The vast majority of B2B transactions are supported by EDI, XML, and extranets. In this appendix, we describe EDI and its transition to the Internet platform. Extranets are covered in Appendix 6A.

**TRADITIONAL EDI**

EDI is a communication standard that enables the electronic transfer of routine documents, such as purchasing orders, between business partners. It formats these documents according to an agreed-upon structure. An EDI implementation is a process in which two or more organizations determine how to work together more effectively through the use of EDI. For other organizations, it is an internal decision spurred by the desire for competitive advantage. EDI is basically a computer-to-computer messaging system with a minimum of human intervention. For a comparison of EDI versus no EDI see Exhibit W5A.1.

EDI often serves as a catalyst and a stimulus to improve the business processes that flow between organizations. It reduces costs, delays, and errors inherent in a manual document-delivery system.

- **Business transaction messages.** EDI primarily is used to electronically transfer repetitive business transactions. These include purchase orders, invoices, credit approvals, shipping notices, confirmations, and so on.

- **Data formatting standards.** Because EDI messages are repetitive, it makes sense to use formatting (coding) standards. Standards can shorten the length of the messages and eliminate data entry errors, because data entry occurs only once. EDI deals with standard transactions, whereas e-mail is more open. EDI uses a special standard language and is secure, whereas e-mail is not. When a user enters data into the EDI system, the data are automatically converted to EDI language. If there are missing or incorrect data, the EDI converter offers assistance. EDI fosters collaborative relationships and strategic partnerships. In the United States and Canada, data are formatted according to the ANSI X.12 standard or the UCS code. An international standard developed by the United Nations is called EDIFACT (see bambooweb.com).

- **EDI translators.** An EDI translator automatically translates data. The software organizes information into a standard format.

EDI has been around for about 30 years in the non-Internet environment. To distinguish it from Internet-based EDI, we call EDI on the non-Internet platform traditional EDI.

**HOW DOES EDI WORK?**

Insights and Additions W5A.1 illustrates how EDI works in a hospital. Information flows from the hospital's information systems into an EDI station that includes a PC and an EDI translator. From there, the information moves, using a modem if necessary, to a VAN. The VAN transfers the formatted information to a vendor(s), where an EDI translator converts it to a desired format.

**APPLICATIONS OF TRADITIONAL EDI**

Traditional EDI has changed the business landscape, triggering new definitions of entire industries. It is used extensively by large corporations, sometimes in a global network, such as the one operated by General Electric Information System (which has over 100,000 corporate users). Well-known retailers such as Home Depot and Wal-Mart would operate very differently without EDI, because it is an integral and essential element of their business strategies. Thousands of global manufacturers, including Procter & Gamble, Levi Strauss, Toyota, and Unilever, have used EDI to redefine relationships with their customers through such practices as quick-response retailing and just-in-time (JIT) manufacturing. These highly visible, high-impact applications of EDI by large companies have been extremely successful. The benefits of EDI are listed in Exhibit W5A.3.

**LIMITATIONS OF TRADITIONAL EDI**

However, despite the tremendous impact of traditional EDI among industry leaders, the set of adopters represented only a small fraction of potential EDI users. In the United States, where several million businesses participate in commerce every day, fewer than 100,000 companies have adopted traditional EDI. Furthermore, most of these companies have had only a small number of their business partners on EDI.
mainly due to its high cost. Therefore, in reality, few businesses have benefited from EDI. The major factors that held back more universal implementation of traditional EDI include the following:

- Significant initial investment is needed, and ongoing operating costs are high.
- Business processes must be restructured to fit EDI requirements.
- A long start-up period is needed.
- EDI requires use of expensive private VANs.
- EDI has a high operating cost.
- Multiple EDI standards exist, so one company may have to use several standards in order to communicate with different business partners.
- The system is difficult to use.
EXHIBIT W5A.3 Benefits of EDI

- EDI enables companies to send and receive large amounts of routine transaction information quickly around the globe.
- Computer-to-computer data transfer reduces the number of errors.
- Information can flow among several trading partners consistently and freely.
- Companies can access partners’ databases to retrieve and store standard transactions.
- EDI fosters true (and strategic) partnership relationships because it involves a commitment to a long-term investment and the refinement of the system over time.
- EDI creates a complete paperless TPS (transaction processing system) environment, saving money and increasing efficiency.
- Payment collection can be shortened by several weeks.
- Data may be entered off-line, in batch mode, without tying up ports to the mainframe.
- When an EDI document is received, the data may be used immediately.
- Sales information is delivered to manufacturers, shippers, and warehouses almost in real time.
- EDI can save companies a considerable amount of money.
Part One

A converter is required to translate business transactions to EDI code.

The system is inflexible; it is difficult to make quick changes, such as adding business partners.

These factors suggest that traditional EDI—relying on formal transaction sets, translation software, and VANs—is not suitable as a long-term solution for most corporations. Therefore, a better infrastructure was needed; Internet-based EDI is such an infrastructure.

INTERNET-BASED EDI

Internet-based (or Web-based) EDI is becoming very popular. Let’s see why this is the case and review the various types of Web-based EDI.

WHY INTERNET-BASED EDI?

When considered as a channel for EDI, the Internet appears to be the most feasible alternative for putting online B2B trading within reach of virtually any organization, large or small. Firms should use Internet-based EDI for several reasons:

- The Internet is a publicly accessible network with few geographical constraints. Its largest attribute, large-scale connectivity (without the need for any special company networking architecture), is a seedbed for growth of a vast range of business applications.
- The Internet’s global network connections offer the potential to reach the widest possible number of trading partners of any viable alternative currently available.
- Using the Internet instead of a VAN can cut communication costs by over 50 percent.
- Using the Internet to exchange EDI transactions is consistent with the growing interest in delivering an ever-increasing variety of products and services electronically, particularly via the Web.
- Internet-based EDI can complement or replace many current EDI applications.
- Internet tools such as browsers and search engines are very user-friendly, and most employees today know how to use them.
- Internet-based EDI has several functionalities not provided by traditional EDI, such as collaboration, workflow, and search engine capabilities (see Boucher-Ferguson 2002).

A comparison of the traditional EDI and Internet-based EDI is provided in Exhibit W5A.4.

EXHIBIT W5A.4  Traditional Versus Web-Based EDI

Traditional Electronic Data Interchange (EDI)

<table>
<thead>
<tr>
<th>Business Application</th>
<th>Translate</th>
<th>EDI Formatted Message</th>
<th>Store and Forward</th>
<th>Value-Added Network</th>
<th>EDI Formatted Message</th>
<th>Translate</th>
<th>Business Application</th>
</tr>
</thead>
</table>

Web-based EDI

![Diagram of Web-based EDI](image)
TYPES OF INTERNET-BASED EDI

The Internet can support EDI in a variety of ways.

- Internet e-mail can be used to transport EDI messages in place of a VAN. To this end, standards for encapsulating the messages within Secure Internet Mail Extension (S/MIME) have been established.
- A company can create an extranet that enables its trading partners to enter information into a Web form, the fields of which correspond to the fields in an EDI message or document.
- Companies can use a Web-based EDI hosting service in much the same way that companies rely on third parties to host their EC sites. Netscape Enterprise is an example of the type of Web-based EDI software that enables a company to provide its own EDI services over the Internet. Harbinger Express is an example of a company that provides third-party hosting services.
- Internet-based EDI is frequently XML based to ease integration among business partners.

THE PROSPECTS OF INTERNET-BASED EDI

Companies that used traditional EDI in the past have had a positive response to Internet-based EDI. With traditional EDI, companies have to pay for network transport, translation, and routing of EDI messages into their legacy processing systems. The Internet simply serves as a cheaper alternative transport mechanism. For a discussion, see Witte et al. (2003). The combination of the Web, XML, and Java makes EDI worthwhile even for small, infrequent transactions. Whereas EDI is not interactive, the Web and Java were designed specifically for interactivity as well as ease of use.

The following examples demonstrate the benefits of Internet-based EDI.

- Compucom Systems was averaging 5,000 transactions per month with traditional EDI. In just a short time after the transition to Web-based EDI, the company was able to average 35,000 transactions. The system helped the company to grow rapidly.
- Tradelink of Hong Kong was successful in recruiting only several hundred of the potential 70,000 companies to a traditional EDI that communicated with government agencies regarding export/import transactions. In 2001, Tradelink’s Internet-based system had thousands of companies registered, and hundreds were being added monthly.
- Atkins Carlyle Corp., which buys from 6,000 suppliers and has 12,000 customers in Australia, is a wholesaler of industrial, electrical, and automotive parts. The large suppliers were using three different EDI platforms. By moving to an Internet-based EDI, the company is able to collaborate with many more business partners, reducing transaction costs by about $2 per message.
- Procter & Gamble replaced a traditional EDI system that had 4,000 business partners with an Internet-based system that has tens of thousands of suppliers.

Note that many companies no longer refer to their collaborative systems as EDI. However, the properties of EDI are embedded into new e-commerce initiatives such as collaborative commerce and electronic exchanges.

REFERENCES