

WHITE PAPER

EDI FOR BEGINNERS



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1 - INTRODUCTION

Electronic Data Interchange (EDI) is defined as the automated exchange of structured data between two partners. For over 30 years, EDI has been helping companies take paper and human involvement out of business document processing (e.g., sending and receiving documents like orders and invoices) and making them more efficient. EDI is an effective tool for reducing security risks, added costs and unnecessary human involvement from document processes. The benefits of EDI include fast transmission, automated accounting, low error rates and high data quality.

EDI is a complex topic and very technical, particularly for non-IT people. The purpose of this white paper is to give you a brief overview of the most common EDI topics and guide you on your first steps in the EDI world.

2 - WHAT IS EDI?

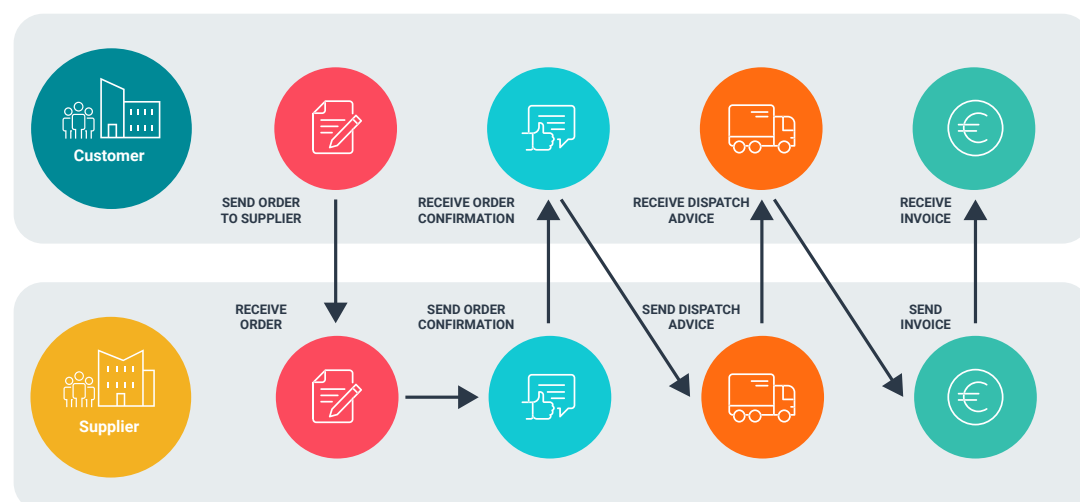
EDI is the process by which data is exchanged between the ERP systems of business partners in a standard electronic format. EDI standardises the sending and receiving of business messages and regulates the route from sender to recipient. The information exchange takes place in the form of structured data: messages sent are machine-readable and ideally correspond to an agreed-upon standard format. The exchange can be used for many business processes between companies that support EDI such as the dispatch/receipt of orders, delivery confirmations or invoices.

2.1 - HOW IS AN EDI MESSAGE SENT?

Data from a business process is converted into an electronic format according to a predefined specifications. There are several ways to send an EDI message (more on this in section 3). The data that makes up the EDI message comes from the sender's ERP system and is sent to the recipient's ERP, removing the need to manually record it. This is where it gets a bit tricky: Because the output from the ERP system and the file format of the sender's ERP system both use different formats, the EDI message is often not readable by the recipient's ERP.

In order to address this "normal case," the necessary conversion is also put in place when an EDI connection is between two partners. In this conversion, the sender format is converted into a standardised EDI format (an "EDI-Esperanto"). The recipient, in turn, converts the standard format into their ERP format. This ensures communication between many business partners independent of their ERP. The EDI connections and interfaces are often operated by service providers.

After conversion by the recipient, data "runs" directly into the ERP system, possibly with some upstream content checks, without requiring manual input. This triggers automated subsequent processes such as the logistical flow of goods or invoice verification. The entire process of creating the message, sending, converting, receiving and processing in the recipient's ERP system takes just a few minutes. And at a fraction of the cost of manual processes!



A typical series of data exchanges between supplier and customer, which can be automated with EDI

2.2 – A BRIEF HISTORY OF EDI

EDI was already in use in the United States over 50 years ago, but without standardised formats. Telephone lines served as the transmission path. The Value Added Networks (VANs) were the first to broaden EDI procedures. If a company connected to a VAN, it could easily exchange messages with all other companies connected to the same network. The VANs were offered by service companies that continued to operate their networks over physical lines.

The first industry-specific EDI message standards were introduced in the late 1970s. In 1988, the United Nations adopted the global standard UN/Electronic Data Interchange for Administration, Commerce and Transport (EDIFACT), which is still regarded as the most important EDI message standard today. The EDIFACT standard gave rise to many substandards, which EDIFACT, for example, tailors to specific industries (as not all industries require all fields that are available in the EDIFACT standard as a whole or require the mapping of industry-specific features).

The Internet has also revolutionised the sending of EDI messages. Networks between companies can now be operated with Internet technologies, making them more efficient and cost-effective. Other concepts such as web EDI and cloud-based EDI services are now indispensable.

2.3 – EDI IN THE CONTEXT OF DIGITISATION

EDI completely fulfills the ultimate goal of digitisation: the complete automation of collaborative business processes. In conjunction with modern Internet technologies such as the cloud, EDI processes are able to play an important role in the digital transformation of a company.

3 – TRANSMISSION PATHS

As previously mentioned in the last chapter, EDI regulates the flow of structured data between companies. For this “traffic,” a “road” is also needed over which it can run. In the case of EDI, the roads are the different transmission paths through which data passes from one business partner to another. In the past, these transmission paths consisted of telephone lines; today, Internet technologies are able to transmit data faster and more securely. In the following sections, we will present the most common transmission paths.

3.1 – FILE TRANSFER PROTOCOL (FTP)

The FTP was introduced in 1985 and is a protocol for the digital transfer of data. It was not explicitly made for EDI, but is the most universally applicable. With FTP methods, data is moved back and forth between two FTP servers. There are different ways of doing this, which we describe from the first-person perspective of one of the companies involved for the sake of simplicity:

3.1.1 - Active FTP

For active FTP, I connect to the FTP server of my business partner and store data in the agreed format (in previously agreed directories). For EDI, for example, this could be an order that I would like to send to one of my suppliers. In order to receive the order confirmation, I have to become active myself. My business partners stores this on their FTP server, again in a different, agreed directory. For my part, I have to re-establish the connection and query whether there is any data in the directory in question. I can then transfer this back to my FTP server. Of course the query can be done automatically, which is also common. In order to carry out an active FTP, I need the FTP specifications (e.g., URL, name of the FTP account and password) of my business partner, because I have to connect to their FTP server.

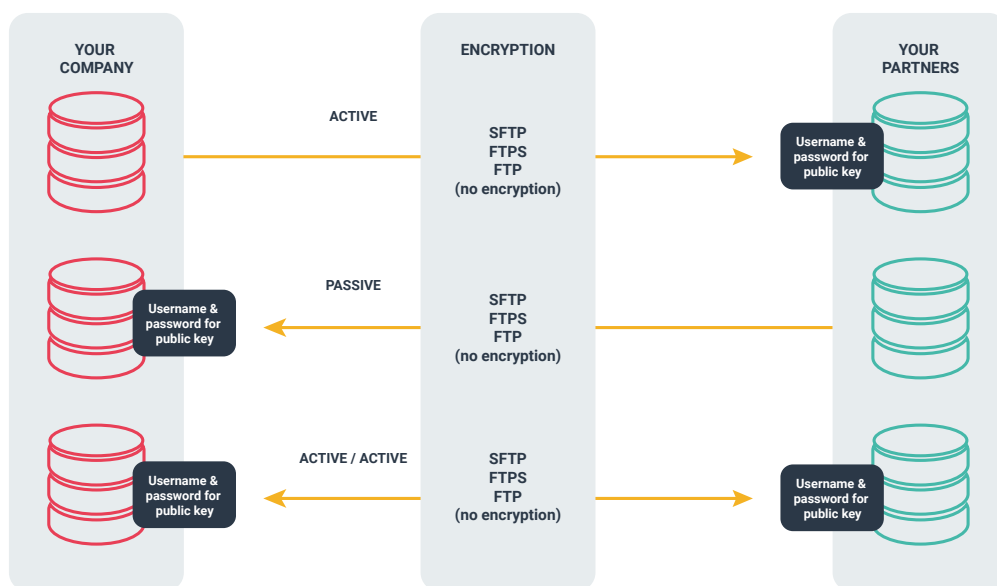
3.1.2 - Passive FTP

Passive FTP is the exact opposite of active FTP. Here, my business partner must actively store their data on my FTP server, ask whether I have stored data for them and “take it back.” I give my business partner my FTP specifications so that they can connect to my FTP server. The used directories are agreed upon beforehand.

3.1.3 - Active-active FTP

With active-active FTP, moving data from both companies involved runs out. I actively store data on my business partner's FTP server. They in turn upload data intended for me to my FTP server. To do this, we exchange our respective FTP specifications with one another. Here too, an agreement is made regarding the directories to be used.

In order to complete the diversity of the FTP procedures, another dimension is added: encryption. The original FTP method does not use encryption, as it would mean that data, as well as passwords and account names, would be transferred freely over the Internet. This is completely unthinkable for today's companies handling business data. There are several ways of encrypting data during the FTP process.



Overview of all FTP directions

3.1.4 - Secure File Transfer Protocol (SFTP)

With SFTP, the so-called Secure Shell (SSH) is used to encrypt data during the transfer. In order to be able to set up an FTP server, SFTP requires authentication. This can be done via a public key procedure or with the combination of user name and password.

3.1.5 - FTPS (FTP via SSL)

The FTPS method uses the so-called Secure Socket Layer (SSL), over which the data is transmitted in encrypted form. Authentication on the FTP server takes place with a user name and password.

Although FTP procedures were not developed for EDI, they are still frequently used. However, with the FTP method, there is no direct confirmation of the receipt or processing of a received message. For this reason, it is usually agreed with the recipient (or collector) of a message (file) that after the data has been successfully transferred, it will be deleted from the agreed directory. This allows the sender to indirectly deduce that the messages made available via FTP have also been processed further.

3.2 – ODETTE FILE TRANSFER PROTOCOL (OFTP)

The OFTP was developed by Odette International for the electronic exchange of data between two partners. The first version of the protocol met the EDI standard of the German Association of the Automotive Industry (VDA) and was widely used in this industry and beyond. Contrary to FTP procedures, OFTP was specifically developed for EDI. The second version of the protocol (OFTP2) is more commonly used today, since it also allows the use of the procedure via the Internet and encrypts data via SSL.

The communication is initiated by a partner, but data exchange takes place mutually. The authentication of the partners takes place via IDs and the corresponding passwords. Another important difference to the FTP procedures with regard to suitability for EDI, is the fact that interrupted data transfers can be resumed with the OFTP procedure. If an FTP transfer terminates, it must be completely restarted. For larger amounts of data, this requires great effort. OFTP is able to continue the transfer exactly where it was interrupted.

3.3 – APPLICABILITY STATEMENT 2 (AS2)

AS2 is an IT standard for secure data transmission over the Internet. It defines how the connection between participants is established and secured and how data is sent. A digital “envelope” is formed around the data to ensure secure and encrypted transport. Digital signatures show who sent which message at what time. The sender of a message also automatically receives an acknowledgement of receipt (e.g., MDN, Message Disposition Notification) on request. This facilitates the revision immensely.

In contrast to other transmission methods such as FTP or X.400, AS2 is designed for business data exchange. It was standardised in 1997 (under the name HTTP Transport for Secure EDI), and today remains a widespread transmission path, which is regarded by many EDI experts as the most suitable for electronic data exchange over the Internet.

To establish an AS2 connection, specifications such as URL, IP address, AS2 ID and information on encryption and signature are exchanged.

3.4 – X.400

X.400 is an alternative to classic Internet email. Contrary to normal email, all domain operators and message paths through the Internet are known, which significantly increases security. The recipient and sender of a message can also be uniquely identified by their X.400 address. The participants in the X.400 procedure can agree on the confirmation of a transmitted message (down to the application level), not only the complete receipt (communication level), but also the subsequent processing (application level) of the message.

There are different protocols:

3.4.1 - P1 protocol

The P1 protocol requires a connection partner to operate a Message Transfer Agent (MTA), which is usually only available at larger companies or at VAN providers due to its acquisition costs. However, P1 is the most secure email protocol with international standardisation. Usually the P1 protocol is run over TCP/IP.

3.4.2 - P7 protocol

The P7 protocol is the inexpensive alternative to P1. To connect to the clearing centre, the user only needs a so-called P7 client, an inexpensive X.400 mail software. This means that the message traffic runs via the client and the two business partners do not communicate directly with each other.

X.400 is, along with AS2, the most widely used transmission path for EDI.

3.5 – CONCLUSION

Many transmission paths are available for sending EDI messages. Some are specially designed for the exchange of business data, others are used more for other purposes. If you are unsure which transmission path is the right one for you, especially when you are getting started with EDI, contact an EDI service provider. They will analyse your company's (and your business partner's) situation and needs, and then provide you with expert advice.

4 – MESSAGE STANDARDS & FORMATS

To standardise EDI, message standards and formats are used. In this section, we explain what these terms mean and provide you with examples of important standards and formats.

4.1 – WHAT IS A MESSAGE STANDARD?

A message standard describes the structure of an EDI message. A standardised structure is important for the automated flow of a business process. In the early days of EDI, there were no message standards. The exchange of business data between two partners took place with bilateral agreement on the file format.

The first message standards were developed within individual industries and were specifically tailored to the respective requirements (in contrast to EDIFACT, in which all possible data fields are available).

An EDI message is built according to the regulations of the message standard. Every standard is described in documentation which specifies the exact sequence data can occur and in what format (e.g., numbers or letters). This ensures that everyone structures their data in the same way.

If the message is not structured according to the standard specifications, this results in an error that interrupts the automated path of data and requires manual intervention. Message standards are therefore necessary for an automatic, digital EDI workflow.

**STANDARDISATION
IS THE KEY FOR
AUTOMATED DATA
EXCHANGE.
FOR EDI, STANDARDS
AND FORMATS
ENSURE A HIGH
STANDARDISATION
LEVEL.**

4.2– IMPORTANT MESSAGE STANDARDS

By far the most well-known, and in Europe, the most important and widespread message standard is EDIFACT which includes a large number of possible data fields. Since many industries do not require the complete bandwidth of the EDIFACT standard, EDIFACT subsets were created for many industries and established as their own “substandard” (so-called “subsets”). Examples include EANCOM (consumer goods industry) or EDILEKTRO (electrical industry).

The message standard American National Standards Institute Accredited Standards Committee X12 (ANSI ASC X12 also known as ANSI X12) comes from the U.S. and has been in existence since 1982. The main difference to EDIFACT is the message structure.

There are standards for certain industries which are not or only indirectly related to the two above mentioned including TRADACOMS (retail), VDA (automotive), TEAPPS (e-invoicing) and OASIS UBL.

4.3– WHAT IS A MESSAGE FORMAT?

In a message standard there are different message types to represent the individual processes between two companies. There are classic message types for purchase orders, order confirmations, delivery notes, invoices or sales reports. There are often industry-specific output types for this purpose. Examples of this can be found in logistics (e.g., shipping orders or status messages for a delivery) and in the energy industry.

Each output type is assigned an ID. In the EDIFACT standard this consists of six letters (e.g. ORDERS for purchase order or SLSRPT for sales data report) and in ANSI X12 three numbers (e.g., 850 for purchase order or 852 for sales report). The structure and data structure of each message type is documented to ensure the highest possible message traffic standardisation.

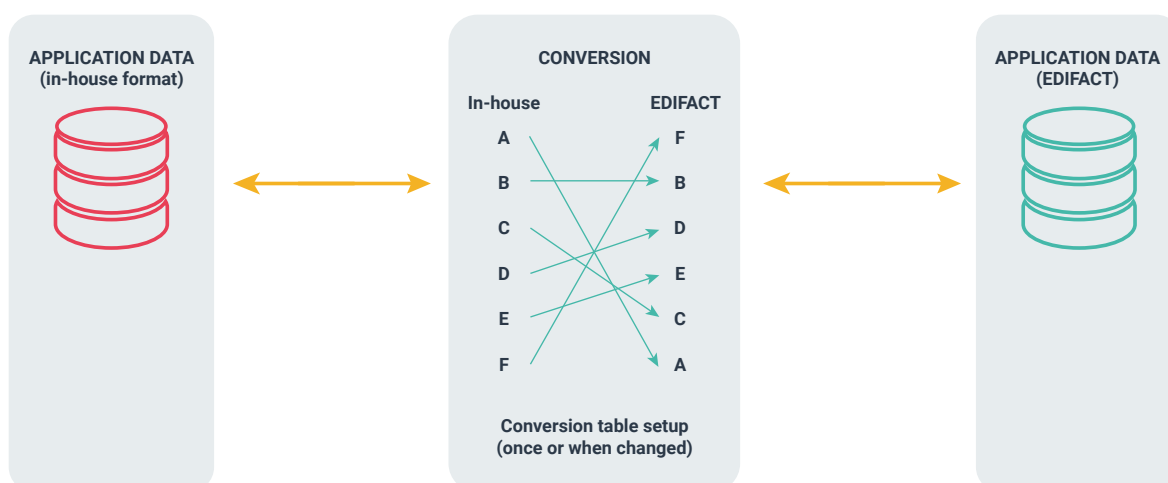
4.4 – FURTHER DEVELOPMENT OF STANDARDS

Many standards are continuously developed; however, this does not mean that the older standard versions are no longer used. On the contrary, all different versions of a standard continue to be used. The effort for users of a standard would be far too great if an adjustment had to be made within the news streams each time a standard was updated. With EDIFACT, the versions are named by year and half-year (e.g., EDIFACT D.96A = EDIFACT version from the first half-year 1996).

4.5 – MESSAGE HULLABALOO?

What happens if two companies want to exchange data via EDI but use different formats? For example, Company A already uses EDIFACT to communicate with other business partners and Company B uses ANSI X12. How is communication harmonised? This is where EDI converters come in, converting one message format into another. Since the structure of the individual message formats and their message types is precisely known and documented, an exact conversion of the data can be ensured without changing the content.

A converter can “sit” in different places — in an EDI in-house solution, directly in the ERP system or in the systems of an EDI service provider.



Simplified representation of data conversion

4.6 – CONCLUSION

Message standards are used to bring business data into a standardised structure to ensure a smooth, fast and error-free data exchange. Without it, any exchange between two companies would have to take place on the basis of a bilateral agreement, which would result in chaos. The exchange of messages in different standards is possible with the help of converters.

5 – WHAT IS AN EDI CLOUD?

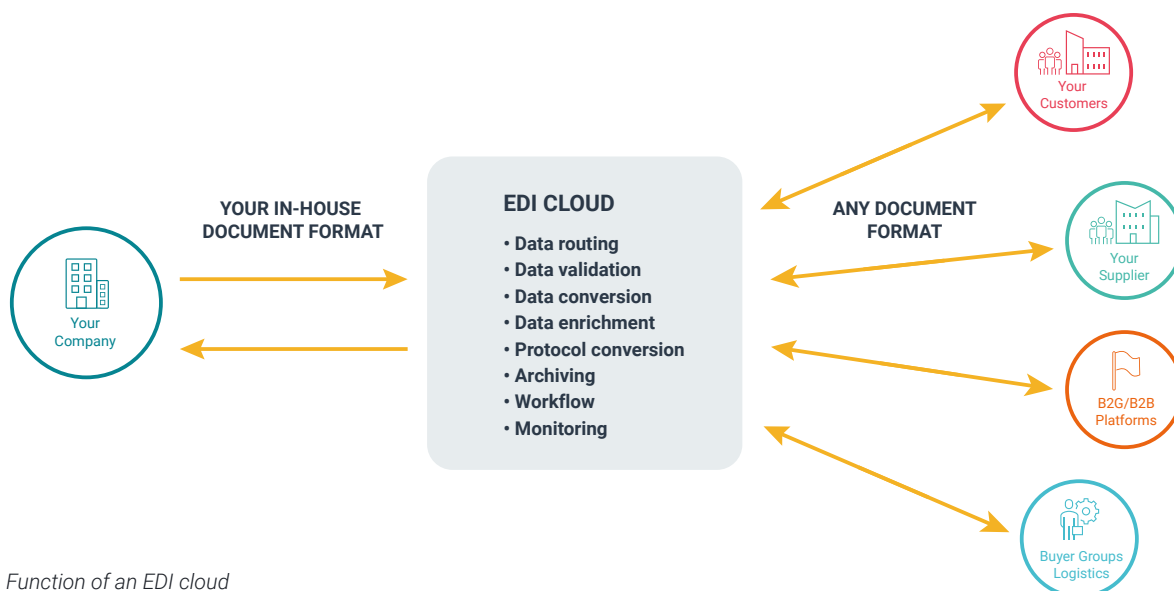
As mentioned, Internet technologies have made EDI faster, better and more affordable. But how does an EDI cloud work and what are the advantages?

5.1 – HOW IT WORKS

EDI converters are used to convert EDI data streams from one format to another. These converters can either be implemented as in-house solutions (with their own EDI software) or used in the cloud service.

Ideally, both companies that want to exchange EDI data with one another should connect to the cloud before starting to exchange data. The connection to the EDI cloud can take place in various ways (see section 3 on Transmission Paths).

When Company A wants to send a message to company B, it sends its EDI file to the cloud. In the EDI cloud, the incoming formats (e.g., an order in the EDIFACT subset EANCOM) are translated (i.e., converted) into an intermediate format. In a second conversion, the EDI message is created in the target format from the intermediate format (e.g., an order in SAP-compliant IDoc format). The finished file is delivered to the recipient from the cloud. This process usually only takes a few minutes. EDI clouds are usually operated by specialised service providers.



Function of an EDI cloud

5.2– EDI CLOUD ADVANTAGES

There are no typical initial investments of an in-house implementation when using a cloud-based solution: no hardware or converter software has to be purchased, licensed or installed (including communication and archiving software). Additionally, the existing IT landscape can remain unchanged ("Never change a running system!"). The IT department is not burdened with EDI operations nor does it require EDI expertise as the EDI service provider manages the full operations.

To use a cloud-based solution, a data connection is established between the company and the cloud of the service provider, since the company's EDI partners are connected to the cloud and not, as with an in-house solution, to the company's own system. This is key as one single EDI interface is sufficient for a company to handle their entire EDI operations.

Customers and suppliers can send and/or receive a wide variety of formats via a variety of transmission paths. An EDI path is created for each partner to ensure that the data is cleanly converted and flows smoothly from one partner to another.

5.3 – CONCLUSION

The use of an EDI cloud relieves companies of the burden of a complex and expensive in-house EDI solution. The entire EDI operation can be handled with a single interface.

ABOUT ESKER

Esfer is a worldwide leader in AI-driven process automation software, helping financial and customer service departments digitally transform their purchase-to-pay (P2P) and order-to-cash (O2C) cycles. Used by more than 11,000 companies worldwide, Esfer's solutions incorporate artificial intelligence (AI) technology to drive increased productivity, enhanced visibility, reduced fraud risk, and improved collaboration with customers, suppliers and internally. Founded in 1985, Esfer operates in North America, Latin America, Europe and Asia Pacific with global headquarters in Lyon, France, and U.S. headquarters in Madison, Wisconsin. In 2018, Esfer generated 87 million euros in total sales revenue.



ABOUT ESKER EDI SERVICES

Esfer offers a full-service EDI portfolio based on an extensive network and over 30 years of experience. Esfer EDI Services (formally e-integration GmbH) is composed of industry experts with proficient knowledge of EDI requirements in different industries and countries. Esfer EDI Services delivers the benefits of EDI — including fast transmission, touchless booking, low error rates and high data quality — combined with the benefits of a cloud platform (Esfer on Demand), that includes maximum data transparency, visibility and security.



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