



**corcentric™**

**EBOOK:**

# **EDI, XML and E-invoicing**

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# 01

# Introduction

EDI, or Electronic Data Interchange, is the transfer of structured data, or standardised electronic documents, between businesses, without human intervention.

Having gained prominence in the 1980s, EDI became the standard for B2B data transmission. However, EDI traditionally has been associated with large corporations, having a reputation for being complex and expensive; a powerful tool, but only for those who really need it.

EDI is often used as shorthand for structured data transfer, particularly when talking about invoice distribution. This is not to be confused with specific EDI standards (more on these later) which are used to format data for transfer.

XML refers to a specific type of structured data, one that is classed as 'human readable', in that it includes markup (XML stands for Extensible Markup Language) or a type of labelling for each datum.

**In the world of e-invoicing, both EDI and XML play important roles. EDI has long facilitated secure data exchange and thus provides a good fit for the needs of sending invoices electronically. However, the greater flexibility and interoperability of XML formatting has won out over EDI standards for e-invoicing requirements brought in for public sector invoicing across the EU.**



## Where do EDI and XML come from?

As is the case from many early technology developments, EDI's routes can be traced back to military data exchanges just after the close of the Second World War. Specifically, logistical challenges in the [1948 Berlin airlift](#). These developments later shaped the first TDCC (Transportation Data Coordinating Committee) standards in the US, leading to development of EDI for Freight Control Systems. An early example of EDI can be found in the London Airport Cargo EDP Scheme (LACES) at Heathrow Airport, London, UK, in 1971.

EDI really started to grow in use in the 1980s, resolving problems pertaining to maritime traffic and associated customs processes. With the growth in industry and business logistics around this time, it wasn't long before the larger, computer-equipped, businesses of the day saw the value in its commercial application.

XML is comparatively young, with the first specification being published in 1998, by

the [World Wide Web Consortium](#). The XML language is used to create documents which can be easily consumed by web services. It is this now ubiquitous use of XML in the context of web services that has favoured it for use with recent e-invoicing services, which are reliant on web services in their architecture.

XML and other forms of structured data invoicing are often referred to broadly as EDI, even if the invoices are not sent out using a specific EDI standard.



## EDI and XML for invoicing

Whilst EDI and XML are used in the transfer of a broad range of data for business, we will focus on the specific use case of these for electronic invoicing.

Invoices have a logical structure that lends them to storage as structured data and, therefore, EDI or XML formatting. This data can then be transferred more quickly and securely than traditional methods of invoice delivery. Furthermore, structured data can be quickly processed when it

reaches its destination – rather than first needing to be scanned or rekeyed in some way.

Data formatted to an EDI standard have an advantage over XML documents in that they do not require parsing to extract the data from the markup, making their delivery and processing faster.

The European Commission has tried to redefine e-invoicing as structured data invoicing only (as set out in [EU Directive 2014/55/EU](#)) to encourage savings from the automated processing of this data. The directive requires all European public administrations to be able to accept invoices in an electronic format from their suppliers, in compliance with the European standards approved by CEN: UN/CEFACT XML and UBL.

A range of national invoice formats have sprung up over Europe, based on the [European Standard EN16931](#) – which ensures adherence to the XML standards UBL and UN/CEFACT.

# 02

## What is the value of structured data for invoicing?

Fundamentally, structured data, such as EDI and XML, facilitates the exchange of business data a machine-to-machine process. The resulting benefits range from faster processing and improved accuracy to compliance and security.

Beyond the immediate benefits, there are strategic benefits to consider, too – from better integration with trading partners through to the ability to win deals where structured data presents an advantage. In many industries, it is practically essential to integrate with the common EDI standard in that industry in order to participate in the supply chain.

**Structured data has now become a requirement for delivering invoices to public sector businesses across the EU, as well as B2B invoicing in countries such as Italy. Even for those who do not need to meet these specific requirements, the range of benefits to using structured data for their invoicing, such as EDI or XML, presents a compelling case.**

# 1



## Speed

As EDI facilitates pure machine-to-machine data transfer, transfer and processing can be done at a speed unmatched by other delivery formats. Furthermore, removing the need for human involvement to convert from one format to another opens up opportunities for automation and around-the-clock processing.

Beyond the simple transfer of information, structured data formats also present an opportunity to analyse and audit data very quickly. This provides businesses with access to strategically valuable insights more quickly, presenting a competitive advantage.

# 2

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## Accuracy

Accuracy of structured data transfer is underpinned by automation, standardisation, and confirmation. Automation takes data-entry error out of the process. Standardisation sets the criteria for content and format, ensuring consistency and reducing the capacity for error. Confirmation receipts are sent as acknowledgement of each transfer, indicating success or failure and allowing management by exception.

# 3



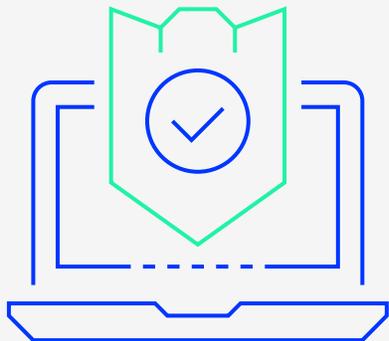
## Cost savings

Whilst EDI has, on one hand, earned a reputation for being costly to implement, the savings potential is significant – hence its global success. These savings are, to a large degree, predicated on the aforementioned points of speed and accuracy. When considering the invoicing use case for EDI<sup>1</sup> the cost savings from receiving faster payments, as well as reduced labour, materials, storage and postage costs<sup>1</sup> the savings are immediately apparent.

Research has consistently shown that EDI costs at most one-third of its paper-based equivalent. One report put the cost at 70 times less. A major American company reported a reduction in its order processing costs from \$38/order to \$1.35/order with EDI<sup>1</sup>.

The EU has reported that by taking 10 minutes less to process electronic invoices, it saves 120 euro per invoice every year. And GS1 UK<sup>1</sup> found that UK grocers saved £14 on every electronic order, facilitated by EDI.

# 4



## Security and Compliance

The role of EDI in a business context is to handle sensitive documents and data, and therefore its implementation comes with a substantial focus on security. Modern transfer protocols allow for 256-bit (or higher) encryption, and access to the transferred data can be limited to a particular set of secure systems, with very few opportunities for human access.

Traditionally, EDI has leveraged the security benefits of direct peer-to-peer connections, but transfer has shifted towards web-based protocols in recent years. With the advent of web-based transmissions, more secure standards such as [AS2](#) (for internet), [AS3](#) (for FTP) and [AS4](#) (for web services) have emerged.

## The EDI process typically includes:

- + Standards to validate the message format and content
- + Controls to ensure the translation application correctly translates standard transmissions into a format usable by the application software
- + Procedures to validate authenticity and authority of sender
- + Dedicated transmission channels for communication with all parties
- + Encryption of transmitted data
- + Detection and protocol for dealing with data outside of approved parties, or in a non-standard format
- + Automatic generation and handling of receipts to determine transmission and processing success/failure

It is worth noting here that EDI's greatest strength, the reliability and security of the network, is sometimes considered its greatest (commercial) weakness. The very fact that the network needs to be so secure, compliant, and resilient means it is less agile and less easy to quickly connect smaller parties. As any security professional will attest to, this is an inherent challenge in any secure environment, so needs to be considered and managed when implementing any standards. Simplicity of connection is one of the reasons why XML standards, rather than EDI standards, were selected to underpin the European eInvoicing Standard EN-16931.

# 03

## How is EDI evolving?

### Traditional EDI

EDI has traditionally been the preserve of large corporations, typically needing to handle vast numbers of documents that would incur significant costs if they were handled by humans. This high-value but high-cost position enabled EDI to command a position as the standard for large-scale B2B data transfer for several decades.

With the technology space opening up to an explosion of agile and hungry solution providers, traditional EDI has adapted and evolved. More so than just defensively evolving in the face of more agile competition, EDI has changed to incorporate a range of technological innovations in recent years. EDI solutions now reflect the sensibilities of modern software solutions – including improved interoperability, ease of use, and cost efficiency.

### Web-based EDI

Since the broad availability and reliability of the internet, web-based EDI has become the norm. EDI can be implemented through managed networks, virtual private networks (VPNs), or point-to-point connections, utilising secure internet connections via AS2 or SFPT.

With the advance in web-oriented solutions to address issues of confidentiality, authentication, data integrity, and nonrepudiation of origin, barriers to web-based EDI have fallen away. Consequently, the speed and cost of implementation has dropped and opened up the availability of EDI to a wider audience.

It is not just the integration of new transmission channels that has fuelled the boom in web-based EDI, improvements in the X12 EDI formatting standard have better positioned EDI for web-based transfers.

# 04 The Challenges of EDI

The greatest strengths of EDI often present some of the greatest challenges when developing and implementing EDI systems. In order to ensure your EDI project runs smoothly, the following challenges will need to be met.

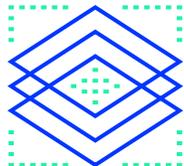
- 1 Security**
- 2 Complexity**
- 3 Staying up to date**
- 4 Resources and Expertise**
- 5 Disaster Recovery**



## Security

Security is inherent in correctly implemented EDI systems, with robust networks backed up by validation and verification procedures at a transaction level. For VAT-compliant invoicing via EDI, the [1994/820/EC](#) directive outlines the security protocols that must be followed.

Traditionally, EDI systems were implemented on-site and sat entirely within a business's firewall. However, a modern approach to solutions architecture demands greater flexibility, scalability, and availability. This means cloud-based solutions. Taking EDI outside of the firewall requires further security planning and procedures to be implemented; otherwise, speed, scalability, and cost benefits come at the price of reduced security.



## Complexity

Complexity, and therefore cost, presents one of the largest barriers to EDI for many businesses. Much of the complexity in an EDI system arises from the integration with systems and subsequent formatting and conversion of data, either inbound or outbound.

Of particular note, VAT compliance presents complexity when trading internationally. Even within Europe, where the EC VAT Directive clearly defines the minimum set of data for an invoice – and corresponding fields have been well-defined and encapsulated in EDI standards (UN/EDIFACT) for many years – there are differences between requirements for each country.

In addition to country-specific variations, there are variations between industries and sometimes closely aligned networks of suppliers and buyers. Outside of transactions made using the UN/EDIFACT

format, the prevalent alternative is ANSI ASC X12 (or simply X12). Despite this apparent standardisation to two main formats, there exists plenty of variation between subsets of the X12 standard.

Traditionally, large businesses have elected to dedicate large volumes of internal IT resources to handle the complexity of developing, implementing, and managing their EDI solutions. However, as markets become increasingly complex, technology advances ever more swiftly, and agility becomes a more significant competitive edge, businesses increasingly look to experienced solution partners to assist with each stage, including the ongoing success of EDI implementation.

Partners, such as Corcentric, who have existing relationships with a broad variety of EDI networks and can, therefore, integrate swiftly present an added advantage over more traditional, single-network EDI solutions.



## Staying up to date

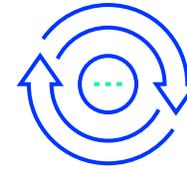
As standards evolve, and technology advances, many businesses find the most practical solution to keeping their EDI solution up to date is to work with an external solution provider. This offloads the responsibility for development and maintenance to the solution partner, with the assurance of a service-level agreement.

In the retail sector, EDI systems require regular updates as requirements, procedures, and business criteria change frequently. Supporting seasonal variations in price, designs, marketing offers, and volume discount criteria through an EDI system provides a level of agility necessary to stay competitive.



## Resources and Expertise

An EDI system that is maintained in-house needs to be paired with EDI-trained staff to ensure optimal operation. Staff changes need to be met with swift and extensive EDI system training to minimise errors and ensure operating costs are kept as low as possible.



## Disaster Recovery

Considering the business-critical role of EDI in the day-to-day functioning of large businesses, it is essential that a comprehensive disaster recovery plan is in place at all times. Moreover, it is the high availability of EDI, not simply recovery from disaster, that is essential to smooth running of commercial relationships and their ongoing success.

# 05 EDI Document Standards

**Whilst the goal of EDI is to enable standardisation of machine-to-machine messages between businesses, there are a broad range of EDI standards. Since the advent of web-based EDI, the number of standards has risen further.**

Many industries develop a preference for a particular standard, such as TRADACOMS in the UK retail industry, but the trend is towards greater variety of standards and subsets within standards, presenting a challenge for businesses to future-proof their investment in EDI systems. As such, many businesses now consider solutions that are able to integrate with and support a range of different EDI standards – improving their agility and making them easier to do business with.

# ANSI ASC X12

The X12 standard was originally conceived by the Accredited Standards Committee (ASC), a group chartered by the ANSI, to support companies across different industry sectors in North America. As one of the original and most successful EDI standards, X12 is now used by more than 300,000 companies worldwide in daily business transactions. X12 is the most popular EDI standard in North America.

ASC X12 members continue to meet annually and update the X12 transaction sets. Each update is assigned a version and a release number. For example, 3050 was version 3, release 5, issued in 1996. Many businesses chose not to use the latest version/release of X12, opting for an older edition, perhaps more widely used amongst their trading partners. For this reason, it is important to clearly establish which X12 version/release or range of versions/releases need to be supported when working with this EDI standard.

Some industry associations have developed subsets of the ASC X12 standards. Many of these were actually developed prior to X12 and have subsequently merged with X12.

- + Grocery and retail, using the Uniform Communications Standard (UCS)
- + Automotive, through Automotive Industry Action Group (AIAG)
- + Petroleum, using Petroleum Industry Data Exchange (PIDX)
- + Retail Apparel Industry (VICS standard)
- + Warehousing Industry (the WINS standard)

# EANCOM

EANCOM is the most widely used subset of the popular UN/EDIFACT standard and was originally developed for the retail sector. EANCOM is now used in a variety of other industry sectors including healthcare, construction, and publishing.

# UN/EDIFACT

United Nations/Electronic Data Interchange for Administration, Commerce and Transport, more commonly known as UN/EDIFACT, is the only international EDI standard and one of the most popular outside of the US.

EDIFACT is maintained and developed through the United Nations Centre for Trade Facilitation and Electronic Business (UN/CEFACT) under the UN Economic Commission for Europe. The EDIFACT standard provides a set of (ISO approved) syntax rules to structure data, an interactive exchange protocol (I-EDI), and a set of standard messages that enable multi-country and multi-industry exchange of electronic business documents.

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# HIPAA

A key component of [HIPAA](#) is the establishment of national standards for electronic health care transactions. Various transaction sets comprise what is collectively known as HIPAA/EDI, utilising national identifiers for providers, health insurance plans, and employers. The standards were implemented to improve the efficiency and effectiveness of the North American health care system by encouraging the widespread use of EDI since 2003.

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# ODETTE

ODETTE is a working group set up to address the electronic data interchange (EDI) requirements of the European automotive industry. ODETTE has been responsible for developing communications standards such as OFTP and, more recently, OFTP 2. The OFTP 2 protocol enables secure transfer of business documents over the Internet, ISDN, and X.25 networks.

OFTP 2 can encrypt and digitally sign message data, request signed receipts, and provide high levels of data compression. All of these services are available when using OFTP 2 over TCP/IP, X.25/ISDN or native X.25. When used over a TCP/IP network such as the Internet, additional session level security can be achieved by using OFTP 2 over TLS.

# RosettaNet

The RosettaNet document standard is widely used in the semiconductor industry, but also in electronic components, consumer electronics, telecommunication and logistics. Based on XML, the standard defines message guidelines, business processes interface, and implementation frameworks for interactions between companies.

Defined by RosettaNet, a non-profit consortium of major computer, consumer electronics, semi-conductor manufacturers, telecommunications and logistics companies, the standard is widely used in the US, as well as much of Asia. RosettaNet is less common in Europe, due to the popularity of EDIFACT, but has become more widely accepted in recent years.

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# SWIFT

SWIFT operates a worldwide financial messaging network, exchanging messages securely between financial institutions. SWIFTNet is the infrastructure used to exchange these documents and FIN, InterAct, and FileAct are used to encode the SWIFT documents for secure, standardised and reliable transmission. The majority of interbank messages use the SWIFT network. As of 2019, SWIFT linked more than 11,000 financial institutions across 200+ countries<sup>2</sup>. The SWIFT document standard is split into four areas: Payments, Trade Services, Securities, and Trading.

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# Tradacoms

This is an early standard for EDI and was primarily used in the UK retail sector. Originally introduced in 1982 as an implementation of the UN/GTDI syntax, one of the precursors of EDIFACT, and was maintained and extended by the UK Article Numbering Association, now called GS1 UK.

The standard is now obsolescent, since the development of it effectively ceased in 1995 in favour of the EDIFACT EANCOM subsets. Despite this, Tradacoms has proved durable and the majority of the retail EDI traffic in the UK still uses this standard today.

## VDA

The VDA develops standards and best practices to serve the needs of companies within the German automotive industry. The VDA has developed various standards, such as VAD-FS (a CAD data-exchange format), to meet the needs of companies such as VW, Audi, Bosch, Continental, and Daimler AG.

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## VICS

The Voluntary Inter-Industry Commerce Standards, as a subset of ANSI ASC X12, is used by the general merchandise retail industry across North America. VICS EDI is used by thousands of department stores, speciality retailers, mass merchandisers, and their respective suppliers.

# 06

# The Anatomy of an EDI System

The fundamentals of an EDI system break down into communications and translation functions, managed by software and adhering to a specific EDI standard. Within each trading partner's system, there will be the following elements:

1. Communications Handler
2. EDI Interface
  - a. EDI Translator
  - b. Application Interface
3. Application System

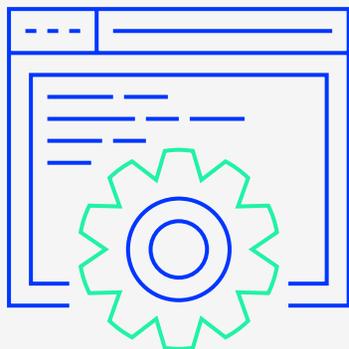
This stack can be viewed as operating top-to-bottom or vice versa depending on whether EDI transactions are being received or sent.

We will consider the process from the perspective of sending data via EDI in the steps below.

- Step 1** Preparing documents to be sent
- Step 2** Translating documents into EDI format
- Step 3** Transmit your EDI documents

# Step 1

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## Preparing documents to be sent

The first step is to collect and organise the data to be included in the documents for transmission. For example, instead of printing an invoice, your system needs to create an electronic file with the necessary information to build an EDI document. The sources of data to consider may include:

- + Human data entry
- + Exporting data from spreadsheets or databases – e.g. CSV file format
- + Reformatting electronic reports into data files
- + Enhancing existing applications to automatically create files that are ready for translation into an EDI standard
- + Investing in application software that has built-in interfaces for EDI file format output

## Step 2



# Translating documents into EDI format

The next step is to pass your electronic data through a translator (software), to convert your source data format into your chosen EDI standard format, using the appropriate segments and data elements.

If you need to integrate with multiple EDI networks, deliver documents in different EDI standards, or have need of this flexibility in the future, it is wise to consider the benefits of outsourcing this translation (and distribution) function. If outsourced to an expert partner, such as Corcentric, the benefits will be immediately apparent, through speed of deployment, lower capital expenditure, and less reliance on internal resources for delivery.

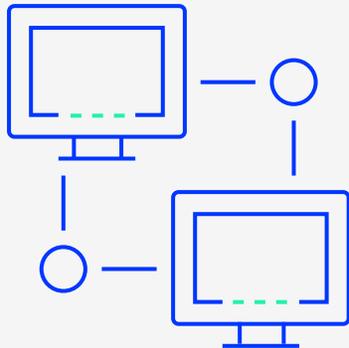
With an outsourced solution, your data sources are connected to an external translation service that translates them into the desired EDI standard. Often, this service can be combined with the capability to connect and transmit these documents to your business partners.

There are a growing number of Value-Added Networks (VANs) that will provide some assistance in translating data, but typically require it to first be formatted in a particular way. Their position in the market is defined by the network of trading partners already working with them. That said, working with an outsourced service provider, such as Corcentric, enables you to connect with these networks as and when you need, without being tied to just one network.

Alternatively, you could purchase EDI translation software to manage and maintain on your premises. This requires specialised expertise in mapping data from internal systems to the EDI data requirements. Translation software requires an initial outlay, as well as significant commitment of internal resources to deploy it. The impression of control this gives businesses used to be sufficient justification but, increasingly, factors such as agility, cost, and speed of deployment count against this traditional approach.

# Step 3

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## Transmit your EDI documents

Once your documents are translated, using the appropriate EDI standard, they are ready for transmission. In order to do this, you must decide how to connect to each of your partners.

Common connections include secure internet protocols such as AS2, outsourcing the whole of the translation and transmission (discussed in step 2), or using an EDI network provider – referred to as a VAN – to connect and deliver your EDI-formatted documents on your behalf.

# 07

# Rollout and training

Successful EDI solutions require far more than just an initial deployment, with a requirement for users to be proficient in working with the input and output from the EDI systems as well as adept at exception management when the need arises.

- 1 Internal process changes**
- 2 Redistributing time**



## Internal process changes

The automation implicit in an EDI solution greatly reduces human workload for any given business. Whilst this vastly improves efficiency, it reduces but does not remove the need for human involvement. Exceptions to standard document formats, content, or authorised trading partners will require procedures so that they can be addressed and inserted back into the workflow as required.

The speed of automatically generated documents necessitates other adjustments to processes besides the handling of exceptions. For example, in a classic, paper-based process, a trading partner typically generates and sends an invoice along with goods. Under the automation of EDI, workflow will need to accommodate the automatic issuance of the invoice when goods are dispatched.



## Redistributing time

Automated invoicing that is made possible through EDI removes manual invoice creation and delivery tasks. As a result, accounts receivable teams are able to focus on more profitable activity, such as chasing late payments and managing exceptions.

The move to more integrated and automated processes reduces opportunities for human error. However, there will still be occasions where a human touch is required to make adjustments to exceptions and to administrate the EDI system, such as adding customers and making other extensions.



# Selecting the perfect EDI or XML invoicing partner

EDI and public sector invoicing platforms can often appear rigid, evolving little over time. However, the pace of commercial change favours the agile. So when selecting a partner, think long-term.

- 1 Flexibility**
- 2 Development and Integration process**
- 3 Credibility**
- 4 Value-add**



## Flexibility

Because every business is different, internal systems and processes require a degree of flexibility and learning from any partner. Scoping out the project in detail before embarking on an EDI solution is crucial for success. Ensure you know just how flexible your partner can be if there are any additional requirements now or in the future.



## Development and Integration process

The experience of a partner becomes readily apparent during the development and integration process, which should be swift and require a minimum of involvement from the IT and accounts departments. There will always be questions and customisation, but the process itself should have a minimum impact on the day-to-day running of the business. Look for a credible partner who can show evidence of developing and integrating quickly and efficiently.

In order to determine a partner's suitability, ask for specific examples of where they developed and integrated EDI systems in a similar market, with similar software and hardware configurations. Can they clearly explain their approach and processes? Do they have customer testimonials to demonstrate previous success? And what is their estimate for how long the integration process will take?



## Credibility

Given the value and sensitivity of the data in question, you need to ensure high credibility of any partner. Primary indicators of credibility include how long they have been doing this, and who have they done it for (and testimonials to a job well done). Whilst it's not essential for a partner to have experience in your industry, they should be familiar with the EDI or other structured data standards you plan to use.

Look for case studies and client testimonials. Ask if you can talk to one of their existing customers to get their impressions of the process.



## Value-add

Beyond the core of EDI translation, connection, and transmission services, there may be other areas an EDI partner can assist your business. An ideal partner should assist beyond the basic deployment, ensuring partner integration and internal familiarity with administration and management of the invoicing platform.

When evaluating potential partners, ask about how they ensure success and what they do to support the rollout and manage exceptions within a network of trading partners.

As businesses become more reliant on data-driven insights, it's valuable to select a partner that either offers a good level of reporting and analytics within the solution or can connect invoicing data to other systems within the business to provide insight.

EDI and XML present technology standards that are here to stay... until the next innovation comes along. Businesses that not only adopt this structured automation but apply it intelligently to their workflow processes will have a competitive advantage. The key will be to identify a partner that can ensure the most effective implementation and continuously maintain and update the resources, expertise, and security of the entire system.

References:

<sup>1</sup> [EDIBasics, 2014](#)

<sup>2</sup> [Swift: About Us](#)

# 09

# About Corcentric EIPP

Corcentric EIPP is a managed service dedicated to streamlining, automating and enhancing business invoicing, from delivery, through to payment. Corcentric EIPP ensures accurate and efficient delivery of invoices to your customers in the medium which suits them.

Beyond saving time and cost through invoice automation, Corcentric EIPP enables a risk-free and seamless shift towards electronic invoicing, reducing errors and driving down DSO.

Corcentric EIPP also removes the classic challenges of document storage and retrieval for auditing and compliance. Businesses depend on Corcentric EIPP to provide secure online access to their document distribution history, facilitating ease of reporting, performance analysis and proof of delivery along with a range of other document management functions.

**Headquartered in the US, Corcentric helps more than 2,000 of the largest companies leverage smarter technology and services to reduce operating costs, improve cash flow, and unlock the hidden value within their enterprise.**



**corcentric™**

**WHAT COULD IT DO  
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Let us show you EDI and XML  
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