

Achieving Trading Partner Integration Using SEEBURGER's BIS: AS2 Spoke



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Executive Summary

Data exchange among trading partners continues to evolve. What's more, this flow of information provides the foundation for efficient business operations. From paper-based data exchange, companies moved to automate communications by implementing electronic data exchange (EDI) systems. With the advent of the Internet, even more cost-effective solutions became available.

This solution brief explores this evolution, and examines the development of the AS1 and AS2 standards for data exchange. The paper looks at how one industry leader, Whirlpool, implemented an AS2 solution to enable its smaller trading partners to automated data exchange. Finally, the brief provides an in-depth review of SEEBURGER's AS2 stand alone solution.

Background

The rising cost of EDI

Most modern companies have encountered the challenges involved with effectively exchanging business data and documents with their trading partners. Often the volume of this business data is so significant that manual processes become too costly. As a consequence, companies have implemented more cost-effective, automated processing solutions. One such solution is an EDI (Electronic Data Interchange) system, which automates communications between all trading partners using classical EDI document standards such as EDIFACT, ANSI X12, TRADACOM, and others.

Basically EDI utilizes two main methodologies to perform data exchange: 1) via a Value Added Network (VAN) service or 2) with a direct Point-to-Point connection.

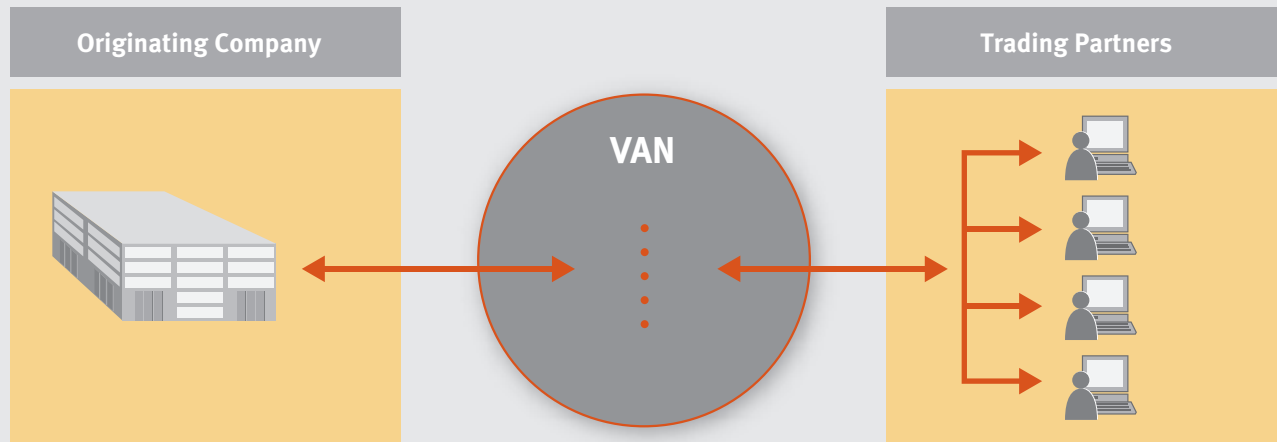
VAN Networks

VAN networks feature a simple connectivity model and provide data routing from the originator to the destination partners as part of the service (See Figure 1). Essentially, VAN systems are mailbox systems, where the originator posts messages; the VAN service then organizes those messages and delivers them to the respective mailboxes of the appropriate recipients.

Currently, there are several VAN providers that offer their services either nationally or internationally. Quite often, a service is only utilized within a specific branch or business type. VAN providers charge for their services in various ways: some of them price services based on data volume, some on the number of transmissions (documents), and some on the number of trading partners that exchange dedicated messages. These fee structures can result in significant expense, prompting users to avoid certain features (e.g., message acknowledgments) due to added costs. Furthermore, horizontally-oriented businesses often support a multitude of different VAN networks in order to communicate with all their trading partners. Even so, companies may find they deal with trading partners who are not able (or willing) to use a VAN network.

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FIGURE 1: VAN networks provide simple connectivity. They are essentially a mailbox system where the user posts messages; the VAN service splits those messages and delivers them to the recipients' respective mailboxes.



Point-to-Point Connections

With point-to-point connections, companies must provide and configure a direct dial-in connection that can link to every single trading partner (See Figure 2). Although this avoids the costs associated with VAN networks, companies still incur costs associated with dial-in configuration and provisioning as well as (long distance) call costs. Furthermore there may be availability and reliability issues associated with the point-to-point connections.

Regardless of methodology, classic EDI data transport is not very cost-efficient due to either VAN provider fees or long-distance call fees. When additional issues, such as availability, reliability, and data security are considered as well, the shortcomings of classic EDI systems become glaringly apparent.

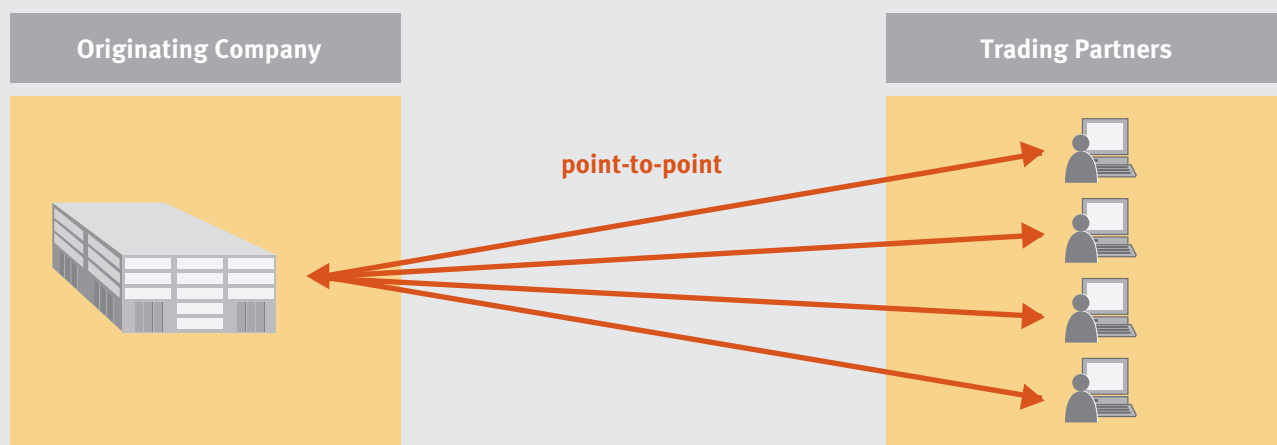


FIGURE 2: With point-to-point connections, the company establishes individual direct connections with each trading partner.

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Improved Standards for Data Exchange:

AS1 and AS2

To address the shortcomings of classic EDI, the Internet Engineering Task Force (IETF) established a work group called EDIINT and tasked it with the development of recommendations for securely transferring EDI data over the Internet. This work group has produced 2 draft standards for this purpose, called Applicability Statement 1 (AS1) and Applicability Statement 2 (AS2), the standard explored in this paper. This document will not cover Applicability Statement 3 and 4. The former provides for the secure exchange of EDI/B2B data using the Simple Mail Transfer protocol (SMTP) over the Internet. AS2 provides for the secure exchange of EDI/B2B data in a two-step approach. First, it uses the Secure Multipurpose Internet Mail Extensions (SMIME) to encapsulate the EDI/B2B data and then the Hypertext Transfer Protocol (HTTP) to transmit the data over the Internet.

The basic design goal was to define standard procedures for EDI data including confidentiality, authentication and non-repudiation of receipt as well as non-repudiation of origin. AS2, which builds on existing and established Internet technologies, can be used to transport all types of data including but not limited to: XML, EDI, text, binary and more.

By using AS2 to exchange data with trading partners, companies can realize a range of benefits:

- Eliminate costs of VAN services or long distance calls
- Enjoy 24/7 availability of the Internet
- Ensure secure and reliable data transmission over the Internet
- Protect data with authentication features (e.g., digital signatures) that prevent data manipulation
- Ensure data security at all times via encryption
- Support more complete data processing with the ability to exchange acknowledgments related to data transfer and receipt

Utilizing the Internet-based AS2 solution for EDI exchange can offer a very fast return on investment (ROI) for companies that support many partners with high transaction volumes or that use VAN services or point-to-point connections.

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How AS2 Works

The purpose of the EDIINT AS2 (EDI over INternet) protocol is to allow the secure exchange of EDI data over the public Internet utilizing HTTP as the transport protocol. Hence, utilizing AS2 for data exchange requires a persistent or continuous Internet connection as a foundational requirement (See Figure 3).

AS2 Message Types

AS2 uses two different message types: the actual payload message and the Message Disposition Notification (MDN).

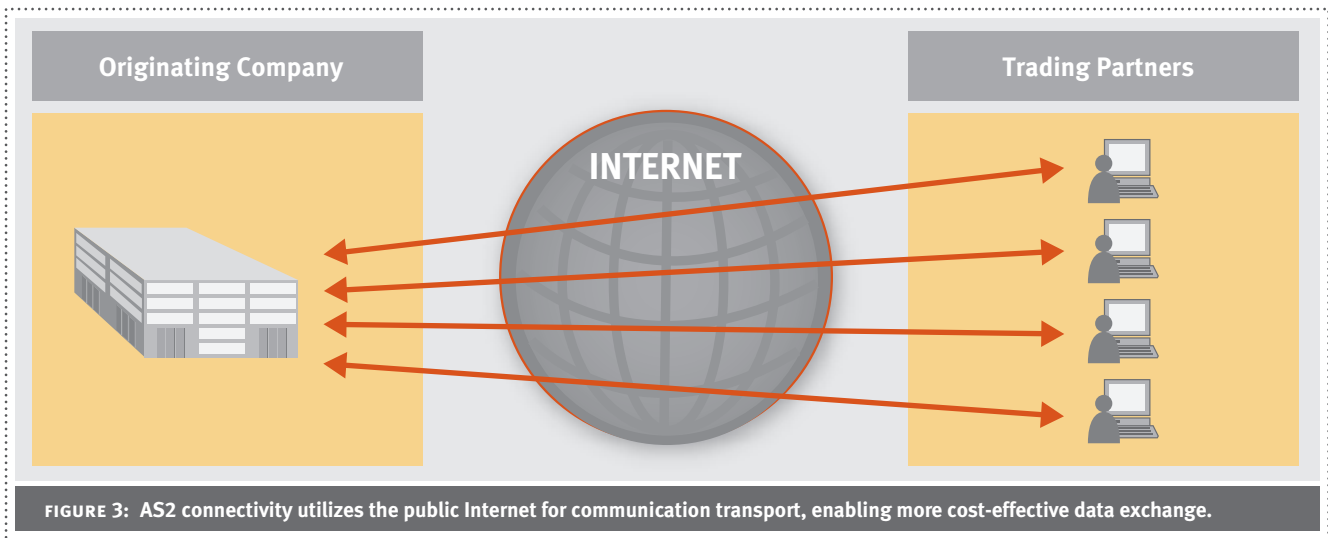
The payload message encapsulates an EDI file so that it can be transmitted via HTTP. Additionally, the payload message may be compressed, encrypted or digitally signed by the sender.

The purpose of the MDN is to acknowledge the receipt of a payload message. An MDN contains machine-readable information about the delivery status of the

payload message. For example, it contains the message digest (MIC) of the payload message as calculated by the recipient. An MDN may be signed, in which case a recipient can authenticate the sender of the MDN and verify its integrity. A valid, signed MDN together with a valid MIC reported by the MDN can be used by the sender of the payload message to claim “non-repudiation of receipt” (NRR) of the payload message.

AS2 Message Exchanges

In the simplest example of an AS2 message exchange, a sender packages the EDI payload file into an AS2 message structure and sends this message via HTTP to the recipient. Optionally, the sender may compress, sign, or encrypt the AS2 message. In this simple example, the sender receives no additional information, such as confirmation or acknowledgment, about the status of the message on the recipient's side.



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If the sender wants to ensure that the message has been transferred, unmodified, and that the recipient has been able to decompress or decrypt the message, the sender must request an MDN from the recipient. In this case, the sender indicates the request for an MDN together with the transmission of the payload message.

In addition, there are two different modes in which an MDN may be delivered: 1) Synchronous, in which the MDN is delivered together with the HTTP response to the HTTP request which carried the payload message; or 2) Asynchronous, in which the MDN is delivered at a later time after transmission of the payload message.

In the asynchronous mode, the sender must indicate the address to which the MDN shall be delivered. The asynchronous MDN may be delivered by a separate HTTP request to the sender's web server or via E-Mail to a mailbox.

In order to identify the sender of an AS2 message, communicants must agree upon unique identifiers, referred to as AS2-IDs.

The final requirement for an organization to implement AS2 for data exchange is a software package that provides EDIINT AS2 capabilities.

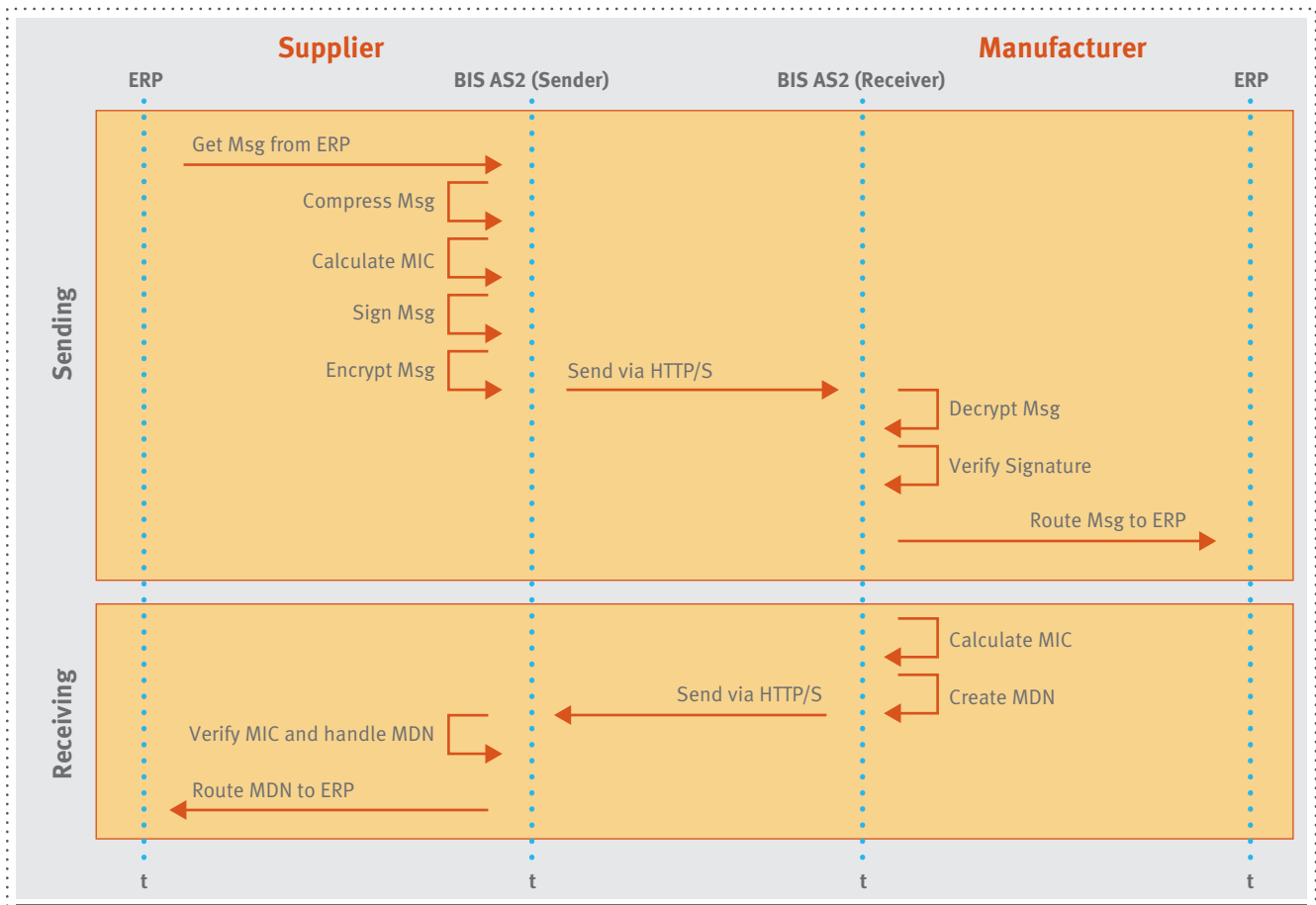


FIGURE 4: This sequence diagram illustrates the steps involved in data exchange via AS2.

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Case Study: Using Innovative AS2 Spoke Solution Enabled Whirlpool to Automate Communications with Hundreds of Smaller Suppliers

Whirlpool wanted to consolidate its internal integration technology as a whole, since older technologies were complicating the company's ability to innovate and deliver more expansive services to its trading partners and customers. This goal included refining its systems down to a single SAP central platform for master data, enterprise architecture integration (EAI), and trading partner integration.

For the latter, Whirlpool wanted to enable data exchange with more trading partners and at a lower cost. To achieve this, the company rolled out the SEEBURGER BIS: AS2 spoke solution to both trade customers and distributors who were previously unable to perform EDI or AS2 communication.

The spoke unit allows the company to give its non-EDI trading partners the ability to communicate with Whirlpool using AS2, to translate their application

formats, and to integrate into their back-end systems via File ports, DB access or API.

The SEEBURGER Spoke unit was critical for the successful Maytag migration and infrastructure, after Whirlpool acquired Maytag in 2005. The company is using this platform to integrate both internal systems as well as trading partner information.

The result of these efforts allowed Whirlpool to deploy new trading partners within days instead of weeks, reduce VAN charges, provide accurate data to all parties, reduce manual processes with trading partners, and distribute data throughout its trading partner community.

SEEBURGER's BIS: AS2 Solution for Data Exchange: An In-Depth Review

SEEBURGER offers two fully compliant AS2 solutions. These solutions have undergone and passed AS2 interoperability testing (hosted by the Drummond group):

- Java based AS2 solution for stand alone use or for integration in an existing B2B/EDI infrastructure
- AS2 module for use with SEEBURGER's Business Integration Server (BIS)

SEEBURGER's BIS: AS2 stand alone solution is a state of the art, purely Java based application that implements the full AS2 specification, including, but not limited to, the following topics:

- Message security
- Signatures
- Encryption
- Non-repudiation of origin
- Non-repudiation of receipt
- Message compression
- Synchronous and asynchronous delivery notifications (MDN)

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Beside the AS2 protocol-specific features, SEEBURGER's BIS: AS2 stand alone solution offers a broad set of functionality to provide a complete and sophisticated solution. Functions include the following:

- Administration
- Trading partner management
- Monitoring of message exchanges and trading partners
- Backend integration services (DB, File, Batch, Script, API)
- Transformation services, including the ability to transform messages from in-house formats to partner-specific formats and vice versa. A wide range of relevant formats are supported (EDIFACT, ANSI X12, CVS, INHOUSE (Flat files), XML)

Administration

SEEBURGER's BIS: AS2 "stand alone" solution serves its entire administrative and monitoring interface through a browser-based GUI. This enables users to remotely administer and monitor AS2 processes from any location with a Web browser. The administration and monitoring function utilizes a secure link via the HTTP/S protocol. SEEBURGER's BIS: AS2 "stand alone" also offers an integrated, role-based user management to assign specific access roles and levels.

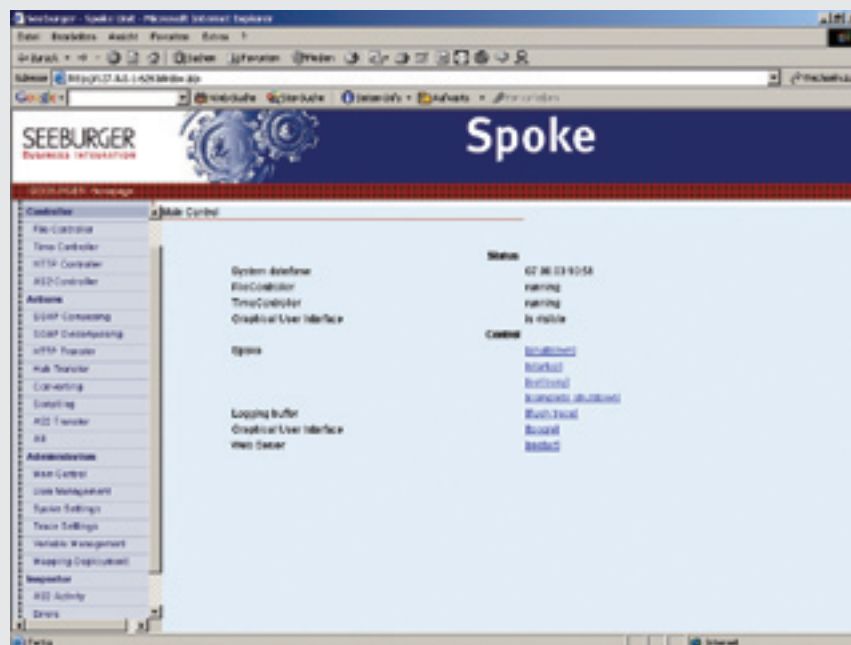


FIGURE 5: Users can conveniently access AS2 processes via SEEBURGER's browser-based interface, enabling remote administration from any location.

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Trading Partner Management

SEEBURGER's BIS: AS2 solution fully supports the management of a company's AS2 communications with its partners suppliers through master and trading partner data.

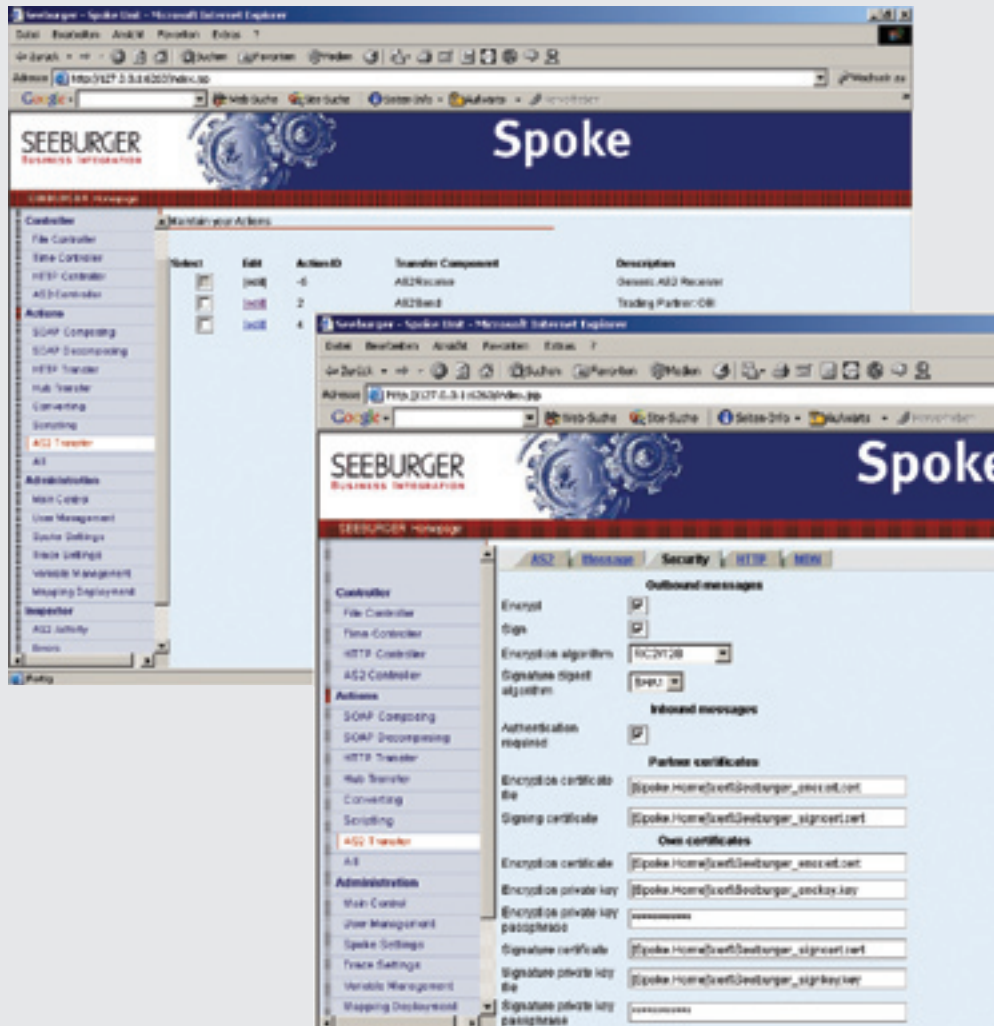
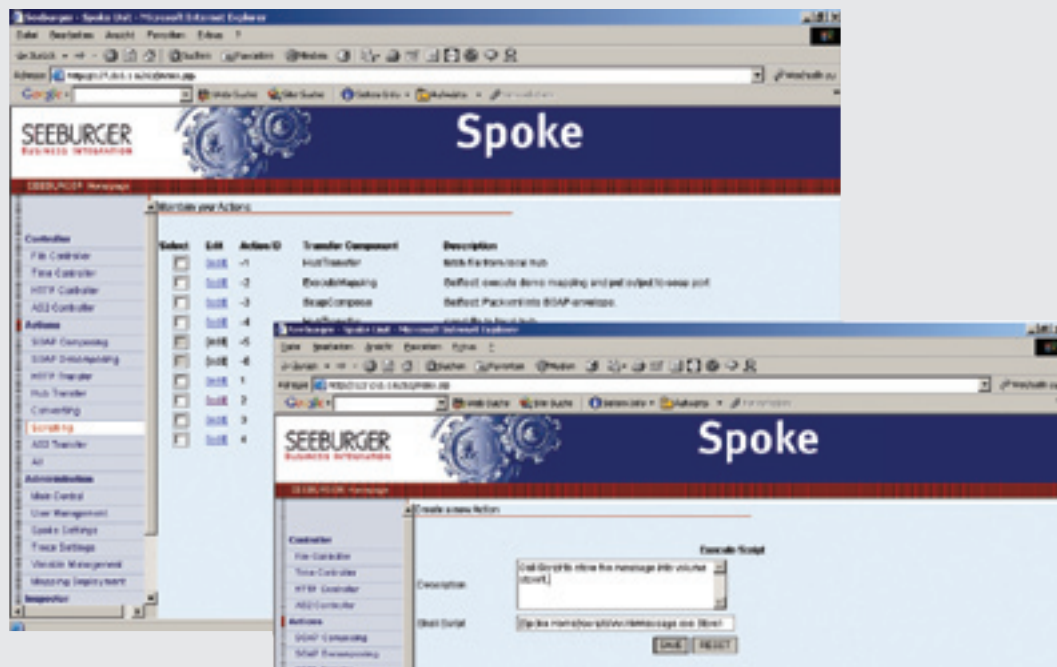


FIGURE 6: The AS2 Trading Partner setup screen enables users to manage trading partner communication requirements by defining the appropriate settings.

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FIGURE 8: The BIS: AS2 “stand alone” solution enables users to define and execute custom scripting.



Integration Services

The ability to integrate AS2 exchanges into backend ERP systems is critical to achieving a fully automated and cost-effective data exchange with your trading partners. SEEBURGER's BIS: AS2 “stand alone” solution provides the flexibility to integrate AS2 communication into already existing EDI/B2B infrastructures or to backend or ERP applications by offering the following integration services:

- **DB Integration**

Enables users to directly integrate received messages into any JDBC supporting database

- **Script Integration**

Allows users to include customized shell scripts into the AS2 process

- **Batch Integration**

Provides the functionality to interact with SEEBURGER's BIS: AS2 “stand alone” solution directly from batch processes

- **File Integration**

Defines and monitors folders, either on local or shared file drives, so that when messages are dropped into folders, the application will receive the event and execute the next appropriate action (e.g., send the message, forward it to another application).

- **API**

As the most advanced of the integration options, the Java-based, SEEBURGER-provided API allows users either to control and drive every aspect of this AS2 solution from within the company's own application, or to fully integrate the AS2 solution into those applications.

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Transformation Services

Unlike many other AS2 solutions, SEEBURGER's BIS: AS2 "stand alone" solution can manage virtually all document conversions by providing a fully functional EDI/B2B converter. So if a user needs to send a specific document format (e.g. an ANSI X12) to a trading partner, but the backend system can only generate another specific format (e.g. Fixed record file); SEEBURGER's BIS: AS2 "stand alone" can perform the conversion. SEEBURGER's BIS: AS2 "stand alone" solution supports conversions for, but not limited to, formats such as EDIFACT, ANSIX12, XML (all Schema or DTD based messages), CVS, and INHOUSE (flat files like SAP IDOCS).

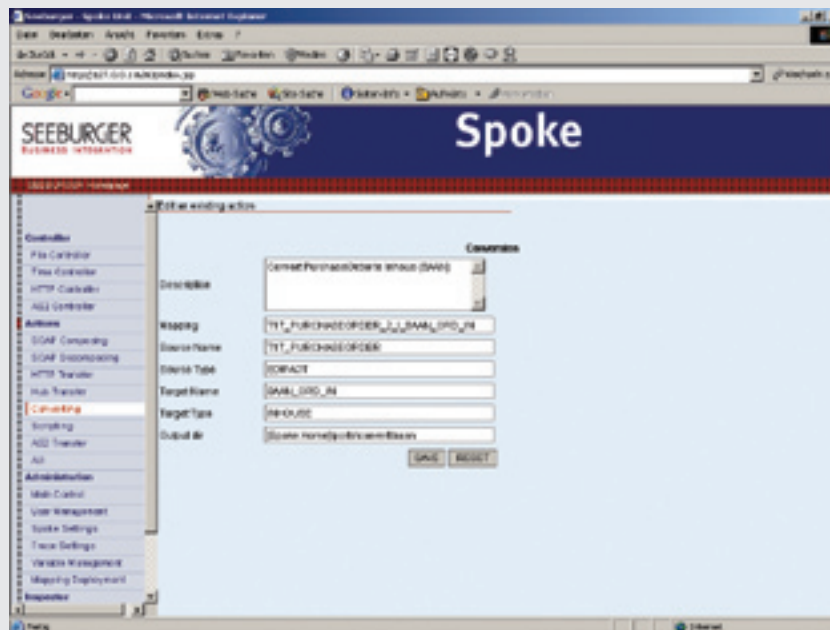


FIGURE 9: The BIS: AS2 "stand alone" solution enables users to define the conversion step during both in- and out-bound processes.

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Security and Reliability

EDI/B2B data typically contains sensitive information (e.g. inventory reports, prices, and more), data security and integrity is crucial. This is especially true since the data is transmitted via the Internet. AS2 was designed from the ground up to provide robust security by supporting digital signature and data encryption technologies. SEEBURGER's BIS: AS2 "stand alone" solution fully supports this requirement, and adds additional role-based user management capabilities, such as role-based application permissions.

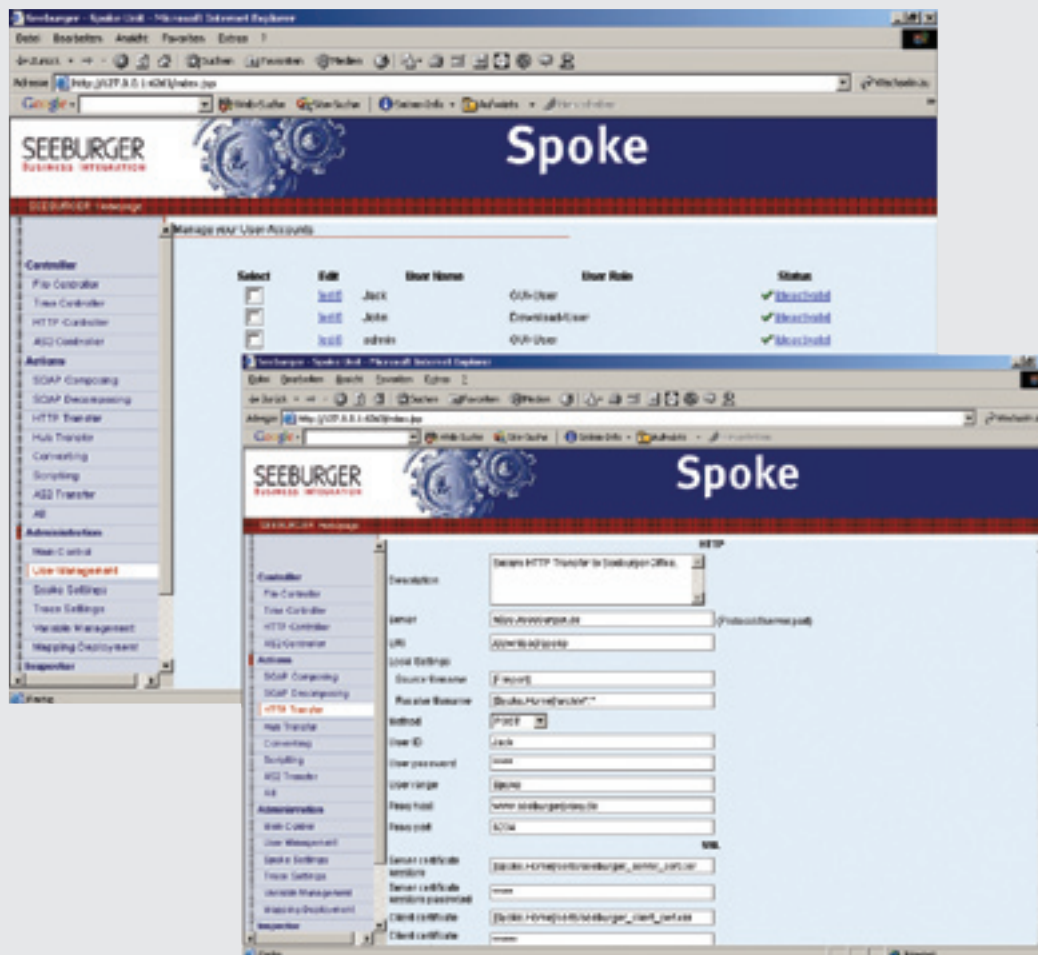


FIGURE 10: Users can easily define specific access rights to maintain stringent data security.

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BIS: AS2 – Feature Overview

TECHNOLOGY	
Java	Pure java based solution
OO-Design	Modern OO-based design
PLATFORMS	
Windows	WIN NT/ WIN 2000/ WIN XP
LINUX	Red Hat, Suse
SOLARIS	
Java	All platforms with JDK >1.4 are supported.
NETWORKS	
TCP/IP	All TCP/IP based networks
INSTALLATION	
Automated installation	Using Java WebStart technology
Automated update	Using Java WebStart Technology No need to do update manually.
Automated/Preset configuration	Automated distribution of a preset configuration from a central point of administration
ADMINISTRATION	
Browser based	Complete access to the application by using your local Browser
No installation needed	No need to install a local GUI client
Integrated User management	Restrict access rights by using the integrated user management
“Remote” Administration	Remote administration and access
Customizable	Is easy to change the look of the GUI to your Corporate design
Centralized error handling	Customizable error-reports and actions
”Application firewall”	Easy restriction of application access rights

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SECURITY	
Transport Security	SSL
Data-encryption	RSA, DSA, IDEA
Digital Signatures	RSA, ElGamal
Authentication	Authentication of users and roles
DATA-TRANSPORT	
Acknowledgements	Acknowledgements for sending/receiving messages
Deliver Exactly Once	Recognition of duplicates
Retry	Configurable retry in case of connection failure
Archiving	Optional archiving of send/received data in file system
Dail-In Support	Support for "dial-I" (RAS)
CONVERSION CAPABILITIES	
XML	All Schema/DTD based messages
INHOUSE	All "fixed record" based messages (e.g. SAP IDOC)
CSV	All "delimiter separated values" messages (e.g. Excel CSV)
EDIFACT	All messages based on EDIFACT
ANSI X12	All messages based on ANSI X12
INTEGRATION CAPABILITIES	
Databases	All JDBC capable databases
Script/Batch-Interface	Possibility to execute external scripts
File	Observes directories for incoming data and sends them according to the configuration.
WebServices/SOAP	Possibility to handle SOAP messages
API	A SDK is delivered to allow application integration
Connection to SEEBURGER BIS	Connection to Seeburger BIS for EDI/EAI

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Conclusion

Today's companies can continue to realize the benefits of automating business processes by implementing cost-effective systems to facilitate electronic data exchange. With AS2, these benefits include:

- Eliminating costs of VAN services or long distance calls
- Providing 24/7 availability via the Internet
- Ensuring secure and reliable data transmission
- Protecting data with authentication features to prevent data manipulation
- Ensuring data security at all times via encryption
- Supporting more comprehensive data processing with the ability to exchange acknowledgments related to data transfer and receipt

Furthermore, companies that support many partners with high transaction volumes or that use VAN services or point-to-point connections will realize a swift return on investment (ROI) utilizing Internet-based AS2 solutions.

SEEBURGER's BIS: AS2 stand alone solution offers a broad set of functionality to provide a complete and sophisticated solution that goes beyond the AS2 protocol-specific features. By providing this broad functionality, the SEEBURGER solution enables companies to enhance the integration of data exchange throughout the whole network of business processes.

About SEEBURGER

SEEBURGER is a leading provider of global business integration solutions designed to optimize transactions throughout the extended enterprise by automating trading relationships with all partners regardless of their size and technical resources. Launched in 1986 to provide integration solutions to the automotive industry in Germany, the company today is ranked among the top business-to-business gateway providers by industry analysts, and serves more than 7,500 customers in 50 countries and more than 15 industries through its flagship BIS and related products and services. SEEBURGER has global offices in Europe, Asia Pacific and North America.

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