This module will examine the growth of Value Added Networks in EDI. It will discuss the various services that VANs provide and briefly touch on some of the existing and emerging technologies employed by VANs.

Session Objectives

◆**Definition and Components**

◆**Why VANs are needed.**

◆**Services and Support**

◆**Cost**

◆**Advanced Issues**

In this section you will learn about VANs – who they are and what they do.

Some of the major VANs are:

- **Advantis**

- **MCI**

- **ATT**

- **GE**

- **Sterling Software Commerce Net**

- **Harbinger**

The main objectives of this module are to look at why VANs are needed, overview of services and support, costs, and to look at where VANs are moving in the future.

Definition

◆**EDI Value Added Network**

◆**A company that provides communication services, electronic mailboxing, and other communications services for EDI transmission.**

VAN stands for Value Added Network. A VAN is a company that provides communication, services, and electronic mailboxing services for EDI transmissions. They are very similar to the way large scale electronic messaging systems work.

You can think of EDI as a replacement for paper documents delivered by mail or FAX. In this same vein, VANs typically replace services that are provided by the post office.

Most VANs came from the world of timesharing computer systems.

EDI VAN Components

Minneapolis · London · Hong Kong · Atlanta

Network
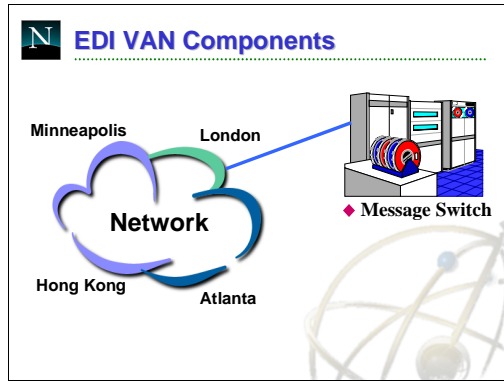
◆ **Message Switch**

VANs are similar to timesharing systems – a "message switch" located usually in a large city is accessed by a proprietary network.

The EDI data is stored and switched from the messaging switching computer via the network front end. The network is what provides the communications flexibility.

All VANs have a back-end message switching system; some also own the network; while others lease networking services from a third party. The key is that VAN customers have local access but the message switching (backend computer system) is located elsewhere.

Large-scale VANs offer international access, and many vendors offer 800 number access.

Why VANs Evolved

◆ **Physical differences**

◆ **Simplification**

◆ **Cost**

◆ **Security**
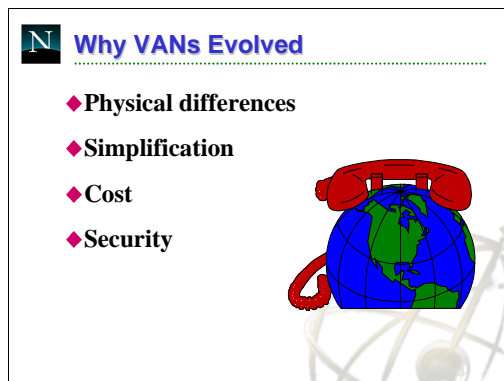
VANs came into existence because PCs with asynchronous modems became popular. Large mainframe-based backend systems had bisynchronous modems that ran at different speeds.

To mediate the physical differences between the PCs and mainframes, and to allow the PCs to communicate with mainframe-based EDI systems, VANs came into being to provide communication services between the local PC systems and the backend mainframe-based EDI services.

This simplifies the design of an EDI system, particularly for smaller trading partners who run their EDI systems on a PC. For these customers, using a VAN is often more cost-effective than handling the technical details of communication internally.

Technology changes at a rapid pace; using a VAN often provides a cost-effective way of keeping up with changes in technology without having to make large investments in computer hardware and software.

Finally, VANs offer a high degree of reliability and security.

VANs eliminate the need to support a wide variety of communications speeds. The VAN acts a buffer – trading partners do not have direct access to your system, which is seen as a benefit to many organizations.

The mainframe-based VAN EDI systems provide built-in backup and audit capabilities. They also typically provide access between any two trading partners anywhere in the world.

Services & Support

SERVICES
Connectivity
Distribution
Conversion
Security
Reliability

SUPPORT
Customer Service
Market Awareness
"Hub" Program Manager
Account Representative
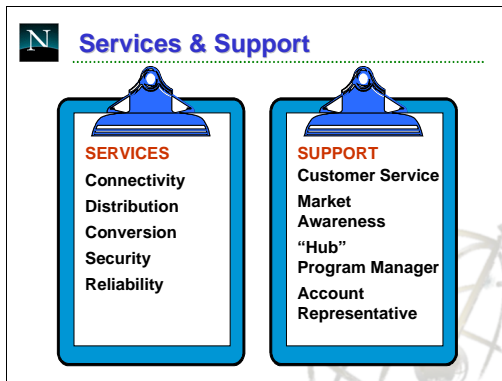
One of the key components of VANs is service and support. Services include:

- Connectivity

- Distribution

- Data conversion

- Security

- Reliability

Support includes:

- Customer services

- Market awareness

- Hub program manager

- Account representative

Connectivity: Most of the organizations that are involved EDI access their VAN by dialup. They have a physical telephone connection which they use to dial into the VAN's network.

Most VANs charge for character count and a monthly subscription fee. So if I call my VAN ever hour, I'm only going to be charged for data you pick up out of their mailbox.

Some organizations are large enough that they have a dedicated line into the VAN's network. This typically occurs with organizations that are doing more than EDI, for example e-mail, EDI, Accounts Payable, etc.

Occasionally EDI VANs provide outdial services where the VAN contacts the trading partner whenever anything changes on the

system.

Distribution: When you sign up for a VAN, typically what they will assign to you is mailbox, and that mailbox in most cases will be identified by your DUNS number. The DUNS number is the most common method if identification in EDI.

N Support

"Hub" Program Management

◆ **Planning**

◆ **Education**

◆ **Documentation**

◆ **Follow-up and tracking**

◆ **Installation**

■ TECHNICAL
■ PROGRAM SUPPORT
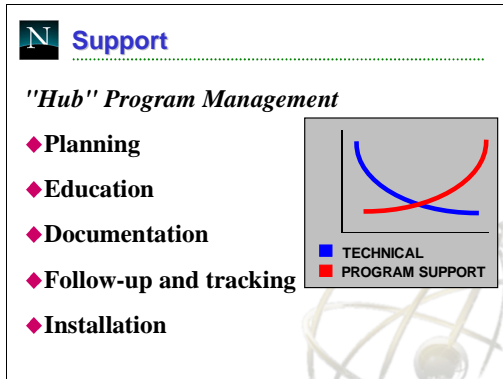
VANs typically have a customer service staff that operates at three levels:

- **Implementation** – people to help get started

- **Operations** - People to assist with day-to-day operation of the EDI system

- **Trouble-shooting** - People to help when something goes wrong

Companies that opt not to go with a VAN will have to incur their own internal costs to implement an internal support organization that addresses all three areas.

The early phases of an EDI project are very technical in nature and require a highly technical implementation staff. As the project matures, the amount of technical support decreases, while the amount of program or market-related support increases. A mature EDI implementation tends to have a relative large program staff and a relatively small technical support staff.

The larger EDI VANs are equipped to handle the project as it matures from a highly technical project to an ongoing EDI program.

Companies that opt to implement their own EDI system must build this into their planning. In many cases it's a good idea to pay for external consulting to get the EDI system up an running, then plan for a full-time staff for program management and a relatively small technical support staff that is geared more towards support rather than system design and implementation.

N Advanced Issues

Interconnects

◆**X.400 Message Handling**

◆**X12.56 EDI Interconnect Mailbag Handling**
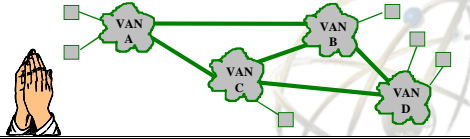
Communication between VANs can sometimes be unreliable. It's important when evaluating a VAN that you find out how they handle communication to other VANs. They should have a direct connection or use X.400. An additional protocol, X.12.56 EDI Interconnect Mailbag Handling, is intended to facilitate communication between VANs and improve the gateway reliability.

Additionally you need to know when data is sent between VANs because this can affect your business operations.

Reliable Internet connections between trading partners is making the issue of managing interconnects between VANs less of an issue.

N EDI Value Added Networks

Session Summary

◆**EDI VANs allow trading partners to share EDI documents.**

◆**VANs are continuing to evolve new and better products and services.**

◆**International VAN service is just starting to grow.**

Value Added Networks came into being to allow trading partners with different hardware and software systems to communicate and share EDI documents.

They have since grown into full service EDI and electronic commerce companies offering a wide range of products and services to businesses.

VANs now provide global access for trading partners.

Module 4: User Profiles and Key Barriers

N

EDI User Profiles and Key Barriers
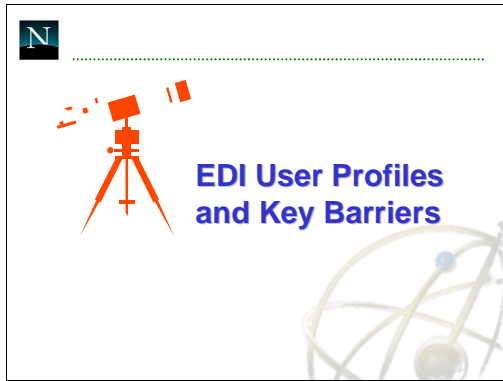
The costs of implementing an EDI system can seem very high, particularly for management that is not familiar with EDI. Additionally, a number of highly specialized technical fields must come together before the EDI system will work. Improved interdepartmental communications is also necessary to successfully implement an EDI system. Therefore a new EDI system is likely to meet with significant barriers.

This module will examine some of the key barriers to implementing an EDI system, and will also offer some guidelines for overcoming those barriers.

N **Session Objectives**

◆ **Discuss how EDI users evolve**

◆ **Define three levels of EDI maturity**

◆ **Learn how to identify the EDI level of**
  ◆ **Your organization**
  ◆ **Your trading partners**

◆ **Review the key barriers experienced during implementation**

◆ **Briefly review international EDI observations**
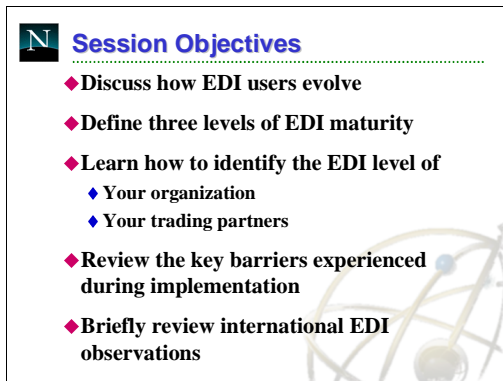
The purpose of this section is to discuss typical EDI users, and how organizations tend to evolve in their level of EDI maturity.

This section also looks at some of the barriers organizations experience in setting up an EDI program.

N **Levels of EDI Maturity**

◆ **Embryonic - Tactical**

◆ **Growing - Strategic**

◆ **Advanced - Cultural**
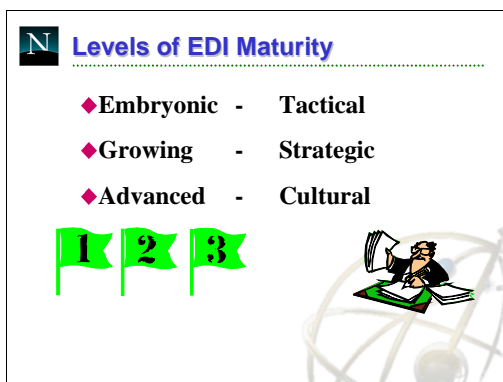
Companies tend to fall into one of three categories when working with EDI:

Level 1: *Embryonic* - This is a tactically oriented phase. This is where most organizations start. It primarily involves the acquisition of components and planning for implementation and deployment.

Two thirds of EDI implementations begin when a customer specifies a requirement to do EDI. Level 1 organizations are usually working with a small number of trading partners.

The need for EDI often originates from sales and/or marketing who have received a communication from a customer that says EDI is necessary to continue the business relationship. EDI often begins as a departmental level operation - they are simply reacting to a

customer request and have a desire to keep a customer relationship alive.

This level is characterized by small investment, a high level of concern for keeping costs low, and speedy implementation.

Level 2: *Growing* - This is a strategic phase. It is at level 2 that the company decides to do EDI.

As volumes of EDI transactions increase, it becomes evident to company management that important production data is being handled by the EDI systems. So an effort to centralize the EDI operation begins.

Typically the EDI system becomes centralized into a single mainframe-based system. At this level, a larger number of departments are supported with a greater number of transactions.

Level 2 organizations usually have a full-time EDI manager. Upper management cannot simply delegate EDI to a technical staff – there is continual and ongoing interaction between the EDI manager and upper management.

The timeline for implementation expands considerably at level 2 because the complexity and size of the project is larger and cuts across departmental boundaries.

Level 2 is often seen as the "re-engineering" phase where companies strive to increase efficiency and reduce costs on a company-wide level by implementing large-scale EDI systems.

Level 3 - *Advanced* - This is a *business cultural* phase, when business decisions begin to be made that assume EDI will be in use. This is where EDI becomes a company way of life – it becomes part of the company culture.

EDI is typically used widely throughout the organization. Such companies require their suppliers to also use EDI systems. EDI issues are handled at a senior management level. The goal here is to reduce paperwork, increase efficiency, manage production schedules (Just-In-Time manufacturing), to decrease costs and increase company profits.

Key Barriers to EDI Implementation

◆ **Knowledge and Understanding**

◆ **Trading Partner Willingness**

◆ **Business Process Change**

◆ **Technical Obstacles**

◆ **Investment and Priorities**

◆ **Organizational Dynamics**
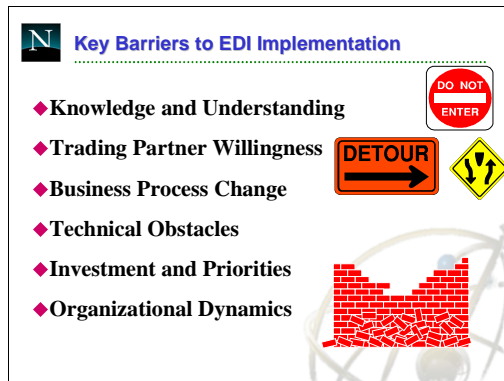
The slide shows the most common barriers to implementing EDI systems within organizations. Most barriers are internal, not external.

Knowledge and Understanding: The most common barrier is lack managerial knowledge of EDI and its benefits.

Trading Partner Willingness: Trading partners are often unwilling to implement an EDI system because the investments can be large and it can take a long time before the partners begin realizing benefits.

Business Process Change: People will have to change the way they work, both internally and with trading partners, when an EDI system goes online. People naturally resist change. Also costs associated with training and support cause further resistance to implementing the EDI system.

Technical Obstacles: This is commonly a problem with level 1 companies that are just beginning to implement an EDI system.

Investment and Priorities: Because the benefits of EDI are realized only after a relatively long period of time, upper management is often initially unwilling to fund development of a system. Another problem is setting and measuring inappropriate goals. Legacy systems sometimes cause problems – it's difficult to justify investments in new systems when the legacy system seems to be working fine. A lot of the EDI design and implementing process involves integration with existing legacy systems.

Organizational Dynamics: A company-wide EDI system requires smooth communication between departments. In companies where departmental communication is a problem – for example, adequate communication systems are not in place – it can become difficult to implement an EDI system.

Overcoming EDI Barriers

◆ **Business planning**

◆ **EDI education**

◆ **Business relationship emphasis**

◆ **Appropriate resources**

◆ **Mutual commitment**
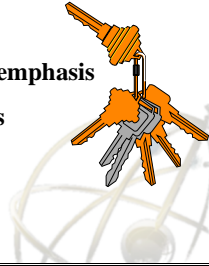
Since most resistance to implementing an EDI system will originate internally, overcoming the barriers tends to be an internally focused operation.

It involves business planning, education, establishing appropriate relationships, rallying appropriate resources, and developing a mutual commitment to the success of the EDI program.

Government Involvement

■ Investment
■ Promotion
■ Use

North America   Europe   Asia
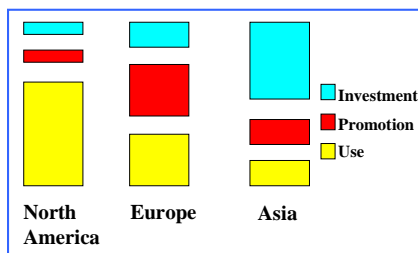
Governments in the United States and Canada are essentially extensions of the EDI user community. In Europe, however, the EDIFACT standards are driven by governments. The slide shows the relative percentages of investment, promotion and use in countries around the world.

The highest level of EDI use is in the United States but the fastest level of growth is in Asia.

Governmental involvement can be a barrier to EDI but should also be viewed as an opportunity. Anyone doing business with governments in the United States or Europe should anticipate implementing an EDI system.

Summary

◆ **Know yourself and your trading partners.**

◆ **Barriers can be overcome.**

◆ **International EDI presents new challenges and new opportunities.**

Knowledge of your organization and that of your trading partners is a key step in overcoming the technical and "cultural" barriers to implementing an EDI program.

Module 5: Introduction to ANSI X12 Standards
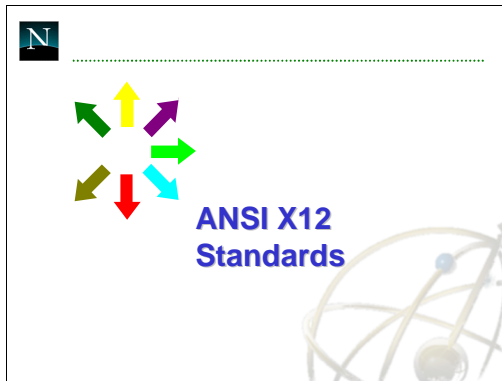
**ANSI X12
Standards**

In this section you will learn the standards terminology and how to read the standards documentation.

It's important to consider who in your organization should be able to read the ANSI X12 documentation. Project management should be aware of what the standards documents do and what their goals are, but rarely do they need to know how to read through the tables.

People implementing the system, however, need to be thoroughly familiar with the standards books and their use.

It's also important to understand that any organization will only be using a small portion of what they find in the ANSI X12 standard. The standard is comprehensive but specific industries or business need only a small subset of what is documented. The rule of thumb is to use only what you need and leave out the rest.

Session Objectives

- ◆ **Standards Terminology & Documentation**
- ◆ **Business Practice Support**
- ◆ **Implementation Decisions**

In this section you will become familiar with the ANSI X12 standard documentation.

You will learn how the standards support your business practices, and you will be able to make specific implementation decisions using the documentation.

Standards Language

Document	-	Transaction
Line	-	Segment
Word	-	Element
Code	-	Identifier
Punctuation	-	Delimiters
Format	-	Syntax
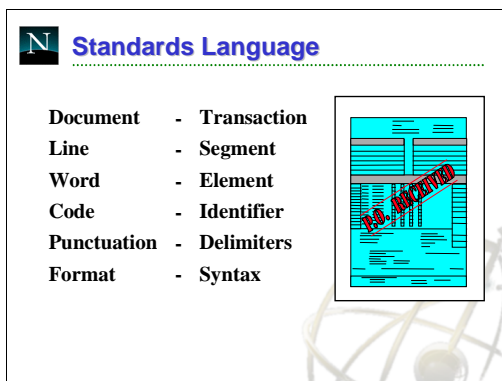
In EDI, you are basically replacing paper documents with electronic documents. The elements that comprise these electronic documents, and the documents themselves, have their own terminology which you must learn before working with the standard.

An EDI document, like a Purchase Order, is referred to as a *transaction* or *transaction set*. A transaction set is a complete set of information - a document.

An individual line of information within the transaction set is called a *segment*.

Each word that makes up the line is called an *element*. An element is a single field of information in an EDI segment. Each item of information is referred to as an element.

EDI documents, or transaction sets, are identified by a 3-digit code. A Purchase Order, for example, is an 850 document.

Each element in a segment is separated with a unique character, just as words in a sentence are separated with spaces. The separator is called a *delimiter*. The most commonly used delimiter in EDI is the asterisk (*). Delimiters are the specific characters divide elements in a segment and also mark the beginning and end of segments. A delimiter is analogous to punctuation in a sentence. Your EDI system must know what delimiters are used before it can parse information from an EDI document.

The format, or layout, of a transaction set is called the *syntax*. The syntax specifies the rules for putting the transaction set together, including the correct order of its segments.

Standards Documentation

ANSI X12 Standards

Three Major Sections
- ◆ Transaction Set Tables
- ◆ Segment Directory
- ◆ Data Element Dictionary

Tab 1 — Transaction Set Tables → Tab 2 — Segment Directory → Tab 3 — Data Element Dictionary
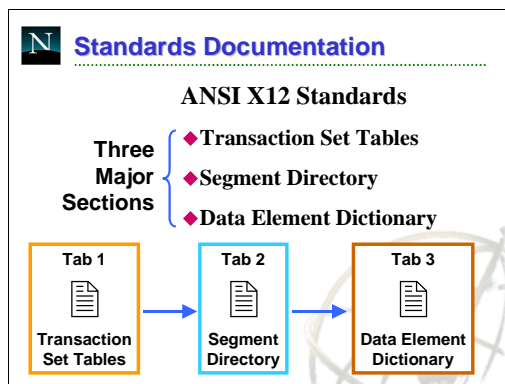
The EDI standard is published in a tab-separated book. Each tab deals with a specific part of the ANSI X12 standard - there's a separate tab for information about transaction sets, a subsequent tab dealing with the segments that make up transactions sets, and a tab that deals with the individual data elements.

Transaction Set Tables: Information about documents or transaction sets is contained in the Transaction Set Tables. This is the highest level of the ANSI X12 standard. The Transaction Set Tables list all of the allowable segments for each transaction set. It also tells you where to go in the Segment Directory to look up a specific segment.

Segment Directory: The next level is the Segment Directory, which defines the types of segments for the specified transaction set and

the allowable data elements. This gives information about the elements needed in the segments. It tells you where you need to go in the third part of the documentation, the Data Element Dictionary.

Data Element Dictionary: The third level of the ANSI X12 standard is the Data Element Dictionary. It defines each data element found in the Segment Directory.

The Transaction Set Tables define all of the EDI transaction sets, or individual documents, like Purchase Orders (EDI document number 850). Each transaction set is organized as follows:

Name and Code: Specifies the name of the document (Purchase Order, Invoice) and the 3-digit EDI identifier code (850).

Description: An English description of the code. It's important always to read the description to make sure your understanding of the transaction set matches that of the authors of the standard.

Table 1: Header information, or information that applies to the entire transaction set. Commonly you will find segments dealing with name, Ship-to address, billing address, etc. in this section. All transaction sets have a Table 1.

Table 2: This table describes segments that make up the individual line items of the transaction set, like line items in a purchase order. Not all transaction sets have a table 2.

Table 3: This table defines the segments that comprise the trailer, or summary information for the transaction set. Information such as total weights and total costs are provided here. Not all transaction sets have a table 3.

Transaction Set Tables

◆ **All transaction sets have a 3-digit code**
  - Purchase order = 850
    functional acknowledgement = 997

◆ **Tables are divided into:**
  - Name & code
  - Description
  - Table 1: Header information
  - Table 2: Body or line item information
  - Table 3: Trailer or summary information

Tab 1

Transaction Set Tables

Example: 850

850 Purchase Order
Functional Group = PO
This Draft Standard for Trial Use contains the format and establishes the data contents of the Purchase Order Transaction Set (850) for use within the context of an Electronic Data Interchange (EDI) environment. The transaction set can be used to provide for customary and established business and industry practice relative to the placement of purchase orders for goods and services. This transaction set should not be used to convey purchase order changes or purchase order acknowledgement information.

Table 1

NOTE	POS. NO	SEG. ID	NAME	REQ. DES.	MAX USE	LOOP REPEAT
	010	ST	Transaction Set Header	M	1	
	020	BEG	Beginning Segment for Purchase Order	M	1	
	030	NTE	Note/Special Instruction	F	100	
	040	CUR	Currency	O	1	
	050	REF	Reference Numbers	O	>1	

Use SEG ID code to look up the segment in the Segment Directory

The slide shows the general organization of the 850 document.

The first line of the document contains the EDI code and the name of the transaction set. Following that is a description.

A bold vertical line divides the document. Information to the left of the line - NOTE and POS. NO - is used by the ANSI X12 committee and can usually be disregarded when developing a system.

The right side of Table 1 contains the individual segments that make up the transaction set.

The 2 or 3 character tag in the SEG. ID (Segment Identification) column must be in the front of each segment to identify what the segment is. The segment IDs physically become a part of the segment. Use the segment ID tag to look up detailed information for a particular segment. For example, to look up the ST Transaction Set Header segment, you would turn to the Segment Directory tab in your ANSI X12 book and then find the item labeled ST.

The REQ. DES (Required Description) column tells you whether the segment is required or not. It has the following labels:

- **M** - Mandatory

- **O** - Optional

- **F** - Floating, which means the segment can appear anywhere in the document. An F segment is usually a human-readable note. Many companies refuse to send or receive note segments because they require interpretation by a person, which can defeat the purpose of EDI.

The Max Use column specifies the maximum number of times a segment can be used in the transaction set. A segment with 100 designation can be used up to 100 times in a transaction set, and a >1 designation can be used any number of times.

Even if you don't use all of the segments in a transaction set, which is usually the case, the

order is very important. You can omit optional segments but you must maintain the order of segments in a transaction set.

Looping

		LOOP ID = N1			200
310	N1	Name	O	1	
320	N2	Additional Name Information	O	2	
330	N3	Address Information	O	2	
340	N4	Geographic Location	O	>1	
345	NX2	Real Estate Property ID Component	O	3	
350	REF	Reference Numbers	O	12	
360	PER	Administrative Contact	O	>1	
370	FOB	F.O.B. Related Instructions	O	1	
380	TD1	Carrier Details (Qty & Weight)	O	2	
390	TD5	Carrier Details (Routing)	O	2	
400	TD3	Carrier Details (Equipment)	O	12	
410	TD4	Carrier Details (Special Handling)	O	12	
420	PKG	Marking, Packaging, Lading	O	200	

This says N1 (Name & associated information) can be used up to 200 times in a Purchase Order

The label LOOP ID - N1 refers to a loop, or a set of segments that can be repeated. The slide shows the N1 segment, which is the most commonly looped, or repeated, set of segments in a purchase order.

The label Loop ID - N1 means that if you want to use this particular set of looping segments, you must always start it with the N1 segment. On the right side of the banner there's a number - in this case, the number is 200. This says you can have up to 200 occurrences of this loop.

Segment Directory

◆ **Same in every transaction**

◆ **Used if appropriate**

◆ **Agree with trading partner**

Tab 2

Segment Directory

The Segment Directory provides details for each segment used in a transaction set.

Some transaction sets support literally hundreds of segments, many (or most) of which are not useful to a particular application or industry. It's important to agree with your trading partner which segments will be used in designing the EDI documents.

Segments are used only if they are appropriate for a particular application. Determining which transaction sets to use is a collaborative process undertaken between trading partners.

Example Segment: N1

N1 — Name
To identify a party by type of organization, name and code
TRANSACTION SETS USED IN:

104 105 810 820 850 860

REF	ELE ID	Name		Attributes	
01	98	ENTITY ID CODE	M	ID	2/2
02	93	NAME	X	AN	1/35
03	66	ID CODE QUALIFIER	X	ID	1/2
04	67	ID CODE	X	AN	2/20
05	706	ENTITY RELATIONSHIP CODE	O	ID	2/20
06	98	ENTITY ID CODE	O	ID	2/20

Syntax Notes:
02 P0203 - At least one of N102 or N103 must be present.
03 P0304 - If either N103 or N104 is present, then the other is required.
Comments:
04 This segment, used alone, is the most efficient method of providing organization identification.

Use ELE ID code to look up the element in the Data Element Directory

N1 is the most commonly used segment in the referenced transaction sets. N1 is used to identify a party by type of organization, name, and code. The bold N1 in the upper-left corner of the segment table is the name of the segment. This is the label referred to in the SEG. ID column of the Transaction Set Table.

Next to segment identification is the name of the segment and a brief description.

Underneath is a line that says Transaction Sets Used In. This table lists all the transaction sets that can use that particular segment. For N1,

this is most of the defined EDI transaction sets.

The REF column is used by the ANSI X12 committee and can usually be ignored when developing an EDI system.

The ELE ID (Element Identification) column lists the identifier for each data element that makes up the segment. To look up details for a particular data element, turn to the Data Element Dictionary tab of your ANSI X12 documentation and look up the element with that number.

The Name column is the name of the data element.

Attributes

The attributes for the data element are listed in a table.

In the first column, M means Mandatory, O means Optional, and X means Conditional. When two elements are conditional, they are related to each other. You use either one or another, but never both. Refer to the Syntax Notes to determine the condition and which element to use depending on the various conditions. In older documentation, instead of the letter X, they use a C to stand for Conditional.

Next column tells what kind of data that goes into that particular element.

- **ID**: EDI word identifier.

- **AN** - Alphanumeric.

The last column is the minimum and maximum number of characters. So if you see 2/20, it says the minimum number of characters for the data element is 2 and the maximum number is 20.

N1 - Name

Purpose: **To identify a party by type of organization, name and code**

Syntax Notes: **1. At least one of N102 or N103 must be present.**

Comments: **A. This segment, used alone, is the most efficient method of providing organization identification.**

Used In: **104 105 810 820 850 860**

| N1 * | N101 98 ENTITY ID CODE M ID 2/2 | * | N102 93 NAME X AN 1/35 | * | N103 66 ID CODE QUALIFIER X ID 1/2 | * | N104 67 ID CODE X ID 2/17 | N / L |
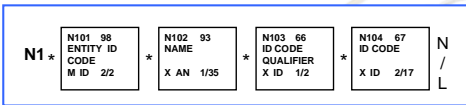
The slide summarizes the N1 segment and shows how it is used in an EDI document.

The bottom of the slide shows how N1 might be implemented in an EDI transaction set, including the delimited data elements that comprise the segment.

Note that the asterisk is still the most commonly used delimiter. The N/L says there must be a character that ends the segment.

Data Element Dictionary

◆**Listed numerically**

◆**Code lists**

◆**Type of data**

Tab 3

Data Element Dictionary
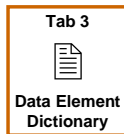
The third tab in the ANSI X12 document is the Data Element Dictionary.

The code lists in the Data Element Dictionary are very long. Many of the element descriptions, like 98 - Entity Identifier Code - go for pages and specify hundreds of individual elements.

Most systems would use only a small subset of the available elements. This is a crucial aspect of EDI system design - deciding which elements are necessary and which are not.

Valid Element Types

◆AN - Alphanumeric

◆B - Binary

◆Nn - Numeric (n decimals)

◆R - Decimal (explicit)

◆ID - Code

◆DT - Date

◆TM - Time

The following lists the valid element types:

- **AN** - Alphanumeric
- **B** - Binary data
- **Nn** - A number with a specified number (n) of decimal places. For example, N3 refers to a number with three decimal places.
- **R** - an explicit decimal notation
- **ID** - A standardized code from the ANSI X12 documentation
- **DT** - Date. Most dates are 6 characters long but are being converted to 8 character format to avoid the year-2000 problem.
- **TM** - Time. Time is usually represented with 4 characters.

Document Distribution

◆ **Envelope Segments**

◆ **EDI Delivery**

◆ **Envelope Details**

Enveloping is the EDI process of packaging transaction sets for delivery to a trading partner. Enveloping involves three levels of detail:

- Which trading partner will receive the EDI documents

- Which departments within the trading partner will receive sets of individual EDI documents

- Organization of the individual documents

EDI Delivery

Trans | Fnl Group | Interchange | VAN

Fnl Group | Interchange

Trans | Fnl Group | BANK | Receivers
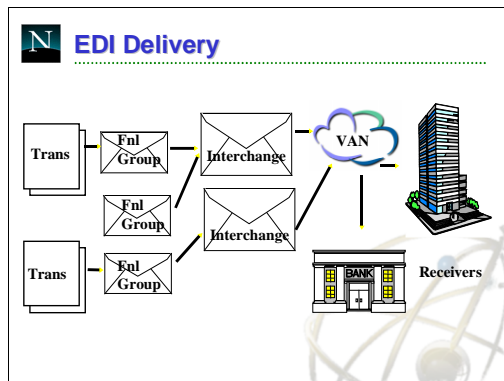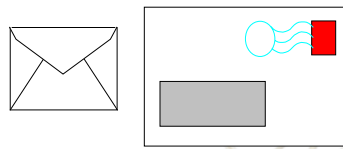
Individual transaction sets (EDI documents) are grouped inside electronic envelopes called Functional Groups. A Functional Group specifies the department within the trading partner that will ultimately receive the transaction sets.

Functional Groups are placed in an electronic envelope called an Interchange, which is addressed to the trading partner.

An Interchange can contain multiple Functional Groups, which in turn can contain many transaction sets.

Envelope Details

◆ **Document** - **Transaction**

◆ **Little Envelope** - **Functional Group**

◆ **Big Envelope** - **Interchange**

This slide shows how the paper counterparts to EDI documents are identified within EDI:

- A document is essentially the same as a transaction set.

- A "little envelope" that is addressed to a department within an organization is the Functional Group.

- The "big envelope" or "shipping envelope" is the Interchange, which can contain many Functional Groups.

How Envelopes Fit Together
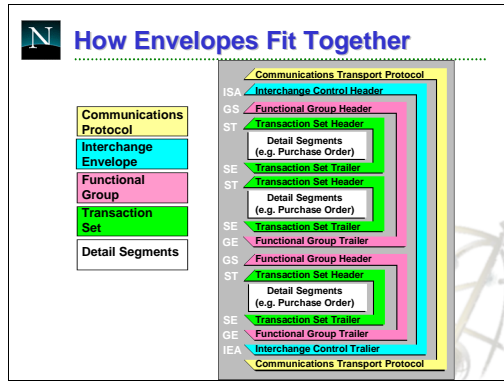
The Interchange address represents the company or governmental agency that will receive the package of envelopes. The Functional Groups represent individual envelopes that might be routed to different departments within the organization that received the Interchange.

This slide shows how EDI organizes Interchanges, Functional Groups, and Transaction Sets.

Each item has a specified beginning and end:

- **Interchange** - ISA (beginning), ISA (end)

- **Functional Group** - GS (beginning), GE (end)

- **Transaction Set** - ST (beginning), SE (end)

All of these are defined in the ANSI X12 documentation.

ST

ST Transaction Set Header
To indicate the start of a transaction set and assign a control number

TRANSACTION SETS USED IN:

104 110 120 121 124 125 126 ....

REF	ELE ID	Name	Attributes		
01	143	TRANS. SET ID CODE	M|Z	ID	3/3
02	329	TRANS. SET CONTROL NO.	M	AN	4/9

Semantic Notes
01   The transaction set identifier (ST01) used by the translation routines of interchange partners to identify the appropriate transaction set definition.

This is the Segment Directory entry for ST, the segment that marks the beginning of a transaction set, or EDI document.

The ST is essentially for routing a document to a particular recipient (company or governmental agency).

SE

SE Transaction Set Trailer
To indicate the end of a transaction set and provide the count of transmitted segments

TRANSACTION SETS USED IN:

104 110 120 121 124 125 126 ....

REF	ELE ID	Name	Attributes		
01	96	NO. OF INCLUDED SETMTS	M	NO	1/10
02	329	TRANS. SET CONTROL NO.	M	AN	4/9

Comments
01   SE is the last segment of a transaction set.

This is the Transaction Set trailer, which specifies the end of the transaction set.

The individual segments that comprise the transaction set would be bracketed within the ST and SE segments.

Once the transaction set is defined, including the ST and SE segments, it must go inside a Function Group, or "departmental" envelope before it can be parsed by the trading partner's EDI system.

N **GS**

GS Functional Group Header
To indicate the start of a functional group & assign a control number

TRANSACTION SETS USED IN:
NONE

REF	ELE ID	Name	Attributes		
01	479	FUNCTIONAL ID CODE	M	ID	2/2
02	142	APPLICAT. SENDER'S CODE	M	AN	2/15
03	124	APPLICAT. RECEIV.'S CODE	M	AN	2/15
04	373	DATE	M|Z	DT	6/6
05	337	TIME	M|Z	TM	4/8
06	28	GROUP CONTROL NUMBER	M|Z	N0	1/9
07	455	RESPONS. AGENCY CODE	M	ID	1/2
08	480	VERSION/RELEASE ID CODE	M	AN	1/12

Semantic Notes
04   GS04 is the group date   06   Must match GE02
05   GS05 is the group time

This is the Functional Group Header. It is used for internal routing - getting things between departments.

A Functional Group can contain virtually any number of transaction sets. Since the GS is responsible for "departmental" routing, then the transaction sets it contains will be "addressed" to the receiving department.

N **GE**

GE Functional Group Trailer
To indicate the end of a functional group & provide control information

TRANSACTION SETS USED IN:
NONE

REF	ELE ID	Name	Attributes		
01	97	NO. OF INCL. TRANS. SETS	M	N0	1/6
02	28	GROUP CONTROL NO.	M|Z	N0	1/9

Semantic Notes
02   The data interchange control number GE02 in the trailer
      must be identical to the same data element in the
      Functional Header GS08.

This is the Functional Group Trailer, which marks the end of the Functional Group.

All of your transaction sets must be inside a functional group defined by GS and GE segments.

N **ISA**

ISA Interchange Control Header
To start and identify an interchange of zero or more functional groups

TRANSACTION SETS USED IN:
NONE

REF	ELE ID	Name	Attributes		
01	I01	AUTHORIZATION INFO. QUAL.	M	ID	2/2
02	I02	AUTHORIZATION INFORMAT.	M	AN	10/10
03	I03	SECURITY INFO. 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

This is the Interchange Header, which specifies the trading partner who will receive the Interchange.

Even if you are sending only one EDI document, it must be within a Functional Group which must be within in Interchange. In other words, all EDI transmissions have an Interchange, Functional Group, and Transaction Set.

N **IEA**

IEA Interchange Control Trailer
To define the end of an interchange of zero or more functional groups

TRANSACTION SETS USED IN:
NONE

REF	ELE ID	Name	Attributes		
01	I16	NUMBER OF INCLUDED			
		FUNCT'L GROUPS	M	N0	1/5
02	I12	INTERCHANGE CONT'L NO.	M	N0	9/9

This is the Interchange Trailer, which marks the end of the Interchange.

Functional Acknowledgments

◆ **Return receipt**

◆ **Compliance with standards**

◆ **Business purpose insensitive**

◆ **Timing**

◆ **Details included**
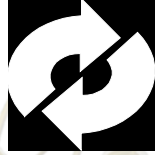
The Functional Acknowledgment is a message sent between trading partners to indicate that a particular EDI transaction set has been received. Functional acknowledgments are routinely sent when documents are received.

It's important to understand that a functional acknowledgment does not specify acceptance of terms and conditions, payment amounts, delivery dates, or anything else. It simply lets your trading partner know that the documents have been received and understood by the EDI system.

Functional acknowledgments are generated automatically by the EDI system.

Worldwide Standards

◆ **X12 ⟶ UN/EDIFACT**

◆ **Global growth**

◆ **Government involvement**

◆ **Administrative messages**

Up to now the focus has been on the pieces that make up the ANSI X12 standard.

Different standards are in use worldwide. Although the differences tend to be very minor, it's important that you understand the differences, at least form a high level.

The biggest difference between X12 standards and EDIFACT standards is that the domestic X12 standards are driven by commercial interests, while EDIFACT standards are largely driven by various governments that are on the UN/EDIFACT board. They are aimed at accommodating government reporting and transactions. In EDIFACT, transactions are referred to as messages. There is a great deal of overlap and similarity between ANSI X12 and EDIFACT.

How Different?

TRADACOM

TDCC AIAG

IDX

UCS KEDIFACT

EDIA

ANSI X12

VICS TDI

ODETTE

WINS **EDIFACT**

There are many subsets of X12 that are used in different industries, like AIAG the Automotive Standard. This is a subset of the full X12 standard.

In EDIFACT the same phenomenon exists – there are many industry specific standards. KEDIFACT, for example, is the version of EDIFACT used in South Korea.

Implementation Decisions

◆ **Versions of Standards**

◆ **Acknowledgments**

◆ **Operational Agreements**

◆ **EDI Management Software**

EDI implementation decisions must be agreed upon by trading partners.

Among the implementation decisions is the version or versions of the ANSI X12 standard to use – trading partners must use the same version of the standard, because it changes frequently.

The more trading partners you have, the higher the probability that you will have to support multiple versions of the ANSI X12 standard. The older the trading partner, the older the standard.

When you buy your software products one of the critical decisions is how many versions of the standard can be supported at the same time.

Are you going to use functional acknowledgments? The two key decisions are what will go into the FA, and when they will be sent.

You need to identify every single segment in detail – this level of operation agreement among trading partners is absolutely necessary and is very detail-oriented.

EDI management software tends to be flexible but you need to know what you want to do with it (version management, etc.) before purchasing software.

Session Summary

◆ **EDI standards support business processes.**

◆ **Standards evolve.**

◆ **Decisions need clarity and agreement.**

This section covered the EDI standards and how to use the standards documentation. It also looked at some of the differences between the ANSI X12 standard and the UN/EDIFACT standard.

Planning with your trading partner is crucial to the success of an EDI implementation. This planning process must address everything from the large business related issues down to the details of defining and transmitting EDI documents.

Module 6: EDI Components: Hardware and Software
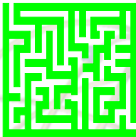
**EDI Components:
Hardware and
Software**
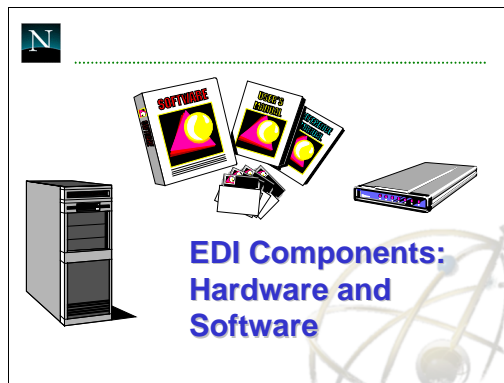
This module will cover the hardware and software components that are commonly used to implement an EDI system.

Session Objectives

◆ **Hardware Requirements**

◆ **Changing Needs**

◆ **EDI System Architecture**

◆ **EDI Software Functions**

◆ **Acquisition Considerations**

◆ **Advanced Issues**

This module will cover:

Hardware requirements for EDI, ranging from small trading partners to large corporations that deal with hundreds of trading partners
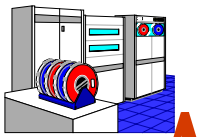
- Changing needs of EDI support and how it affects hardware and software

- EDI system architecture components

- EDI software functions

- Acquisition considerations when evaluating EDI software packages

- Advanced issues

Hardware Requirements

Computer Systems

◆ **PC**

◆ **Mid-range**

◆ **LAN**

◆ **Mainframe**

Keep pace with changing needs

STORAGE
SPEED
ACCESS
AVAILABILITY
COST

EDI hardware requirements are not that detailed – in many cases all that is needed is a personal computer.

There are also mainframe-based systems, so the selection of hardware is entirely dependent on the application.

The important thing to understand is that needs will change over time. It is particularly important to keep up with hardware and software changes of your trading partner.

Hardware Requirements

Communications

- ◆ **Modems**
- ◆ **Phone lines**

PROTOCOL
SPEED
ERROR
   CHECKING
LINE CONTROL
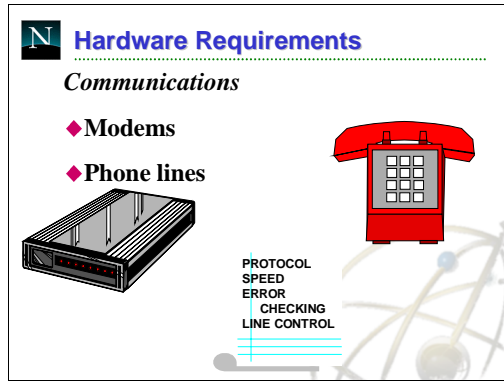
Since your EDI system will either be communicating with a VAN or over the Internet, you need to pay close attention to the requirements of your data communications capability.

Typically communication means a modem and a phone line.

EDI System Architecture

- ◆ **Stand alone**
- ◆ **PC front end**
- ◆ **Co-resident**
- ◆ **Gateway / Server**
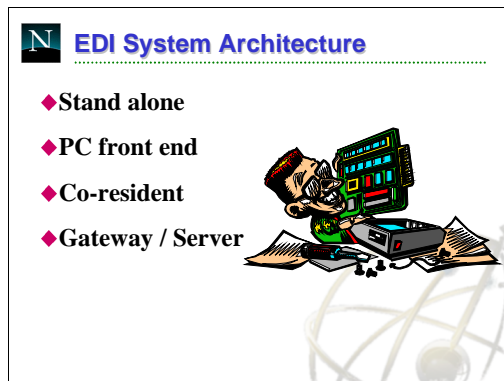
The various architectures tend to track the changing and different needs of different trading partners.

Standalone – A small trading partner will typically use a PC-based EDI system. The main considerations for standalone PC-based systems are:

- Low Cost
- Ease of use and installation
- Can be operated by clerical personnel
- Fast processing time

PC Front-end – The PC front-end system typically communicates with a backend Mainframe-based legacy database system, so human interaction is minimal. The goal is to translate EDI data into non-EDI formats that can be used by the legacy systems.

Considerations:

- Cost
- No/minimal human interface
- Data translation
- Flexibility
- Throughput
- Maintenance

Co-resident – In this system, the EDI system co-resides with other large systems, like AP, AR, distribution, etc. These are mainframe based systems that can be very expensive, but

they provide very efficient integration between the EDI system and other internal business systems.

Gateway/Server – These are large and complex systems that can do EDI communications on a national or global scale.

EDI System Architecture

Gateway/Server

VANS

Core Applications

Divisions

Trading Partners

Software Translation and Mapping

Plants Branches

Remote Locations

Communication Software

Distrib. Centers

Communication Software
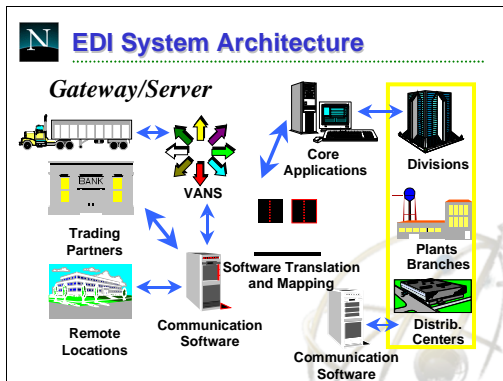
The graphic shows a complex gateway/server architecture typical of those used by very large manufacturing and distribution companies.

All of the communication goes through the translator through various communication modules that in turn communicate with VANs or via direct connections to trading partners.

Large and costly installations of this type are good candidates for moving to an Internet-based system.

EDI Software Functions

Communication

EDI process management

Integration

Translation

BILL TO = *BT*
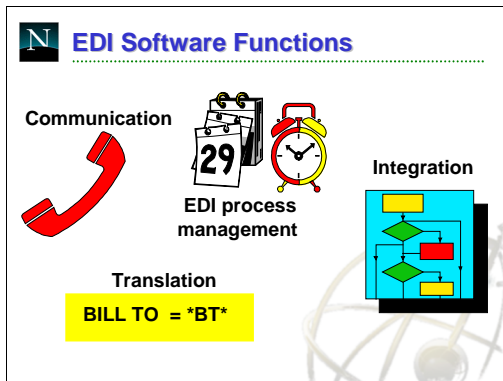
Communication: If you are going to communicate with VANs, your software package must support it and preferably be certified by a particular VAN that you will be using.

All EDI software packages perform translation.

The crucial question to ask is how many versions of the ANSI X12 standard to support. If you are dealing with many trading partners, this can become an issue. Most of the translation products do a good job of validation, which ensures that the output and input data conforms to the ANSI X12 standard.

Translation: Netscape uses the TSI Mercator system for handling data translation.

EDI process management: It's important for the EDI system to handle the operational aspects of EDI. It should handle aspects of scheduling, maintaining an audit trail, archive and retrieval, query and reporting, and system restart.

Trading partner management involves:

- Administrative information

- Standards requirements

- Control number sequencing

- Acknowledgment requirements

- Communication

Integration: Integration is probably the most important aspect of your software function. The integration function allows your EDI software to communicate with other departmental functions and internal applications. It's important to key your investment in EDI software keeping in mind the amount and degree of integration with internal systems that will be required.

Integration also refers to data mapping, or changing your EDI data into a format that is compatible with internal legacy systems.

Mapping

Decisions

HOW
Systems Decisions
Standards and Applications

WHAT
Business Decision
Trading Partners and Standards
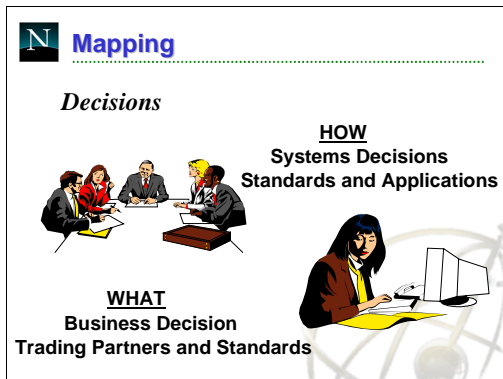
Data mapping, or translating data to and from your legacy system to the EDI system, is a key component of the overall EDI implementation.

Netscape CommerceXpert products use the TSI Mercator system to handle mapping to and from legacy database systems.

Given a choice, it is nearly always a good idea to go with a commercial data mapping product rather than trying to develop a custom mapping solution. Many companies have learned the hard way the costs and time involved in developing a comprehensive mapping solution.

The data mapping strategy should include high levels of the organization – every department that plans on interfacing to the EDI system should be involved in developing the mapping strategy that supports the overall EDI system.

The mapping strategy must address:

- Trading partners and their standards

- Systems decisions

- Standards and applications

N **Acquisition Consideration**

Evaluation Criteria

· **Functionality**	· **Strategic plans**
· **Customer support**	· **Product**
· **Vendor viability**	· **Compatibility**
· **Reference**	· **Throughput**
· **Maintenance**	· **Licensing**
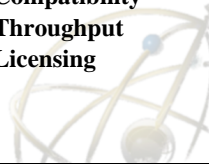
It's important to have a clear plan of what you want to accomplish with your EDI system before evaluating software vendors.

- Is this vendor going to be in business over time?

- Do they have a track record in developing EDI software?

- Do they have reference customers?

- What about maintenance and support?

- Do they offer consulting for system design, installation, and implementation?

- Can they assist in integrating the EDI system into an internal legacy system?

The slide shows some of the other issues to consider when acquiring EDI software.

N **Advanced Issues**

◆**Quality control**

◆**Test data**

◆**Reality checking**

Quality Control: EDI can be viewed as a series of interconnected programs. It's critical that your EDI system work in concert with your other internal systems, and with external systems like VANs and other trading partners. The quality control process must address these interconnection issues.

Test Data: Companies are available that can create test data to validate your EDI system once it is up and running. The test data should have known inaccuracies in it so your system can be validated. You should use test transactions when adding a new application, working with a new trading partner, working with a new internal department, or any time a significant change occurs in your system design.

Reality Checking: Once the testing is complete you should plan on a "reality check" process to ensure your system is actually doing what you intend once you and your trading partners are online. This area is often referred to as "modeling".

EDI Hardware and Software

Session Summary

◆ **EDI needs change over time.**

◆ **Most EDI users will make more than one EDI software purchase.**

◆ **The level of EDI integration must complement business reality.**

◆ **New EDI products will continue to emerge.**
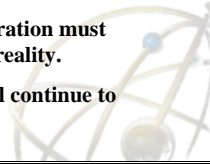
EDI hardware and software needs change over time, and companies must keep abreast of the changes, which are often driven by new technologies and trading partner requirements.

Equipment and software purchases will change as the EDI program matures. The hardware and software purchased must complement business activity between trading partners, and also between departments within a company. New products will always emerge as technology advances.

EDI Glossary

A

Access Control: The process of limiting access to resources of a system only to authorized users, programs, processes, or other systems. See also physical security.

Account Identifier: A unique alphanumeric ID assigned to a customer account by a VAN. The account identifier is used for billing purposes.

ACH (Automated Clearing House): A central distribution and settlement point for electronic items exchanged between an originating bank and a receiving bank.

Acknowledgment: A special transaction set (ANSI/X12 997) transmitted by a receiver as an affirmative response to the sender.

Acknowledgments: A specific type of EDI segment used within EDI to indicate acceptance or rejection of an entity.

AIAG (Automotive Industry Action Group): An industry organization formed to improve the competitiveness of the American automotive industry. It was an early developer of EDI standards.

Alpha Numeric: A combination of both letters (alpha characters) and numbers (numeric characters).

ANSI (American National Standards Institute): A national voluntary organization of firms and private individuals that develops standardized business conventions.

ANSI ASC X12 (American National Standards Institute Accredited Standards Committee X12): A non-profit organization chartered to develop and maintain voluntary American national standards. It is the U.S. secretariat to the International Standards Organization. The X12 committee develops and maintains EDI standards. There are approximately 300 member organizations representing over 30 industries.

ANSI standard: A document published by ANSI that has been approved through the consensus process of public announcement and review. Each of these standards must have been developed by an ANSI committee and must be revisited by that committee within 5 years for update.

Application acknowledgement: A transaction set whose purpose is to return a response to a transaction set that has been received and processed in an application program.   The purchase order acknowledgement is an example of an application acknowledgement. It is used to respond to the purchase order, presenting such things as whether the receiver can fulfill the order and if it can be done in time.

Application advice: A transaction set that documents errors in the content of any transaction set beyond the normal syntax checks.

Applications Link: The software bridge developed to facilitate the interface between a company's internal business management software and EDI translation software.

ASC: Accredited Standards Committee. See ANSI X12.

ASN (Advance Shipment Notice): An X12 transaction set number 856 that is used to notify the receiver that product is in transit.

ASYNC (Abbreviation for asynchronous): A communication protocol, or mode of data transmission, where one character is sent at a time, with each character surrounded by a start, stop, or parity bit.

Asynchronous: A form of data transmission in which individual characters are sent one at a time, delineated by a start bit and a stop bit. Traditionally used for low speed data transmission.

Audit Trail: A permanent record of messages transmitted and received.

Authentication: A mechanism which allows the receiver of an electronic transmission to verify the sender and the integrity of the content of the transmission through the use of an electronic key or algorithm which is shared by the trading partners. This is sometimes referred to as an electronic signature

Autodial (Automatic Dialing): Capability of a terminal, modem, computer or similar device to place a call over the switched telephone network and establish a connection without operator intervention; also known as autocall.

B

Bar Code: An array of rectangular marks and spaces in a predetermined pattern. Usually used for automatic product identification.

Batch: An accumulation of data to be brought together for processing or transmission.

Batch Processing: A type of data processing operation and data communications transmission where related transactions are grouped together and transmitted for processing, usually by the same computer and under the same application; generally regarded as non-real-time data traffic consisting of large files.

Baud: A measurement of the signaling speed of a data transmission device; equivalent to the maximum number of signaling elements, or symbols, per second that are generated; may be different from bit/second rate, however, especially at higher speeds, as several bits may be encoded per symbol, or baud, with advance encoding techniques such as phase-shift keying.

BISYNC (Abbreviation for bisynchronous): A communication protocol whereby data is sent as blocks. These blocks are checked for accuracy by the receiving computer.

Bisynchronous (Binary Synchronous Communications [BSC]): A communications protocol whereby messages are sent as blocks of characters. The blocks of data are checked for completeness and accuracy by the receiving computer.

Bit rate (BPS): The rate at which bits (binary digits) are transmitted over a communications path. Normally expressed in bits per second (bps). The bit rate is not to be confused with the data signaling rate (Baud) which measures the rate of signal changes being transmitted.

BSC: Abbreviation for Bisynchronous

C

CAD: The electronic storage of drawings developed using computer-aided design applications.

CCITT: The former United Nations standards organisation that recommended world-wide communications standards. Its official name was the Consultative Committee on International Telegraphy and Telephony. See ITU-TSS.

CICS (Customer Information Control System): An IBM program product and mainframe operating environment, designed to enable transactions entered at remote terminals to be processed concurrently by user-written application programs; includes facilities for building and maintaining databases.

Ciphertext: Encrypted output of a cryptograph algorithm. Input to the decryption process.

Clear Text: Data in its original form. Input to the encryption process and output of the decryption process.

Communication Protocol: Methods of communicating data over telephone lines or other physical transmission media.

Compliance checking: A checking process that is used to ensure that a transaction complies with ANSI X12 or EDIFACT syntax rules.

Compliance: Adherence to an accepted EDI standard.

Component Element Separator: A character separating component data elements.

Component Element: In EDIFACT, a sub-element of a composite data element.

Composite Data Element: In EDIFACT, an element that consists of multiple component data elements.

Connect Time: The time that a circuit, typically in a circuit-switched telephone-like environment, is in use; also holding time.

Control Number: A number assigned by the sending EDI partner, used to identify documents and transmissions to the receiving partner.

Control Structure: The beginning and end (header and trailer) segments for entities in EDI.

CRC (The Contractor Registration Capability): Functional asset of the DoD EC Program Office with oversight provided by DISA.

Customer Interface: A customer computer program to "map" data from an EDI standard into the proprietary format required by a computer application.

D

D&B (Dun and Bradstreet): "D&B numbers" or DUNS numbers are commonly used to uniquely identify trading partners and their mailboxes on a VAN.

Data Decompression: An automated process to decompress or "unwrap" data received by re-inserting trailing blanks and spaces.

Data Dictionary: The publication which defines all of the data elements approved for use within a given electronic transmission standard.

Data Element: The smallest item of information in an electronic data standard.

Data Element Requirement Designator: A data element has one of the following requirement designators defining its need to appear within the transaction set: M- data element MUST appear; O- data element MAY appear at the option of the sending party; C- data element is dependent on value or appearance of other data elements.

Data Element Separator: A syntax character used to separate data elements within asegment. Also referred to as a "delimiter".

Data element type: A data element may be one of six types: numeric, decimal, identifier, string, data or time.

Data Interchange Standards Association: The Secretariat and administrative arm of ANSI X12.

Data Mapping: Relationship between the X12 message syntax and the user's data.

Data Segment Identifier: A predefined code which identifies a data segment.

Data Segment Terminator: A special character, printable or unprintable, which indicates the end of a segment.

Data segment: A well-defined string of alternating data elements and data element separators. The electronic equivalent of a line item on a business form.

Decryption: A process of transforming ciphertext into clear text for security or privacy reasons.

Dedicated Line: A communication link permanently established between two locations. May be either a privately installed cable or a line leased from the phone company.

Delimiters: These consist of two levels of separators and a terminator. The delimiters are an integral part of the transferred data stream. Delimiters are specified in the interchange header and may not be used in a data element value elsewhere in the interchange. From highest to lowest level, the separators and terminator are segment terminator, data element separator, and subelement separator.

DES (Data Encryption Standard): A Federal Information Processing Standard (FIPS) for data encryption, using a symmetric security algorithm.

Dial-up Line: Ordinary phone line. Part of the switched network used by the phone company to handle all types of calls-not just data communications transmissions. Contrast with leased line.

Dial-up: Describing the process of, or the equipment or facilities involved in, establishing a temporary connection via the switched telephone network.

Direct transmission: The exchange of data from the computer of the sending party directly to the computer of the receiving party. A third party value added service is not used in a direct transmission code.

DISA (Data Interchange Standards Association): The not-for-profit membership organization that provides secretariat service to ASC X12.

Document: As used in EDI, one complete piece of data. For example, one Purchase Order, or one Invoice. Also known as a "Message".

Download: To transfer information from a large computer to a smaller computer.

E

EAGLE: Proprietary standard/network for Hardlines Industry. See definition of Hardlines.

EAN European Article Number: A number that can be assigned to and encoded on an article of merchandise for wanding or scanning in certain countries.

EC: See Electronic Commerce.

EDE (Event Driven EDI): See definition of Event Driven EDI.

EDI (Electronic Data Interchange): The computer-to-computer transmission of business data in a standard format. For pure EDI "computer-to-computer" means "original application program-to-processing application program."

EDI Compliance Test Facility: Functional asset of the DoD EC Program Office with oversight provided by DISA.

EDI Standards: A defined standardized format for transaction sets.

EDI Translation Software: Software that translates data in and out of the ANSI X12 format.

EDI translation: The conversion of application data to and from an EDI standard format.

EDI Translator: Computer software used to perform the conversion of application data to and from the X12 standard.

EDI Users Group: The governing body of all EDI standards composed of members from industry and government organizations. The major responsibility of the EDI Users Group is to approve proposed changes to EDI standards.

EDI/FAX: Converts computer-readable EDI documents to human-readable printed form and sends to receiver's facsimile machine.

EDI/LaserMail: Converts computer-readable EDI documents to human-readable printed form and mails document(s) to recipient.

EDIA: Electronic Data Interchange Association. A nonprofit, public interest organisation designed to develop, foster and maintain a program of action to achieve coordination of data and information systems by the standardisation of descriptions and codes for intercompany computer-to-computer EDI for business transactions.

EDIFACT (Electronic Data Interchange for Administration, Commerce and Trade): The internationally recognized standard for electronic data interchange, started in September 1986 by the United Nations Joint Electronic Data Interchange Committee.

It provides details of syntax rules, segment construction and message structure. Also known as UN/EDIFACT and ISO 9735.

EFT: Electronic Funds Transfer. See also ACH.

Electronic Commerce (EC): 1) Any form of electronic communication that facilitates performing business related activities electronically. EDI and E-Mail are subsets of EC. 2) The conduct of business transactions, supporting functions such as, administration, finance, logistics, procurement and transportation, between the Government and private industry using an integrated automated information environment to interchange business information.

Electronic Envelope: Electronic information which groups a set of transmitted documents being sent from one sender to one receiver.

Electronic Funds Transfer (EFT): an electronically transmitted credit or debit transaction within the financial community where availability of funds is either immediate or for next business day's settlement.

Electronic mailbox: The place where EDI transmission is stored for pickup or delivery within third party service provider's system. Trading partners

Element: The smallest item of information in the standard. Comparable to a "field".

E-mail: Electronic mail. Text messages sent from one person to another person, on the same or different computer systems. Systems at the same building or site may be connected together with a LAN, while systems at different sites are generally connected by a WAN.

Encryption: A process of transforming clear text into ciphertext for security or privacy reasons.

Envelope: The transmission header and trailer enclosing an EDI message.

Event-Driven EDI: Centralized control and overall automation of the EDI process. Supplies integration of batch and online capabilities for time-critical EDI requirements.

F

FA (Functional Acknowledgment): Also know as the 997 document. An electronic acknowledgment indicating the ANSI X12 message that was received is syntactically correct.

Facsimile Transmission: A process involving the transmission and reproduction of photographs, maps, drawings and other graphic matter.

FAX: A scanner/printer combination that transmits text and graphics over telephone lines. Since the 1980s, fax machines have undergone rapid development and refinement and are now indispensable communication aids for news services, businesses, government agencies, and individuals. It uses CCITT Group 3 data compression techniques. Small paper documents can be transmitted over long distances very quickly, but the information is not represented as structured data elements as in EDI.

FEDI (Financial Electronic Data Interchange): An EFT transaction which contains payment-related information in an EDI format, within the addenda record. FEDI

transactions are normally associated with a Corporate Trade Exchange (CTX) ACH payment format.

Field: The smallest item of information in a record.

File: Grouping of records each made up of multiple logical segments. A file is the largest unit of information recognized by the system.

Fixed Length Format: A computer flat file format which requires each line (segment) of information to be a specific length, usually 80 columns or spaces.

Fixed-length files: Typically used in proprietary or private EDI standards; the makeup of which is composed of 80-bite segments.

Flat File: A computer file from which all formatting symbols have been stripped. Flat files are generated by computer applications or translation software so that data can be mapped from one format to another.

Formats: A set of records where element lengths and types are defined.

FTP (File Transfer Protocol): A protocol used to transfer files between two computers. Generally used over a TCP/IP-based network.

Functional Acknowledgment: These are used by the receiving party to indicate the syntactical correctness of the Groups and Transactions received from atrading partner. They are returned to the sender in a Functional Acknowledgment Group with individual transactions indicatingacceptance.

Functional Group: A grouping of several transaction sets of the same type. For example, a group of purchase order documents.

Functional Group Envelope: An EDI envelope that separates different types of transaction sets.

G

Gateway/Network Interconnect: A connection between two networks that allows messages on one network to be routed through to the other.

Gateway: A conceptual or logical network station that serves to interconnect two otherwise incomplete networks, network notes, subnetworks or devices; performs a protocol-conversion operation across numerous communications layers.

GENCOD: French retail industry standard.

H

Handshaking: That portion of a communications protocol necessary to maintain the connection during periods of inactivity.

Hardlines Industry: Manufacturers, wholesalers, distributors, home centers and retail chains of hardware and housewares products - see definition of EAGLE.

Header: The portion of the message that precedes the actual body and trailer of the business transaction.

HTML: HyperText Markup Language, an SGML document type definition used as an authoring language for the World Wide Web.

Hub: A large company very active in EDI, which strongly encourages business partners to use EDI. Also called "sponsor." Its trading partners are called "spoke" companies.

I

IE Information Exchange: A VAN service that acts as an interpreter, making it possible for dissimilar computer systems to talk to each other. IE provides a nationwide electronic message service that links sponsors and their suppliers allowing the exchange of business documents.

Industry Guideline: A subset of a national standard designed for ease of use within one industry. For example, AIAG is an X12 subset.

Interactive EDI: The use of EDI in a transaction processing environment.

Interactive: A program that is able to carry on a "conversation" with the operator. The program prompts the operator helping the user through a routine while checking input for acceptability and notifying the operator when an error is made.

Interchange Acknowledgment: An Interchange Acknowledgment indicates the success or failure of a particular Interchange transmission. It does not imply acceptance of the EDI documents that make up the Interchange.

Interchange Control Structure: The beginning and ending segments of each EDI transmission.

Interchange Envelope: An EDI envelope that contains all the transaction sets for a particular trading partner.

Interchange Header: The Interchange Header contains the sender and receiver addressing information, the sender date and time, and a control number which uniquely identifies the interchange between the trading partners. It also defines the Data Element Separator, the Sub-element Separator, and the Segment Terminator to be used throughout the interchange (i.e., until the next Interchange Trailer).

Interchange Trailer: Contains information to match it with its Interchange Header and audit trailer information to ensure that no data was lost during the transmission.

Interchange: The actual exchange of information from one company to another. A set of documents is sent from one sender to one receiver at a time. Each interchange begins with an Interchange Header segment, ends with an Interchange Trailer segment and is delineated by interchange control segments.

Internet: A world wide network of networks with 20-25 million users, and growing at the rate of 50% per year. Most value added networks are connected to the Internet. See also World Wide Web.

Invoice: Also know as the 810 document. This is a request for payment from the purchaser for products or services rendered.

ISDN (Integrated Service Digital Network): Based on digital transmission, a network that allows voice and data traffic to use the same digital links and exchanges.

ISO: International organization for standardization.

ITU-TSS: The United Nations standards organisation that recommends world-wide communications standards. Its official name is the International Telecommunications Union - Telecommunications Standardisation Sector. Formerly know as CCITT.

J

Just-In-Time (JIT): The set of techniques for managing the delivery of supplies to manufacturing plants, so that they are delivered just before they are required at the plant. The technique allows for a reduction in inventory level, and more flexibility in the output of the finished goods.

K

L

LAN: Local Area Network. LANs are usually restricted to a building. See also Router and WAN.

Leased Line: A telephone line reserved for the exclusive use of a leasing customer without interexchange switching arrangements. Also called a private or dedicated line.

Line Speed: The rate signals are transmitted over a channel, usually measured in bauds or bits per second.

LINX: The EDI program established by the Ports of Seattle and Tacoma.

Loop: A repetition of a segment or a group of segments

M

Mailbox: An electronic message storage place for data. A customer can retrieve messages from his/her own mailbox, and can send messages to other trading partners' mailboxes. See VAN.

Mailslot: A subdivision of the mailbox. that allows for the separation of various types of EDI data.

Mapping: The translation from an EDI standard format to a company's internal format.

Message: (USA) The entire data stream including the outer envelope, also known as a document. (International) The equivalent of transaction set in the USA.

MIME: Multi-purpose Internet Mail Extensions.

MNP (Microcom Networking Protocol): Proprietary error-correcting protocol for modems operating at speeds from 2.4 kbit/s to 9.6 kbit/s; operates only point-to-point and does not have easy connections to X.25 and ISDN technology.

Modem (MOdulator-DEModulator): Electronic device that converts signals from one form to a form compatible with another kind of equipment, such as transmitting computer data over telephone lines.

N

Network Architecture: Reference used for the definition and development of protocols and products for interworking between data processing systems, often used to define a hierarchy of communication function layers.

Network: The interconnection, through telecommunications links, of computers and terminals in different locations. Also, a network is a third-party mailbox service that can be accessed by EDI customers to send/receive data.

Node: A site housing one or more communication processors, usually geographically removed from a centrally located computer.

O

ODETTE (Organization for Data Exchange by Teletransmission in Europe): A European project with agreed EDI standards for interchange among European automobile manufacturers.

On-Line: Interactive use of a computer.

Operating System: Software that controls the execution of programs. An operating system may perform resource allocation, scheduling, input/ output control, and data management.

ORDERNET: Proprietary standard for Healthcare Industry.

P

PAEB: The Pan American EDIFACT Board is separate from ANSI X12, and it serves as the coordinating body on EDI for national standards organisations of North, Central and South Americas.

Partnership Agreement: An agreement set up for two or more EDI users before theycan begin communication.

PEDI: An interim term for the standards describing the provision of EDI over X.400 (X.435 or F.435)

PO (Purchase Order): Also known as the 850 document. Record of the agreement made with a vendor to purchase merchandise. Includes item description, quantity, cost, discount terms and method of shipping.

Private Network: A network established and operated by a private organization or corporation for users within that organization or corporation.

Proprietary Format: A data format specific to a company, industry, or other limited group. Proprietary formats do not comply with the ASC X12 standards.

Protocol: Formal set of rules governing the format, timing, sequencing, and error control of exchanged messages on a data network; may be oriented toward data transfer over an interface, between two logical units directly connected, or on an end-to-end basis between two users over a large and complex network.

PTT (Postal, Telegraph and Telephone Agencies): A generic name for government agency responsible for operating a nation's communications services and systems.

Public Network: Generically, a network operated by common carriers or telecommunications administrations for the provision of circuit-switched, packet-switched, and leased-line circuits to the public.

Public Standards: EDI standards that are used by multiple industries and are developed and maintained by open organizations.

Q

QR (Quick Response): Retail Sector -- see definition

Qualifier: A data element which gives a generic segment or a generic data element a specific meaning.

Quick Response: The set of techniques for managing the distribution of goods so that they are delivered just before they are required at the retail end point. The technique allows for a reduction in inventory level. Analogous to Just-In-Time in manufacturing.

R

RAILINC: For-profit subsidiary of the Association of American Railroads (its network)

Real Time: A transmission or data processing operating mode by which data is entered in an interactive session; pertaining to an application whereby response to input is fast enough to affect subsequent input, such as a process-control "system" or a computer-aided designed "system" (IBM); describing processing in which the results are used to influence an ongoing process.

Record: A set of elements relating to a specific unit of information.

REDINET: The EDI network originally developed by Control Data Corporation; operated by Sterling Commerce's Network Services Group since June 1991.

Router: The bridge between two or more LANs or a LAN and a WAN.

RTE (Real Time EDI): See definition

S

SDLC (Synchronous Data Link Control): A communications line discipline associated with the IBM systems network architecture (SNA).

Security: A process of system screening that denies access to unauthorised users and protects data from unauthorised uses. See also encryption . In many cases security refers to physical security such as keyboard locks or the placing of computers in secure areas behind locked doors. See also system access control.

Segment Identifier: A 2 or 3 character code which uniquely identifies a specific segment. The identifier serves as a name for the segment and occupies the first character positions of the segment.

Segment Requirement Designator: A segment has one of the following requirement designators defining its need to appear within the transaction set: mandatory segment must occur; optional segment may occur at the option of sending party; floating segment may occur anywhere after the first or preceding the last segment in a transaction set.

Segment Tag: This is a unique identifier composed of a combination of two or three uppercase letters and/or digits, the first character of which is alphabetic. The identifier serves as a name for the segment and is located in the first character position of the segment.

Segment Terminator: A character that separates segments. A segment terminator tells the computer where one segment ends and the next begins. The terminator is defined in the Interchange Header.

Segment: A segment is the intermediate unit of information in a transaction set. Segments consist of a predefined set of functionally related data elements which are identified by their sequential position within the segment. A segment begins with a segment identifier, and ends with a segment terminator. Each line item in a transaction set is a segment.

Session: The act of (at least) signing on and signing off one's Mailbox. A session may or may not include sending and/or receiving data to/from the System. A session MUST end with the transmission (by the customer of a Signoff record.)

SGML: Standard Generalized Markup Language, ISO standard 8879 for the representation of data structures and relationships. Often associated with text and publishing. See also HTML.

SMTP: Simple Mail Transfer Protocol.

SNA (Systems Network Architecture): An architecture for interchanging data trough an SNA network in a sort-and-forward fashion.

SNA/DS (System Network Architectural Distribution Services): an E-mail messaging protocol that is used with many mainframe based messaging systems. It operates over a dedicated line using the SNA communications protocol.

SPEC 2000: Airline industry standard for spare parts.

Spoke Company: A trading partner of a hub company.

Standards Bodies: Organizations and/or committees that develop EDI standards.

Standards Maintenance Commitee: A sub-group of the EDI Users Group that reviews and analyzes all proposed changes and recommends appropriate actions.

Store and Forward: Service where a message carried by the network may be temporarily sorted or routed in the network prior to delivery to the recipient.

Sub-element Separator: A single character used to separate the components of an element.

Sub-element: A portion of a larger composite data element.

Subset: A subset of a national standard for ease-of-use within one industry. The subset usually indicates only those segments, elements, and code values needed by the industry.

SYNC: Abbreviation for Synchronous. A communi-cation protocol where data is sent in blocks based on a common clock signal.

Synchronous Transmission: Data communications in which characters or bits are sent at a fixed rate, with the transmitting and receiving devices synchronized; eliminates the need for start and stop bits basic to asynchronous transmission and significantly increases data throughput rates.

Syntax: The rules governing the structuring of the user data and of associated data in the interchange of messages.

T

TCP/IP (Transmission Control Protocol/Internet Protocol): TCP/IP is a set of protocols for Layers three and four of the seven-layer OSI network model. These are respectively, the network and the transport layers.

TDCC (Transportation Data Coordinating Committee): Sets standards for motor, rail, ocean and air industry, administered by EDIA.

TDI: Trade Data Interchange. An EDI standard used by the European business community for general business documents.

Telecommunications: A term encompassing both voice and data communications in the form of coded signals over via public or private telecommunications media.

Third-Party Network: A commercial service that allows people to transmit data to a computer and store it so it can be retrieved by the party to whom it is addressed. This is also called an electronic mailbox.

TPA (Trading Partner Agreement): Contractual arrangement between the parties involved in electronic trading covering the EDI specific parts of the exchange of trading information. Also called Interchange Agreement.

TRADACOMS (Trading Data Communications Standard): An EDI standard for retail used primarily in the United Kingdom and Western Europe.

Trading Partner Agreement: A service order spelling out the terms and conditions for doing business electronically.

Trading Partner: In EDI, this generally applies to two parties engaged in the exchange of business data through electronic means.

Transaction Set: Standard defined groupings of one or more segments which represent a specific EDI document. Examples of transactions include Equipment Interchange Reports (Gate-in and Gate-out) and Repair Estimates. The order and number of segments within a transaction are defined for each applicable EDI standard.

Translation Software: A software program used to reformat business documents into an EDI standard. Translation software puts the data into the standard's syntax and inserts the appropriate EDI symbols for the transmission of the transaction set. The CDX EDI Bridge is an example of a translation software program.

Translation: The act of accepting documents in other than standard format and translating them to the EDI standard.

Transmission: All the data to be transmitted between one user and another, or one user and the VAN.

U

UCS (Uniform Communication Standard, used for Grocery Industry): A standard for EDI documents developed specifically for the Grocery industry.

UN/EDIFACT: See EDIFACT.

UPC (Universal Product Code): A standard numeric product identifier and its associated graphical representation used as a product descriptor.

V

VAN (Value Added Network): 1) A secure and privately owned network offering services such as mailboxing, reliable data transmission, carbon copy services, many access methods and other value-added capabilities. 2) A company that provides communications services, electronic mailboxing and other communications services for EDI transmissions.

Variable Length Format: A computer format in which fields or elements are given a specific location, a maximum length, and are separated with a symbol that denotes the end of the element. EDI standards use a variable length format.

Variable-length files: Typically used in public EDI standards; where the length of a segment can be variable within a minimum and maximum length as required by each standard.

VDA: German automotive industry standard.

VICS (Voluntary Inter-Industry Communications Standard): A standard for EDI documents developed specifically for the Retail industry.

W

WAN: Wide Area Network. A WAN is usually used to connect LANs through Routers.

WINS (Warehouse Information Network Standard): A standard for EDI documents developed specifically for the Warehouse industry.

Work-flow Automation: The use of automated processing in everyday business operations.

World Wide Web: A graphical user interface layer that sits on top of Internet . See also HTML.

X

X.25: A synchronous communications protocol defined by the ITU-TSS to establish a virtual connection between two parties (as though it were a dedicated line). This protocol is often referred to as packet switching, after its method of encapsulating portions of the message in small packets for transmission. The protocol was originally defined for data transmission , but is now widely employed for voice, video, facsimile and other applications.

X.400: A communications standard defined by the ITU-TSS for a store -and- forward messaging system.

X.435: CCITT draft recommendation which specifies how the PEDI protocol can be used to provide EDI over X.400.

X.75: A communications protocol defined by the ITU-TSS for interconnecting two X.25 networks.

X12: The North American ANSI EDI standard, which arose in 1979.

Y

Z