Sterling e-Invoicing

Product Concepts Guide

Version 1.3

Sterling Commerce

An IBM Company

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Sterling e-Invoicing

Electronic invoicing (e-Invoicing) allows you to eliminate the paper trail that companies must maintain to comply with Value Added Tax (VAT) laws. Compared with Electronic Data Interchange (EDI), e-Invoicing not only facilitates the actual invoice transaction but also the audit requirements from a tax perspective. Thus, you do not need to maintain a paper record of invoices for tax purposes. Sterling e-Invoicing gives you the benefits of electronic invoicing while also being compliant with these tax laws. Sterling e-Invoicing also indirectly interoperates with providers of non-TrustWeaver™ e-Invoice solutions. These other providers may act as a supplier or a buyer. Sterling e-Invoicing does not connect to these providers directly, but accepts the invoices they send, and sends them in an acceptable format.

This document describes the product concepts for Sterling e-Invoicing.

Prerequisites

The following are prerequisites for using Sterling e-Invoicing:

✦ The audience using this software should be familiar with the application, e-Invoicing, TrustWeaver, and Value Added Tax (VAT) compliance regulations.

Note: This documentation is not intended to explain e-Invoicing or how to use TrustWeaver software.

✦ You must have purchased an e-Invoicing license for use with the application.

Overview

Sterling e-Invoicing uses the e-signature method of compliance. This is the digital signature approach in which the invoices are digitally signed by the seller using keys approved by the government of that country, and then the signature is verified by the buyer. Future audits can be verified for their authenticity and integrity by re-verifying the signatures on the archived invoices. The e-signature method of compliance is the preferred option of the tax authorities. It is a technical solution and it provides an unequivocal technical guarantee of the authenticity and integrity of the invoice.

Sterling e-Invoicing provides the following:

✦ A supplier process, supporting invoice validation and signing.

✦ A buyer process, supporting signature verification and invoice validation.

✦ An archive of the invoice functions enable a customer or a tax auditor to search, view, and report on invoices and also to re-verify the signature on those invoices in the event of an audit.

✦ Timestamping facility for archived invoices having country code IT (Italy), which is used in the audit trail of an invoice.

✦ Mapping functionality that enables you to translate the invoice from any supported EDI format to the canonical invoice format.

Sterling Commerce has partnered with TrustWeaver to provide e-signature signing and verification through its on-demand service. TrustWeaver offers products and on-demand services that support all of the necessary hardware and certificate authorities.

Signature Verification and Invoice Validation

Signature verification is performed through the TrustWeaver on-demand service. The EU-115 directive states that e-Invoices should contain certain items of information that are necessary for tax purposes. Sterling e-Invoicing ensures that invoices contain the mandatory data to be compliant. This information includes the invoice number, date, supplier VAT ID, Buyer VAT ID, currency, and line item details (description, quantity, price, and VAT amount).

Validation is achieved by mapping the invoice received from a customer to a canonical invoice format in which the fields that are mandatory are checked against the canonical format.

Note: Canonical format is a format for storing hierarchical names that displays the hierarchical attribute of each component of the name.

Customers must provide a map with their invoice format so that it can be translated to the published canonical format. The canonical version of the invoice is also used by the invoice archive functionality to extract the necessary business content from the archive to support a human-readable view format and reports for the invoice.

Archive Methods

Sterling e-Invoicing supports three methods of archiving invoices:

✦ Integrated archive: In this method, invoices are stored in a database that is managed by Sterling e-Invoicing and the archive is managed automatically. Also, Sterling e-Invoicing provides a user interface to support viewing the archive data.

✦ External archive: In this method, the customer uses Sterling e-Invoicing to sign and verify invoices, but the customer archives the invoices by storing the data to enable the tax auditors to review it in the future.

✦ Custom/Trading partner archive: In this method, invoices are signed or verified by TrustWeaver software on behalf of a trading partner but not archived on their behalf. If you choose to send this data to your trading partners, Sterling e-Invoicing gives you the ability to send the necessary data to your trading partners so that they can archive it.

Typically, an installation of Sterling e-Invoicing uses either the integrated archive or the external archive for invoices that are being stored by the host of Sterling e-Invoicing. The installation may also use the trading partner archive for some of the trading partners regardless of the archiving solution chosen. You can use a combination of integrated archive and trading partner archive or external archive and trading partner archive.

Auditor functions

Auditor functions can be used by both the staff within your company and by tax auditors. The audit functions enable you to search for invoices and perform the following actions:

✦ View a human readable representation of the invoice.

✦ View or download original signed invoice data.

✦ View or download invoice verification details.

✦ Create and download human-readable invoice summary and detail reports.

✦ Re-validate invoices and view or download the re-validation report.

Re-validation of invoices will invoke the TrustWeaver Request service. Since the archive may contain data for more than one legal entity, access to the invoice data in the archive is restricted based on permissions.

Permissions control the following:

✦ Legal entities that a user may access.

✦ Functions that a user can perform on the invoices.

If a tax auditor needs to access data using Sterling e-Invoicing, the tax auditor is assigned the necessary permissions to access only the integrated archive and not any other functionality in the application.

Supplier and Buyer Processes

The supplier and buyer processes that manage the flow of invoices through the entire e-Invoicing process are provided when Sterling e-Invoicing is installed, and require no user modification. These processes:

✦ Implement the necessary legal separation required for supplier and buyer e-Invoice processing so that the supplier-side processing is distinct from buyer-side processing.

✦ Perform the signing, verification, validation, and archiving of invoices.

You configure the processing options for the supplier and buyer using e-Invoicing agreements that are:

✦ Configurable objects that relate two organizations involved in an electronic invoice transaction and store the relationship options.

✦ Versioned, importable, and exportable like other application resources.

Mapping

Mapping functionality enables you to translate an invoice from any supported EDI format to the canonical invoice format. Some of the parameters in the canonical format are mandatory for the validation of the invoices and if these parameters are not present in your invoice, the translation fails.

Note: We provide you with a sample map (X12_810_To_Canonical.mxl). This map is located in the **<Map Editor Install Dir>/Samples/maps** directory. You can use this map as an example to create your map for converting your invoice format to the canonical format.

Interoperability

Sterling e-Invoicing interoperates indirectly with providers of non-TrustWeaver e-Invoice solutions. These other providers may act as a supplier or a buyer. Sterling e-Invoicing does not connect to these providers directly, but accepts the invoices received, and send invoices in an acceptable format.

User Permissions

Sterling e-Invoicing provides user permissions that can be assigned as necessary, so that you can access the user interface and perform different operations based on the permissions assigned to you.

These user permissions ensure the security of the data, and separate the data into supplier and buyer sets.

The e-Invoicing-specific permissions enable users to:

✦ View invoices

✦ Re-validate invoices

✦ Download invoices

✦ Create and edit agreements

✦ Perform operations on behalf of all legal entities

✦ Perform operations on behalf of a specific legal entity (requires separate permission to be set up per entity, by the operator of all the entities)

Note: To perform an operation on behalf of a buyer or a supplier, the VAT ID of the buyer or the supplier must be used to create this permission.

Each operation performed through the user interface requires the appropriate permission to be assigned before carrying out its operation. You are notified on-screen of a failed operation if this notification is set up in the application.

Access to Sterling e-Invoicing by Tax Auditors and End Users

Sterling e-Invoicing provides you with a user interface from which you can perform various functions, such as searching, downloading, viewing, reporting on, and re-validating invoices. The display of the user interface depends on the permissions assigned to you. For example, for a tax auditor, the user interface displayed depends on permissions that have been assigned to the tax auditor login. If the tax auditor is only required to audit the supplier process, then only the supplier process reports can be downloaded and viewed. The same rule applies to the buyer process. The tax auditors may download a human-readable format of the invoices that contains the raw invoice, detail information, and audit trail. The user can download the invoice summary report, the human-readable format, re-validate invoices, and download invoice details. End users can edit the following types of information if they have the appropriate permissions assigned to their account:

✦ Agreements

✦ Partner relationships

✦ Maps

✦ Connection to TrustWeaver

✦ Global e-Invoice Configuration

Application and Sterling e-Invoicing

The following table briefly describes the components used by Sterling e-Invoicing and their functionality:

Functionality	Details
Services	◆ eInvoice Agreement Lookup service is used to find an e-Invoice agreement.
	◆ eInvoice Archive service is responsible for archiving e-Invoices. Based on the type of archive selected, this service either archives electronic invoices in a canonical format to a database or provides the archive information to an external system through a business process.
	◆ The eInvoice Archive Status Update service updates the operational status of an invoice to either Failed or Info if the invoice is stored in the archive. It also adds a description explaining why the status was updated.
	◆ eInvoice Duplicate Check service checks the e-Invoicing internal archive database for duplicate invoices. When checking the duplicate invoices, the Transaction Register is checked first for the duplicates, and then the archive database is checked.
	◆ eInvoice Event service is responsible for sending e-mail notifications to the buyer or supplier and to Sterling e-Invoicing administrator in case of any failures during the business process execution.
	◆ eInvoice Time Stamping Request service, when invoked, searches for all the invoices that have a supplier or buyer VAT ID as IT (Italy) and that are not yet timestamped.
	◆ TrustWeaver Request service is used to construct a SOAP request to be sent to the TrustWeaver e-Invoice server for the purpose of signing, validating, timestamping, or re-validating an invoice.
	◆ TrustWeaver Response service is used to parse the TrustWeaver e-Invoice Server Response sent using HTTP.
	◆ Semaphore service limits the number of open connections that can be established with the TrustWeaver server.
Predefined business process	To help you accomplish your business goals, Sterling e-Invoicing provides predefined business processes. These predefined business processes are initiated by services during e-Invoice processing and do not require you to modify them. They are:
	◆ eInvoiceRevalidation enables the validation of the e-Invoice.
	◆ EinvoiceTimeStamping searches for the invoices having the country code IT (Italy) and that are yet to be timestamped. It then performs the timestamping of the invoices.
	◆ eInvoiceBuyerProcess enables validation of the signed invoices, translation of invoice into canonical format, and archival of invoices.
	◆ eInvoiceProcess does an agreement lookup and invokes the supplier and/or buyer process depending on the values in the agreements.
	◆ eInvoiceSupplierProcess enables the signing of the invoices, translation of invoice into canonical format, and archival of invoices.
	◆ TrustWeaverEInvoicing creates the SOAP request and sends it to the TrustWeaver server and gets the SOAP response from the TrustWeaver server.

Functionality	Details
Map Editor	- Map Editor wizard enables you to generate a file layout using the EDI format that you select. - Properties dialog boxes that enable you to define and modify the map components. - Autolink function automatically creates links between input and output fields that have the same name or business name. - Additional mapping operations as needed.

e-Invoice Buyer and Supplier Processes

When Sterling e-Invoicing processes an invoice, which begins when the eInvoiceProcess business process is invoked. The eInvoiceProcess looks up the agreement between the buyer and supplier to determine the required processing options. If supplier processing is enabled, the eInvoiceProcess invokes the supplier process, which sends the unsigned invoice to the TrustWeaver server to be signed. If buyer processing is enabled, the eInvoiceProcess invokes the buyer process, which sends the signed invoice to the TrustWeaver server to be validated. If both supplier and buyer processes are enabled, the eInvoiceProcess invokes the supplier process first and then the buyer process. Archiving is performed for the signed invoice on the supplier side, and the validated invoice on the buyer side. The archive also contains the detailed information of the invoice, which includes the policies used while signing or validating the invoice.

Logical Separation of the Buyer and Supplier Processes

There is a legal requirement that the supplier and buyer processes are separate. Sterling e-Invoicing inbound and outbound process flows separate the buyer and supplier processes in the following manner:

1. If both the buyer and the supplier processes are executed at the same time based on the configurations in the agreements, no part of the process flow can be skipped. The supplier process is executed in full to sign the invoice, and the buyer process is executed in full to validate the signed invoice.

2. The actual buyer and supplier processes are implemented as distinctly separate business processes. These business processes are run in an identical manner regardless of whether both the buyer and the supplier processes are being executed or just one of the processes.

3. The buyer and supplier processes communicate with the TrustWeaver server to perform the signing and validation of the invoices. TrustWeaver does the signing and validation process using separate machines (either virtual or physical), and those machines are always managed by separate groups of people.

4. From a tax auditor perspective, the user interface allows the archived invoices to be viewed for only the supplier side, or only the buyer side, thus maintaining the separation. The necessary user permissions are assigned so that the tax auditor can view only the specified invoices.

Supplier Process

The Supplier Process involves signing the invoice. This process is invoked by the same eInvoiceProcess business process that invokes the buyer process. The supplier process sends the invoices to TrustWeaver server using the TrustWeaver Request service and the HTTP service protocol to sign the invoices. The TrustWeaver Request service creates the invoice document in a SOAP format out of the raw invoice and the HTTP service protocol sends the document for signing by establishing a connection with the TrustWeaver server. Once the document is signed, it is passed through the TrustWeaver Response service to get a raw invoice out of the SOAP format and separate the signature from it. The supplier process also supports translation of the invoice into canonical format, and archiving of invoices (or packaging of the invoices to the supplier archiving system, if using a third-party archiving system).

The SupplierProcess business process needs the following inputs:

✦ PrimaryDocument, which is the raw invoice to be processed.

✦ Agreement information in ProcessData set by the Agreement Lookup service.

The output of this business process is the signed invoice, while logging of the event and archiving is done in the execution of the process. This business process does not invoke another business process to do further processing, because it will be done by the eInvoiceProcess.

The basic flow implemented for this business process is as follows:

1. Invokes the TrustWeaver signing process synchronously. In case of errors, the TrustWeaver business process logs the event and sends e-mail notifications. If errors occur at this stage, further processing is stopped.

2. Invokes the Translation service to translate the invoice to canonical format, using the map information provided by the eInvoice Agreement Lookup service. If an error occurs at this stage, the eInvoice Event service is invoked to send e-mail notifications and log the errors. The process is stopped.

3. Invokes the eInvoice Archive service.

4. Invokes the external or custom/trading partner archive process if configured.

Errors are generated if any of the following scenarios occur:

✦ Agreement object is invalid or not found by the eInvoice Agreement Lookup service

✦ Failure in signing of the e-Invoice by the TrustWeaver server

✦ Failure in translation to canonical format

✦ Duplicate invoice number detected

✦ Failure to archive

✦ Failure while writing archived data to disk (if archiving fails, or if a third-party archive is used)

Buyer Process

The buyer process supports the buyer-side e-Invoicing flow, including invoice validation, translation of the invoice into canonical format, and archiving of invoices.

1. The buyer process sends the invoices to TrustWeaver server using the TrustWeaver Request service and the HTTP service protocol to validate the invoices.

2. The TrustWeaver Request service creates the invoice document in a Simple Object Access Protocol (SOAP) format out of the raw invoice and the HTTP service protocol, and sends the document by establishing a connection with the TrustWeaver server.

3. Once the document is validated, it is passed through the TrustWeaver Response service to obtain a raw invoice in the SOAP format and separate the signature from it.

There is no configuration user interface for the buyer process. It is based on the VAT IDs or Lookup IDs (as well as the message type, that allows you to specify the type of message exchanged if you have multiple agreements with the same supplier/buyer information but use different message types) of the sending and receiving trading partners configured in the agreements.

The basic flow for the BuyerProcess business process is as follows:

1. It needs the following inputs:

    ◆ PrimaryDocument with the signed invoice to be processed.

    ◆ Agreement information in ProcessData set by the Agreement Lookup service.

2. Invokes the TrustWeaver validation process synchronously. In case of errors, the TrustWeaver business process logs the event and sends e-mail notifications. If errors occur at this stage, further processing is stopped.

3. Invokes the Translation service to translate the invoice to canonical format, using the map information provided by the eInvoice Agreement Lookup service from step 1. If an error occurs at this stage, the eInvoice Event service is invoked to send e-mail notifications and log the errors. The process is stopped.

4. Invokes the eInvoice Archive service.

5. Invokes the external or custom archive process, if configured.

To ensure proper processing based on the service level agreement (SLA), the eInvoiceProcess has to perform different functions. The basic flow implemented for this business process is as follows:

1. The eInvoiceProcess needs the following inputs:

    ◆ PrimaryDocument with the invoice to be processed (raw or signed depending upon the configuration).

    ◆ SupplierVAT, which is the ProcessData parameter that indicates the Supplier VAT ID.

    ◆ BuyerVAT, which is the ProcessData parameter that indicates the Buyer VAT ID.

    ◆ Lookup IDs, which is configured for each entity as an alternative lookup field to the VAT ID. Requires either SupplierVAT and BuyerVAT or SupplierLookupID and BuyerLookupID.

    ◆ Message-Type, which is required if there are multiple agreements set up for the same pair of entities for different message types.

2. Invokes the eInvoice Agreement Lookup service to populate ProcessData with all the specified agreement information (canonical format translation map, error notification e-mail, and so on). In case of errors, the eInvoice Event service is invoked to log the event, send e-mail notifications, and processing is halted.

3. Invokes the supplier process, buyer process, or both depending upon agreement configuration. Any errors occurring during the execution of these processes are already handled, so the processing is stopped.

4. Invokes the *normal* post-processing business process, if configured in the agreement.

Errors are generated in the following scenarios:

✦ Agreement object is invalid or not found by the eInvoice Agreement Lookup service

✦ Failure in the validation of the e-Invoice by TrustWeaver

✦ Failure in translation to canonical format

✦ Duplicate invoice number detected

✦ Failure to archive

✦ Failure while writing archived data to disk (if archiving fails, or if a third-party archive is used)

Sterling e-Invoicing Functionality

Sterling e-Invoicing enables you to send a signed or unsigned electronic invoice to your trading partner. It enables your trading partner to send the invoice to TrustWeaver to sign if the invoice is not signed already, or to validate if the invoice is signed. The signed and validated invoice is archived for future auditing by your company and tax auditors. If you wish to archive the invoices in your own database then you need to use the external archive functionality. The internal archives can be used for:

✦ Searching specific invoices.

✦ Re-validating invoices. Invoice re-validation invokes TrustWeaver.

✦ Viewing a human readable representation (canonical format) of the invoice, including mandatory business data fields required by EU115.

✦ Viewing and downloading the original signed invoice data, including timestamp information.

✦ Viewing and downloading invoice verification details.

✦ Viewing audit entries for invoices. The audit trail is a log of every action a user performed on the invoice.

✦ Viewing summary reports for the archived invoices.

One trading partner may sign, validate, and archive on behalf of the other trading partner. Archived invoices with the country code IT (Italy) are timestamped (due to special Italian tax regulations) by an accredited Italian time stamp authority (TSA). Any operation performed on the integrated archive like downloading, timestamping, or re-validating, is recorded to maintain an audit trail. If any error occurs during the signing, validation, or archiving, the specified users are notified through e-mail.

Canonical Invoice Format

e-Invoices handled by the system are converted into a canonical format for uniform processing. The canonical representation of the electronic invoice is required for two reasons.

1. The incoming invoice that is signed or validated can be validated by mapping it to the canonical format.

2. Since the incoming invoice can be of any supported electronic data interchange (EDI) format, it is necessary to have a uniform canonical format that stores the invoices in the archive database. The canonical format of the invoice can be stored in the integrated archive database for a period of up to eleven years. During this period, you can view, track, and generate reports from the archived data.

Maximum Invoice Size

The maximum invoice size agreed in the Service Level Agreement (SLA) with TrustWeaver is currently four megabytes by default, for both inbound and outbound invoices. This size is configured globally but can be overridden based on parameters you specify in the document envelopes. Sterling e-Invoicing does not send invoices larger than the size agreed in the SLA with the TrustWeaver on-demand service.

Limiting Invoice Size

Sterling e-Invoicing envelopes can be configured to generate invoice interchanges smaller than the maximum invoice size agreed in the SLA with TrustWeaver. This can be configured for the following standards:

✦ EDIFACT

✦ TRADACOMS

✦ ASC X12

✦ VDA

Size limit settings are added to the interchange envelopes and (if applicable) transaction envelopes. The transaction level settings apply only if the interchange envelope is set to use the smallest transaction limit and the standard uses transaction-level envelopes.

Maximum Number of Open Connections

Sterling e-Invoicing limits the number of open connections to the TrustWeaver server. The number of open connections is controlled by the Semaphore service. The Semaphore service counts the number of open connections and it increments the count when a connection is established and decrements the count when a session ends. If the number of open connections is equal to the value of the maximum number specified for the open connections parameter, then it stops the process until a connection is freed.

Sterling e-Invoicing enables you to set global parameters to specify the number of retries allowed when a self-correcting, transient error (essentially a hiccup in the processing that is not expected to be repeated, or not expected to last for long) is returned by the TrustWeaver Server. This parameter specifies the number of times to loop with a small pause between each loop. You are also able to configure the number of retries allowed when a delaying error (a self-correcting, transient error, but an error that is expected to take some time to resolve) is returned by the TrustWeaver Server. This parameter specifies the number of times to loop with a pause between each loop. Thus, the application automatically pauses the connection to TrustWeaver when processing errors occur, but you can manually unpause the connection using the Lock Manager.

For more information on the Semaphore service, see *Managing Services and Adapters*.

Validating e-Invoices

Invoices may be in different formats for different trading partners. The invoices handled by Sterling e-Invoicing are converted into a canonical format for uniform processing. The system also extracts the relevant mandatory invoice data from these invoices and stores it in a uniform format in the integrated archive database. Also, the invoices are validated for compliance.

Archiving e-Invoices

Sterling e-Invoicing supports three archival methods:

✦ Integrated archive: In this method, invoices are stored in a database that is managed by Sterling e-Invoicing and the archive is managed automatically. Also, Sterling e-Invoicing provides user interface to support viewing of the archive.

✦ External archive: In this method, the customer uses Sterling e-Invoicing to sign and verify invoices, but the customer archives the invoices by storing the data to enable the tax auditors to review it in the future.

✦ Custom/Trading partner archive: In this method, invoices are signed or verified by TrustWeaver software on behalf of a trading partner but not archived on their behalf. If you choose to send this data to your trading partners, Sterling e-Invoicing gives you the ability to send the necessary data to your trading partners so that they can archive it.

Typically, an installation of Sterling e-Invoicing uses either the integrated archive or the external archive for invoices that are being stored by the host of Sterling e-Invoicing. The installation may also use the trading partner archive for some of the trading partners regardless of the archiving solution chosen. You can use a combination of integrated archive and trading partner archive or external archive and trading partner archive.

Integrated Archive

The Integrated Archive is an invoice archive that stores signed and validated invoices for up to eleven years, including the original signed invoice and supporting auditable detail created by TrustWeaver when signing or verifying the electronic signature. The access to this archive is based on permissions you set.

The Integrated Archive is not stored in the existing application database--all the invoice data is stored in a separate database. If you handle e-Invoicing on behalf of your trading partners, the Integrated Archive may contain invoices for many distinct legal entities.

The Integrated Archive specifies whether the invoice is archived from the buyer or supplier. If a user has only the buyer permission associated with his or her user account, he or she cannot access (even to view) the supplier side invoices, and vice versa. If a user has buyer and supplier permissions, he or she can view all the invoices. The archive stores a canonical format of the invoice data, so that it can be easily viewed and retrieved. Reports are also generated using the data stored in the archive. All the operations performed on the invoice in the integrated archive are tracked and audited. Also, the timestamping information of the invoices is maintained in the integrated archive.

External Archive

If you choose to use an external archive, the archiving must be provided by a third-party archiving application. A JAR file is created by Sterling e-Invoicing, and the eInvoiceExternalArchive business process created by the customer is used for further processing or to place the JAR file in a specific location from which the third-party application picks up the file for archiving. The third-party hosting the external archive is responsible for any country-specific requirements. The third party application is also responsible for re-validation and timestamping.

Note: The JAR file contains only the signed invoice file, detail file, and individual invoice files in canonical format.

Custom/Trading Partner Archive

If you use a trading partner archive while configuring agreements, Sterling e-Invoicing will send the invoices to TrustWeaver to be signed, and validated on behalf of a trading partner but the archiving will not be performed by Sterling e-Invoicing. The necessary details will be sent in a JAR file to your trading partner, and your partner is responsible for archiving the data.

Integrated Archive Online Access

Sterling e-Invoicing user interface provides online access to data in the integrated archive only. Using this user interface, you can perform the following operations:

✦ Search for invoices

✦ View and download the human-readable version of the invoice in report format

✦ Re-validate invoices and view the re-validation report

✦ For each invoice, you can view the signed invoice data, the accompanying details, and audit log for that invoice

✦ Download the raw invoice including the accompanying auditable details

✦ View and download invoice summary in report format

The results displayed will be based on:

✦ Search criteria

✦ User permissions

You can also download a human readable report in different file formats.

Integrated Archive Re-validation

This feature is used to re-validate invoices and view them in the required format. You can access the information in the integrated archive based on the permissions assigned to you.

Scheduled Archive Timestamping

Due to Italian tax regulations, all signed and validated invoices need to be timestamped by an accredited Italian Timestamping Authority (TSA) by no more than fifteen days after they were received and archived. It is preferred that the time interval for timestamping should be a day or two less than the fifteen-day period to allow for a number of retries if the TSA is temporarily inaccessible. Sterling e-Invoicing allows invoices in the integrated archive to be timestamped once, individually or in batches based on a per-invoice expiration of the time period as follows:

✦ Invoices that are signed and archived where the supplier country code is IT (Italy) must be timestamped

✦ Invoices that are validated and archived where the buyer country code is IT (Italy) must be timestamped

Note: Timestamping is performed automatically by Sterling e-Invoicing.

Archive Audit Trail

Sterling e-Invoicing logs every action taken by you on the invoices and these actions are displayed in the audit trail page of the user interface.

Agreements

Sterling e-Invoicing creates relationship objects called agreements to describe the relationship between partners in the system and store their e-Invoice processing options. These relationship objects are similar to contracts, for example, the application trading partner contracts. The e-Invoicing relationship objects in Sterling e-Invoicing enables you to configure processing options through the e-Invoice agreement user interface. The relationship objects are versioned, importable, and exportable but cannot be archived. They store the necessary configuration parameters, (for example, document and signature format, the map to use for translation to canonical format, test or production indicators, associated business processes, and so on).

Access to these relationship objects is governed by user permissions to ensure:

✦ Security of the data

✦ Separate visibility of data into the buyer and supplier sets

✦ Operations on behalf of a specific legal entity

TrustWeaver Error Handling

The TrustWeaver business process is used by the buyer and seller processes for the validation and signing processes respectively. The TrustWeaver business process invokes the TrustWeaver Request service to create a simple object access protocol (SOAP) request to be sent to the TrustWeaver Server over HTTP for purposes of signing, validation, or timestamping using the HTTP client adapter. The errors that may occur during this communication are:

✦ Network errors

✦ One of the Certificate Authorities for a particular country used by TrustWeaver is unavailable

The recovery strategies for the above errors are as follows:

✦ Immediate retry with a small delay between two subsequent sets of retries for a configurable number of times within a loop for network errors.

✦ Delayed retry for a configurable number of times within a loop having a larger delay between two subsequent sets of retries for errors like TrustWeaver server busy and maximum number of open connections exceeded.

✦ For the size of invoices bigger than the maximum invoice size allowed, you must resolve errors through human intervention.

If any failure occurs while connecting to the TrustWeaver server due to any reason, an error message **Not Found** is displayed and re-validation fails. If any of the errors cannot be resolved, then an e-mail notification is sent to the specified users. The e-mail addresses are configurable through the eInvoice Agreement Lookup service. If a TrustWeaver error occurs while processing an invoice, then all the processes involving the buyer and supplier countries are paused for the time period specified in Delayed Retry Wait parameter (when you set global e-Invoice configuration options). For example, if an error occurs while processing an invoice from UK to PL, all processing of invoices to and from UK, and to and from PL will be paused for this interval.

Supplier Process Error Scenarios

The supplier process error scenarios are as follows:

1. Translation error (single invoice): In this scenario, the supplier process will halt to allow the user to modify his or her map to fix the issue. Once the map is fixed, the user may resume the supplier process, which will pick up the updated map and rerun the translation. If the translation failure is not due to a mapping issue, the user terminates the wrapper process (and does whatever is needed within the business system to rectify the invalid invoice).

2. Translation error (one or more invoices within a batch): On the supplier side, this will be handled in the same manner as a translation failure on a single invoice. There is no requirement to process the invoices in the batch that did not have translation errors, as the invoices are not considered "legal" invoices until they are signed.

3. Duplicate invoice number (single invoice): In this scenario, the supplier process will complete with an error, preventing any further processing. Since the invoice has not yet been signed, there is no requirement to archive it.

4. Duplicate invoice number (one or more invoices within a batch): In this scenario, the supplier process will complete with an error, preventing any further processing. Since the invoice batch has not yet been signed, there is no requirement to archive it.

5. Error during TrustWeaver signing (for example, due to extended network outage): In this scenario, the supplier business process will halt once the TrustWeaver business process has stopped due to an error, so that it can be resumed once the condition is rectified. The user recovers from this scenario by resuming the supplier business process, which will invoke the TrustWeaver business process again.

6. Error during archival: In this scenario, the supplier business process will halt so that the user can resume it once the error condition (for example, database down) is rectified. Again, a conditional loop is used so that the process is resumed in the specified place.

Buyer Process Error Scenarios

The buyer process error scenarios are as follows:

1. Error during TrustWeaver signing (for example, due to extended network outage): This will be handled in the same way as on the supplier side (the buyer business process will halt so that it can be resumed).

2. Translation error (single invoice): In this scenario, the errors will be reported within the status report, but processing will continue on despite the translation error.

3. Translation error (one or more invoices within a batch): As with a single invoice, all the invoices in the batch must be archived regardless of translation errors. However, invalid invoices will be marked as such, allowing valid ones to be processed normally.

4. Duplicate invoice number (single invoice): In this scenario, the duplicate invoice must still be archived, and will be marked as duplicate within the archive.

5. Duplicate invoice number (one or more invoices within a batch): Similar to the single invoice error scenario, duplicate invoices will be marked as duplicates, but still archived. Non-duplicates within the batch are processed normally.

6. Error during archival: In this scenario, the buyer business process will halt so that the user can resume it once the error condition (for example, database down) is rectified. Again, a conditional loop is used so that the process is resumed in the specified place.

Error Handling

Sterling e-Invoicing sends e-mail notifications to the specified user or users (Supplier, Buyer, Sterling e-Invoicing operator) for any of the following classes of errors:

✦ Signing

✦ Verification

✦ Archiving

✦ Timestamping

The following parameters are used to construct the e-mail message:

✦ Type (Error, Warning, information)

✦ E-mail address of the recipients

✦ Subject of the e-mail

✦ Error code, if any (the TrustWeaver server sends an error code if there is a failure between Sterling e-Invoicing and the TrustWeaver server)

✦ Reason

The eInvoice Agreement Lookup service searches for these parameters mentioned above from the agreement and creates the content required for the e-mail.

Note: The e-mail address of the users is configurable through the Identities screen.

E-mail notifications are sent to the specified users in the following scenarios:

✦ On the supplier side, if signing fails, the business process that handles the signing process invokes the eInvoice Event service and passes the relevant information including the reason for failure and failure code if any. An e-mail is sent to the specific supplier stating that the signing process failed.

✦ On the buyer side, if validation fails, the business process that handles the validation process invokes the eInvoice Event service and passes the relevant information including the reason for failure and failure code if any. An e-mail is sent to the specific buyer stating that the validation process failed.

✦ Notifications are also sent if the external or internal archiving fails, including failure to store canonical data, timestamped invoice, raw invoice, and audit information.

Workflow Scenarios

Introduction

Sterling e-Invoicing enables suppliers to send invoices to buyers electronically, using e-signatures, third party signature verification, and archiving. Either the buyer or the supplier can host the e-Invoicing software. Each company can archive its own data, or the company hosting Sterling e-Invoicing can archive for both companies. Therefore, there are multiple configuration scenarios possible. This section provides some sample scenarios and describes them.

Scenario 1

The following diagram shows the scenario where the buyer runs Sterling e-Invoicing and receives signed invoices.
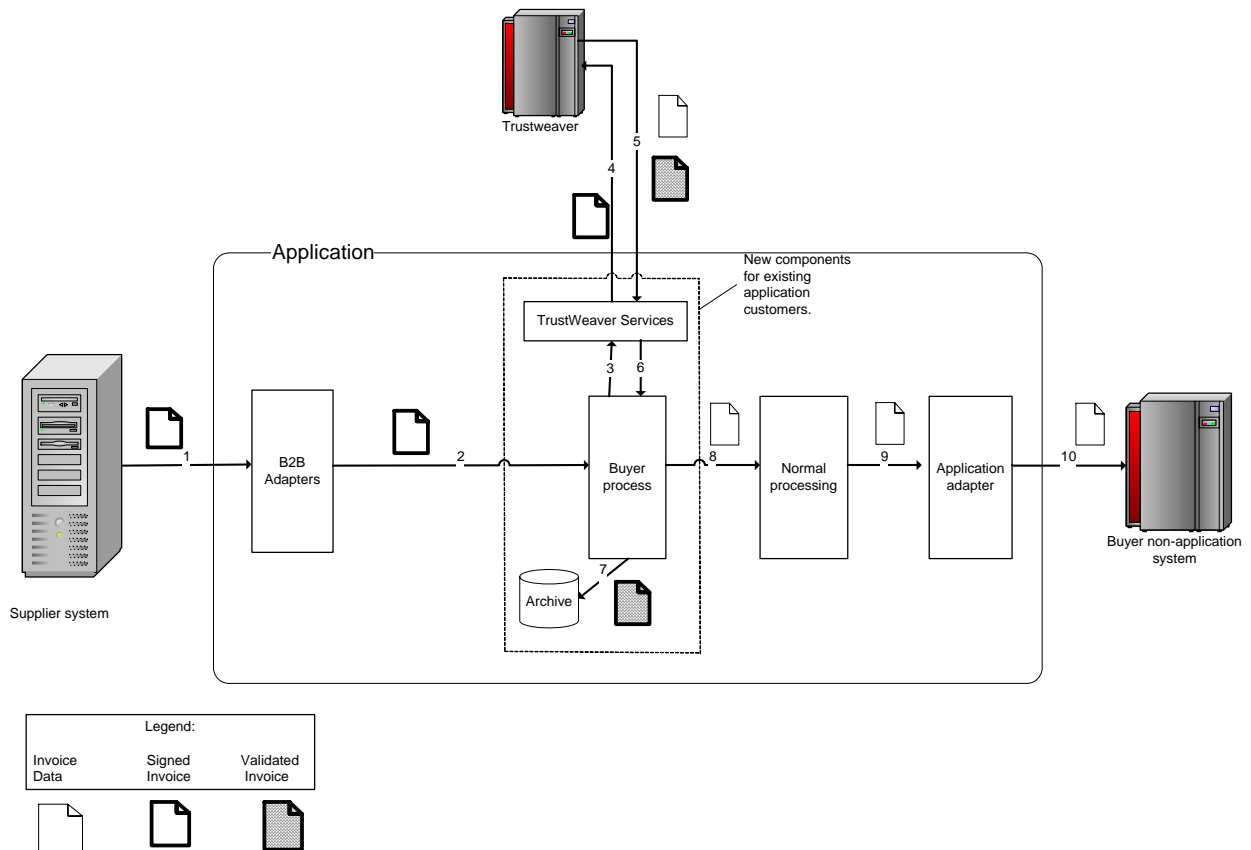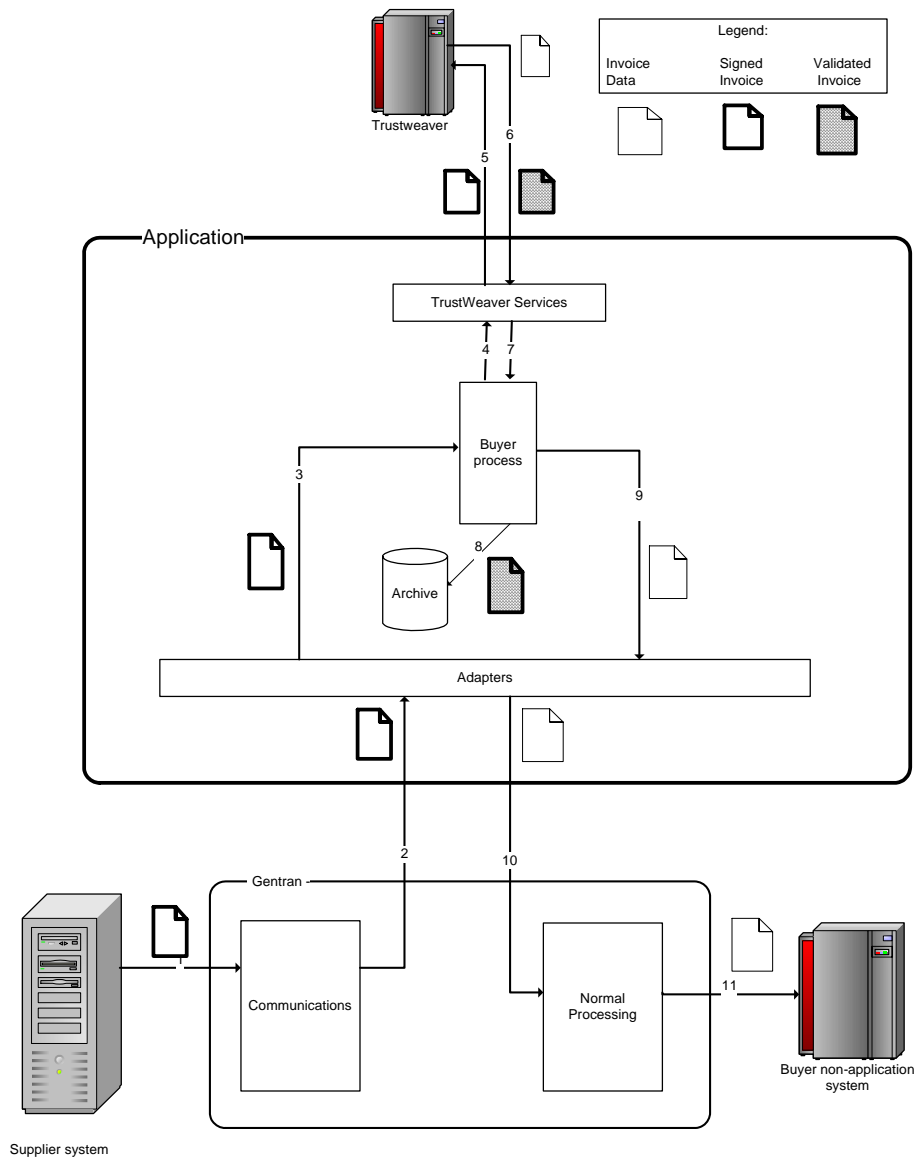

Note: In the diagram above, Sterling e-Invoicing software resides in the Application box.

The following steps describe the process:

1. Supplier sends the signed invoice data to Sterling e-Invoicing through a communication channel.

2. The signed invoice data is sent to the buyer process.

3. The TrustWeaver Request service is called by the buyer process.

4. An HTTP connection is established with the TrustWeaver server to validate the signed document.

5. TrustWeaver returns a validated invoice and the raw invoice data to the buyer process through the HTTP connection.

6. The validated invoice data is sent to the buyer process after passing through the TrustWeaver Response service, which extracts the raw invoice and separates the signature from the SOAP format document.

7. The validated invoice is archived.

8. The raw invoice data is sent for normal processing.

9. Communication is established with the buyer's non-application system through the application adapters.

10. The raw invoice is sent to the normal buyer-side processing.

Scenario 2

The following diagram shows a scenario where the buyer runs Gentran and Sterling e-Invoicing and receives signed invoices:

Note: In the diagram above, Sterling e-Invoicing software resides in the application box.
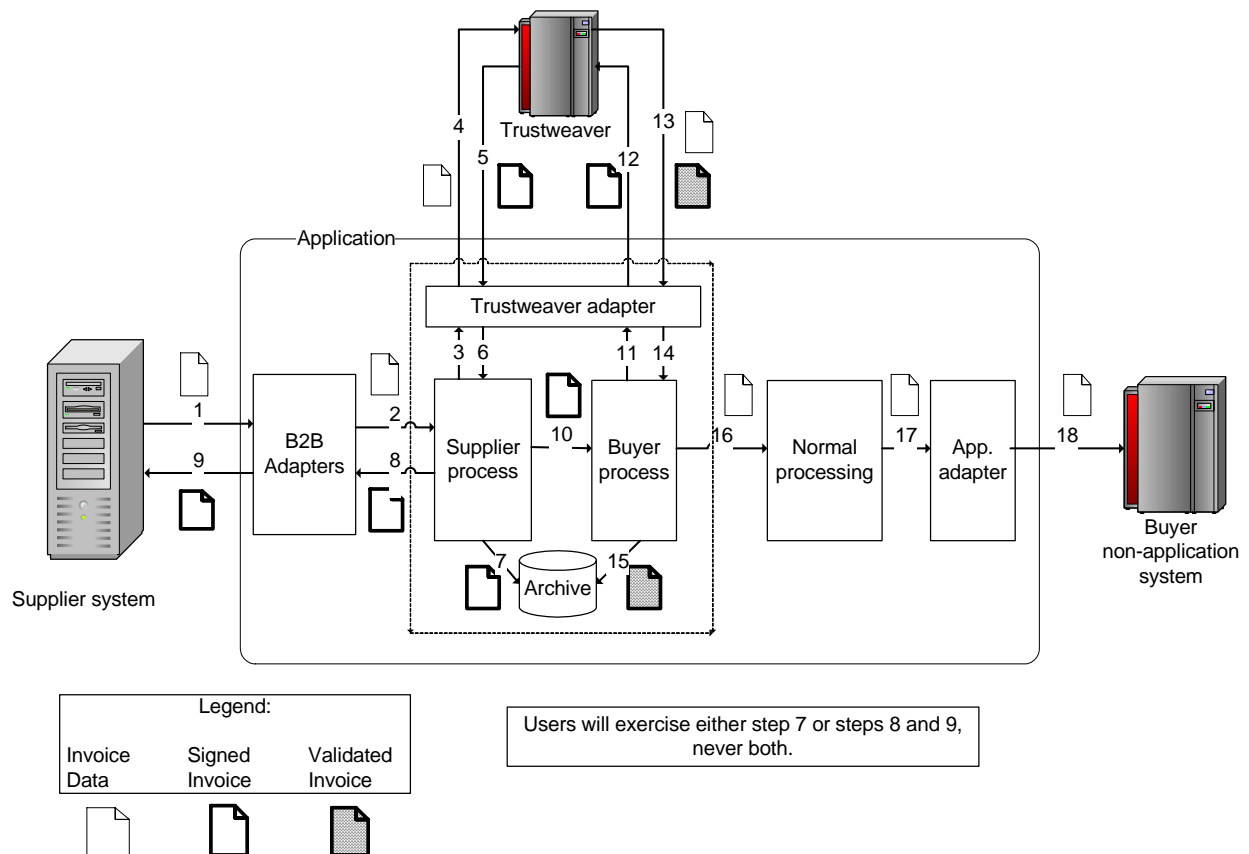
The following steps describe the process:

1. Supplier sends the signed invoice data into Gentran through a communication channel.

2. The signed invoice is sent to Sterling e-Invoicing through the application adapters.

3. The signed invoice is sent to the buyer process.

4. The TrustWeaver Request service is called by the buyer process.

5. An HTTP connection is established with the TrustWeaver server to validate the signed document.

6. TrustWeaver returns a validated invoice and the raw invoice data to the buyer process through the HTTP connection.

7. The validated invoice data is sent to the buyer process after passing through the TrustWeaver Response service, which extracts the raw invoice and separates the signature from the SOAP format document.

8. The validated invoice is archived.

9. The raw invoice data is sent to Gentran for normal processing.

10. Communication is established with the buyer's non-application system through the application adapters.

11. The raw invoice is sent to the normal buyer-side processing.

Scenario 3

The following diagram shows a scenario where the buyer runs Sterling e-Invoicing, receives unsigned invoices, TrustWeaver signs and archives the invoice on behalf of the supplier, and returns the signed invoice to the supplier:

Note: In the diagram above, Sterling e-Invoicing software resides in the application box.
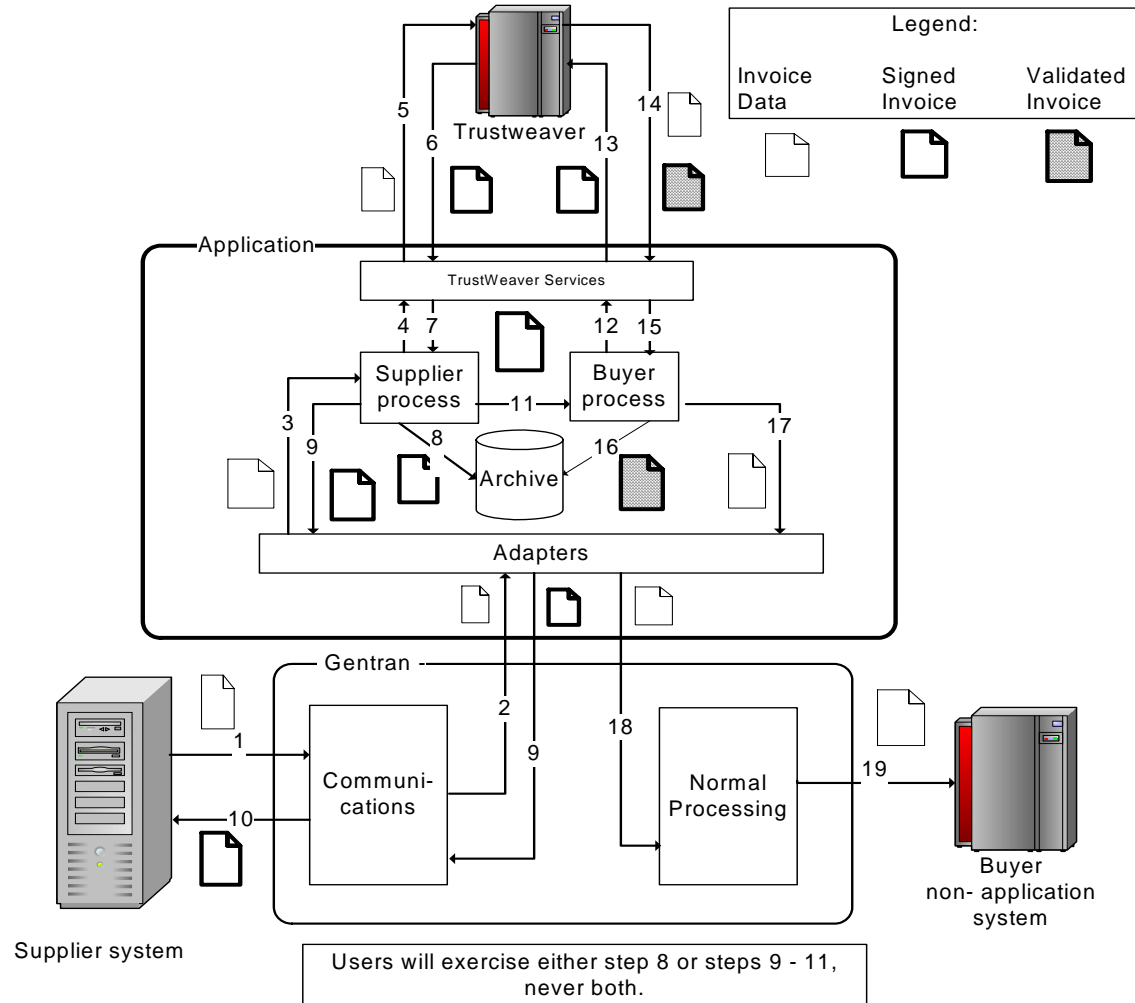
The following steps describe the process:

1. The supplier sends the unsigned invoice data into the buyer's Sterling e-Invoicing through a communication channel.

2. The unsigned invoice data is then deposited into the supplier process within Sterling e-Invoicing.

3. The TrustWeaver Request service is called by the supplier process.

4. An HTTP connection is established with the TrustWeaver server.

5. TrustWeaver server returns a signed invoice through the HTTP connection.

6. The signed invoice data is sent to the Supplier process after passing through the TrustWeaver Response service, which extracts the raw invoice and separates the signature from the SOAP format document.

Note: Either step 7, or steps 8 and 9, are performed, never both.

7. The signed invoice data is archived.

8. The signed invoice is sent back to the application from the supplier process.

9. The signed invoice is sent from the application to the supplier system through a communication channel. At this step, the supplier processing is complete.

10. The signed invoice is sent to the buyer process from the supplier process.

11. TrustWeaver Request service is called by the buyer process.

12. An HTTP connection is established with the TrustWeaver server for validation of the signed invoice.

13. The validated invoice is returned and transported through the HTTP connection.

14. The validated invoice data is sent to the buyer process after passing through the TrustWeaver Response service, which extracts the raw invoice and separates the signature from the SOAP format document.

15. The validated invoice is archived.

16. The raw invoice data is sent for normal processing.

17. Communication is established with the buyer's non-application system through the application adapters.

18. The raw invoice data is sent to the normal buyer-side processing.

Scenario 4

The following diagram shows a scenario where the buyer runs Gentran and Sterling e-Invoicing, receives an unsigned invoice, TrustWeaver signs and archives on behalf of supplier, and returns the signed invoice to the supplier:

Note: In the diagram above, Sterling e-Invoicing software resides in the application box.

The following steps describe the process:

1. The supplier sends the unsigned invoice data into the Gentran system through a communication channel.

2. The unsigned invoice data is sent into the application through the application adapters.

3. The unsigned invoice is sent to the supplier process.

4. The TrustWeaver Request service is called by the supplier process.

5. An HTTP connection is established with the TrustWeaver server.

6. TrustWeaver server returns a signed invoice through the HTTP connection.
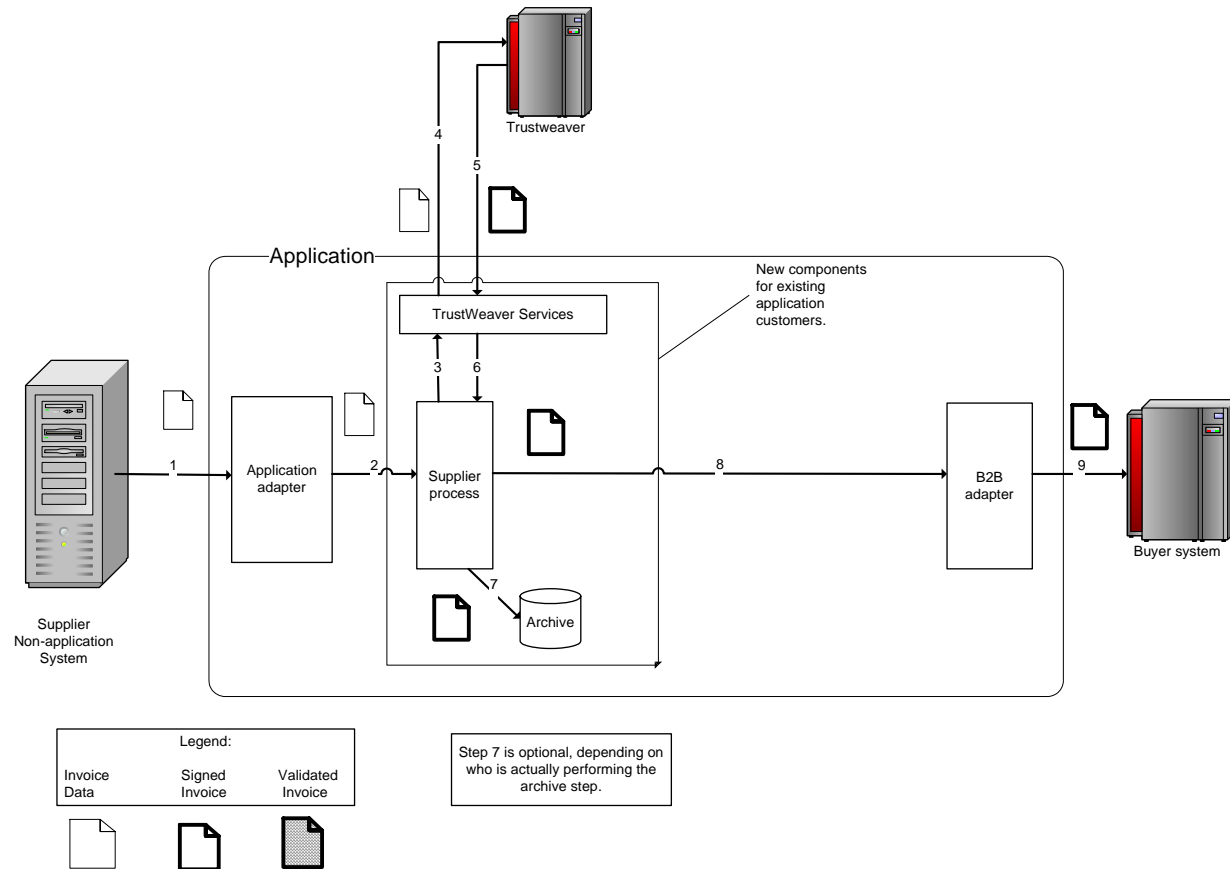
7. The signed invoice data is sent to the Supplier process after passing through the TrustWeaver Response service, which extracts the raw invoice and separates the signature from the SOAP format document.

Note: Either step 8, or steps 9 to 11 are performed, never both.

8. The signed invoice data is archived.

9. The signed invoice is sent back to the Gentran system from the supplier process.

10. The signed invoice is sent from the Gentran system to the supplier system through a communication channel. At this step, the supplier processing is complete.

11. The signed invoice is sent to the buyer process from the supplier process.

12. TrustWeaver Request service is called by the buyer process.

13. An HTTP connection is established with the TrustWeaver server for validation of the signed invoice.

14. The validated invoice is returned and transported through the HTTP connection.

15. The validated invoice data is sent to the buyer process after passing through the TrustWeaver Response service, which extracts the raw invoice and separates the signature from the SOAP format document.

16. The validated invoice is archived.

17. The raw invoice data is sent for normal processing.

18. Communication is established with the buyer's non-application system through the application adapters.

19. The raw invoice data is sent to the normal buyer-side processing.

Scenario 5

The following diagram shows a scenario where the supplier runs Sterling e-Invoicing, TrustWeaver signs the invoices, and sends the invoices to the buyer:

Note: In the diagram above, Sterling e-Invoicing software resides in the application box.

The following steps describe the process:

1. The unsigned invoice is sent from the supplier's non-application system into the application through the application adapters.

2. The unsigned invoice is sent to the supplier process.

3. The TrustWeaver Request service is called by the supplier process.

4. An HTTP connection is established with the TrustWeaver server to have the invoice signed.

5. TrustWeaver returns a signed invoice through the HTTP connection.

6. The signed invoice is sent to the supplier process after passing through the TrustWeaver Response service, which extracts the raw invoice and separates the signature from the SOAP format document.

7. The signed invoice is archived.

Note: Step 7 is optional depending on who is performing the archive step.

8. The signed invoice is sent to the buyer system through B2B adapters.

9. The signed invoice is sent from the application to the buyer system.

Scenario 6

The following diagram shows a scenario where the supplier runs Gentran and Sterling e-Invoicing, TrustWeaver signs the invoices, and sends the invoices to the buyer:
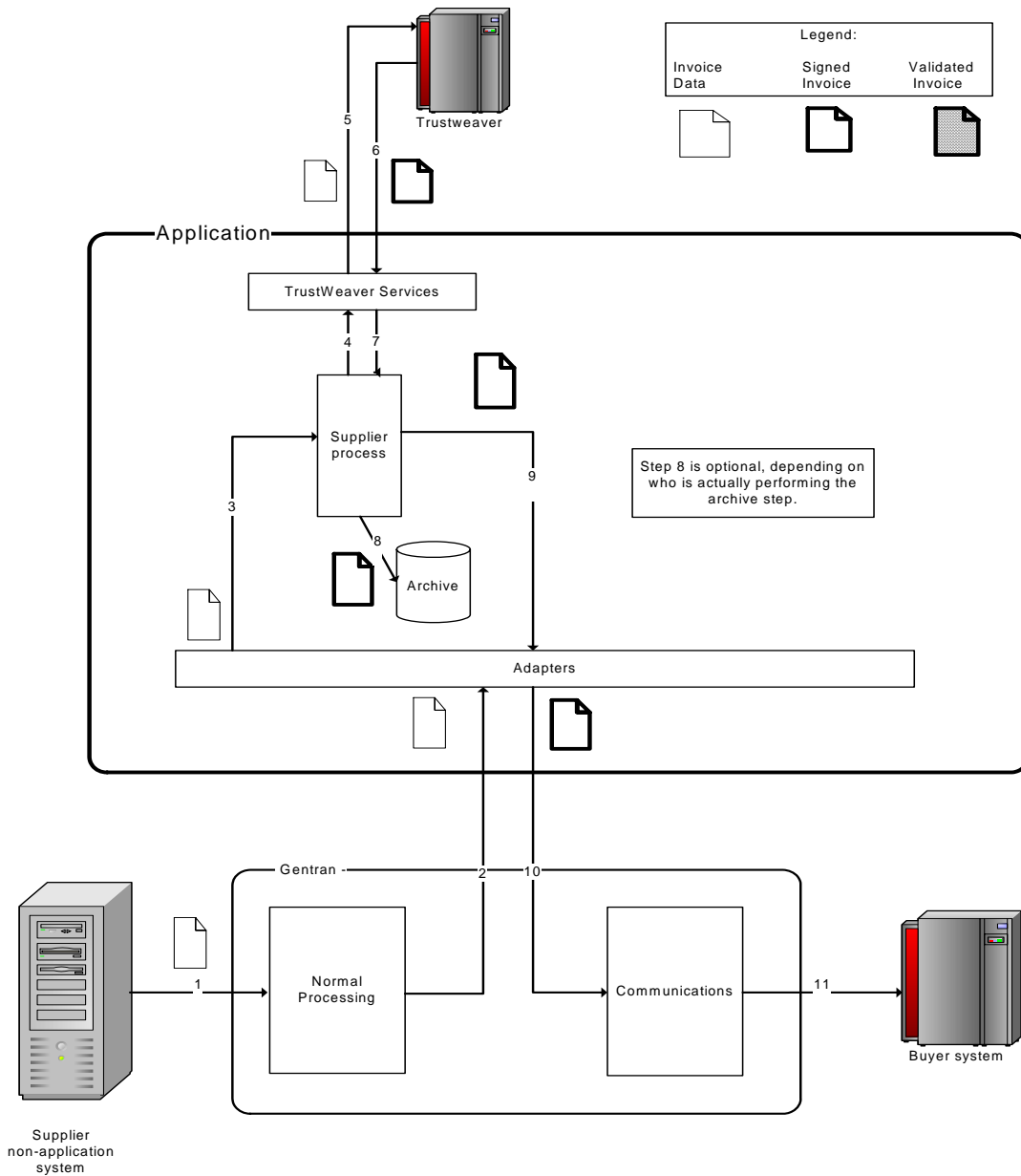
Note: In the diagram above, Sterling e-Invoicing software resides in the application box.
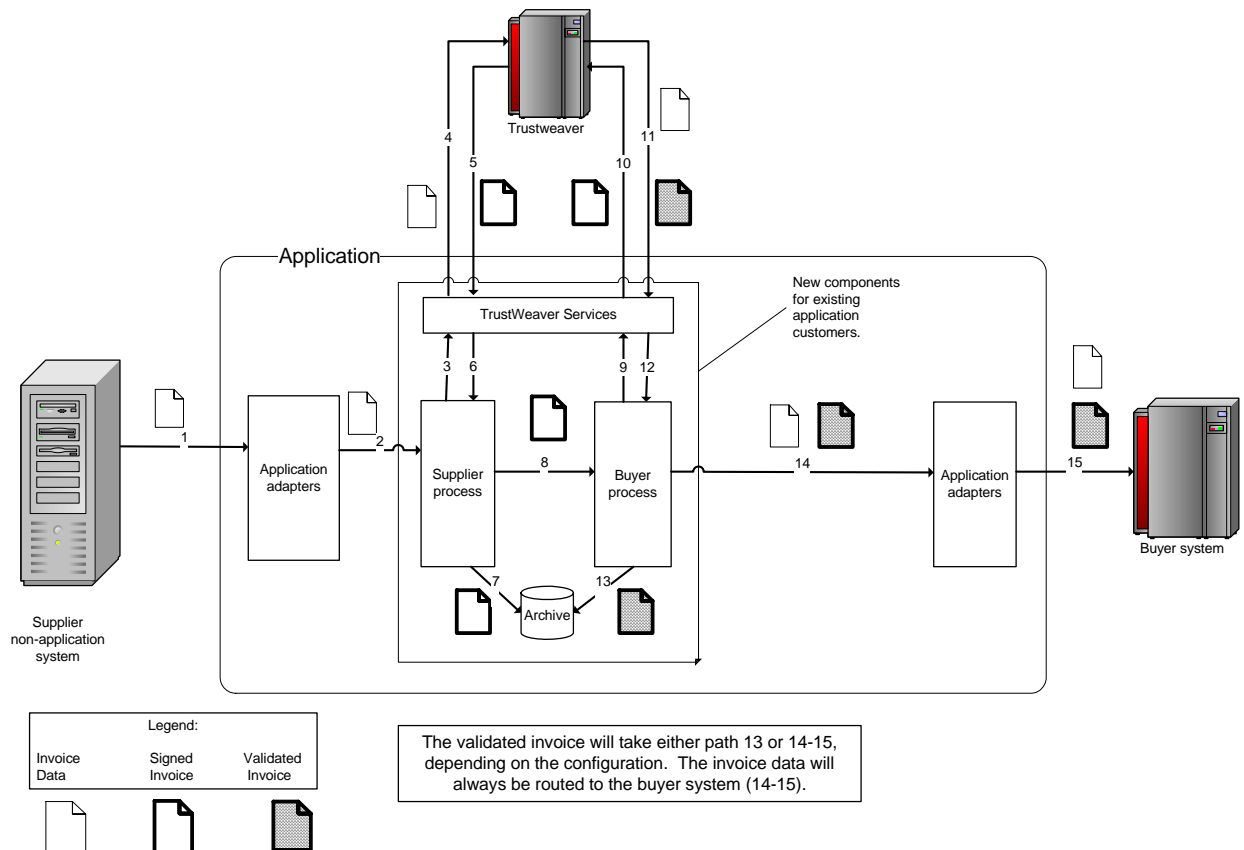
The following steps describe the process:

1. The unsigned invoice is sent from the supplier's non-application system into the Gentran system for normal processing.

2. The unsigned invoice is sent to the application through the application adapters.

3. The unsigned invoice is sent to the supplier process.

4. The TrustWeaver Request service is called by the supplier process.

5. An HTTP connection is established with the TrustWeaver server to have the invoice signed.

6. TrustWeaver returns a signed invoice through the HTTP connection.

7. The signed invoice is sent to the supplier process after passing through the TrustWeaver Response service, which extracts the raw invoice and separates the signature from the SOAP format document.

8. The signed invoice is archived.

Note: Step 8 is optional depending on who is performing the archive step.

9. The signed invoice is sent for further processing.

10. The signed invoice is sent to the Gentran system from the application through the application adapters.

11. The signed invoice is sent from the Gentran system to the buyer system through communication channels.

Scenario 7

The following diagram shows a scenario where supplier runs Sterling e-Invoicing, TrustWeaver signs the invoice, archives and validates it on behalf of the buyer, and sends the validated invoice to the buyer:

Note: In the diagram above, Sterling e-Invoicing software resides in the application box.
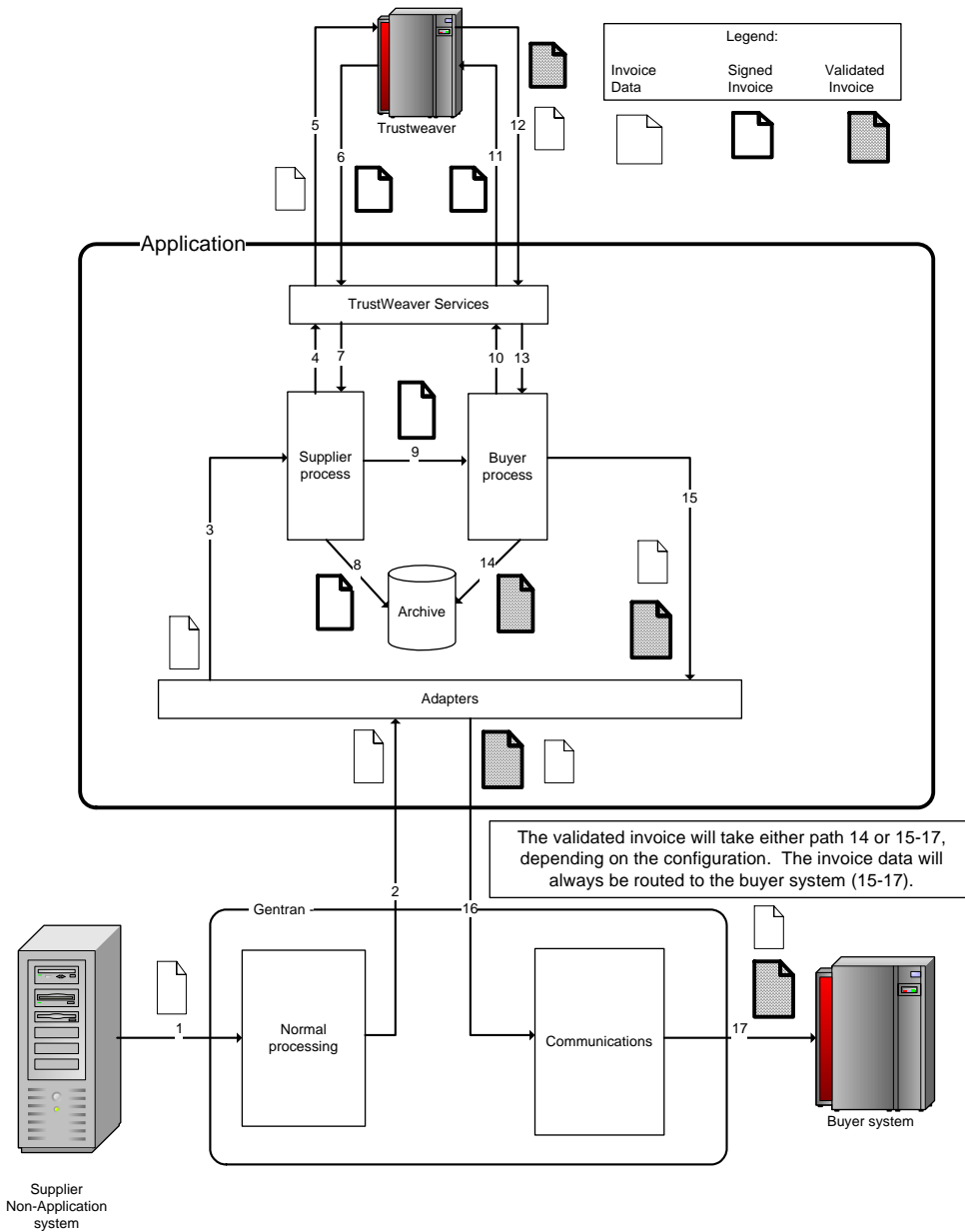
The following steps describe the process:

1. The unsigned invoice data is sent by the supplier's non-application system into the application through the application adapters.

2. The unsigned invoice data is then deposited into the supplier process within Sterling e-Invoicing.

3. The TrustWeaver Request service is called by the supplier process.

4. An HTTP connection is established with the TrustWeaver server.

5. The TrustWeaver server returns a signed invoice through the HTTP connection.

6. The signed invoice data is sent to the Supplier process after passing through the TrustWeaver Response service, which extracts the raw invoice and separates the signature from the SOAP format document.

7. The signed invoice data is archived.

8. The signed invoice is sent to the buyer process from the supplier process.

9. The TrustWeaver Request service is called by the buyer process.

10. An HTTP connection is established with the TrustWeaver server for validation of the signed invoice.

11. The validated invoice is returned and transported through the HTTP connection.

12. The validated invoice data is sent to the buyer process after passing through the TrustWeaver Response service, which extracts the raw invoice and separates the signature from the SOAP format document.

13. The validated invoice is archived.

14. The raw invoice data and the validated invoice are sent for normal processing.

15. Communication is established with the buyer's system through the application adapters.

Note: The validated invoice will take either path 13 or 14 to 15, depending on the configuration. The invoice data is always routed to the buyer system.

16. The raw invoice data and validated invoice are sent to the normal buyer-side processing.

Scenario 8

The following diagram shows a scenario where the supplier runs Gentran and Sterling e-Invoicing, TrustWeaver signs the invoice, archives, and validates it on behalf of the buyer, and sends the validated invoice to the buyer:

Note: In the diagram above, Sterling e-Invoicing software resides in the Application box.

The following steps describe the process:

1. The unsigned invoice data is sent by the supplier's non-Application system into the Gentran system for normal processing.

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2. The unsigned invoice data is then sent to the application using the application adapters.

3. The unsigned invoice data is sent to the supplier process.

4. The TrustWeaver Request service is called by the supplier process.

5. An HTTP connection is established with the TrustWeaver server.

6. The TrustWeaver server returns a signed invoice through the HTTP connection.

7. The signed invoice data is sent to the Supplier process after passing through the TrustWeaver Response service, which extracts the raw invoice and separates the signature from the SOAP format document.

8. The signed invoice data is archived.

9. The signed invoice is sent to the buyer process from the supplier process.

10. The TrustWeaver Request service is called by the buyer process.

11. An HTTP connection is established with the TrustWeaver server to validate the signed invoice.

12. The validated invoice is returned and transported through the HTTP connection.

13. The validated invoice data is sent to the buyer process after passing through the TrustWeaver Response service, which extracts the raw invoice and separates the signature from the SOAP format document.

Note: The validated invoice will take either path 14, or 15 to 17, depending on the configuration. The invoice data is always routed to the buyer system.

14. The validated invoice is archived.

15. The raw invoice data and the validated invoice are sent for normal processing.

16. The raw invoice data and the validated invoice are sent to Gentran system from the application through the application adapters.

17. The raw invoice data and the validated invoice are sent to the buyer system from the Gentran system through a communication channel.

Glossary

A

activity

Activity is a task carried out by a service or adapter within a business process.

adapter

Adapter is a type of service that connects external systems with the application.

application adapters

Application adapters integrate external business applications with the application.

application server

Application server is a software server that runs and manages an application or applications.

authentication

Authentication is the process of verifying the identity of a particular entity and ensuring that a message has not been modified in transit or storage.

authority-signed certificate

Authority-signed certificate is signed using a key maintained by a certificate authority. Before issuing a certificate, the certificate authority evaluates a certificate requestor to determine that the requestor is the certificate holder referenced in the certificate.

B

BPML

Business Process Modeling Language (BPML) is an XML-based language for describing business processes designed by the Business Process Management Initiative (http://www.bpmi.org).

business process

Business process is a series of activities that accomplishes a business objective.

business process model

Business process model is an executable graphical (or BPML) representation of a business process.

C

CA

Certificate authority (CA) is a company that is responsible for verifying and processing certificate requests and for issuing and managing digital certificates. The CA you choose should be one that your trading partners will trust. You must meet the requirements for the CA you choose.

CA certificate

CA certificate is a digital certificate issued by a certificate authority (CA) for verifying trusted certificates. A CA certificate contains a public key corresponding to the private key, which the CA owns to sign certificates it issues.

category

Category is a classification assigned to an item that indicates the higher level grouping to which the item belongs (for example, garden tools). Items are put into logical, like, groupings to facilitate the management of a diverse number of items and the ability to search and query for the category designation.

certificate

Certificates contain the public half of your public/private key pair along with other identifying information about your trading profile and point of contact. The application uses certificates to distribute your public key and those of your consumers.

certificate authority (CA)

Certificate authority (CA) is a company that is responsible for verifying and processing certificate requests and for issuing and managing digital certificates. The CA you choose should be one that your trading partners will trust. You must meet the requirements for the CA you choose.

CA-Signed Certificate

CA-signed certificate is a digital certificate that is signed using keys maintained by certificate authorities. Before issuing a certificate, the CA typically evaluates a certificate requestor to determine that the requestor is in fact the certificate holder referenced in the certificate.

configurable services

Configurable services are those that require the specification of parameters (other than a name and description), before they are ready to be used in a business process.

D

digital certificate

Digital certificates attach to an electronic document for security purposes. A digital certificate verifies the identity of the document sender and gives the document receiver the means to encode a reply. To provide a chain of verification and prevent tampering, the digital certificate contains a public key, identity information, and one or more signatures.

digital signature

Digital signature is a digital code attached to an electronic message. Just as you sign a document as an indication that you are the person you claim to be, a digital signature indicates to the receiver that you are who you claim to be. Anyone who has the public key in the key pair can use it to decrypt the digital signature. If the results match, the signature verifies. Assuming that the private key is known only to its owner, a matching digital signature also authenticates the signer.

E

e-Invoice

e-Invoice (electronic invoice) enables elimination of paper trails that companies must maintain to comply with Value Added Tax (VAT) laws.

Extensible Markup Language (XML)

Extensible Markup Language (XML) is a language specification designed especially for Web documents. It allows designers to create their own customized tags, enabling the definition, transmission, validation, and interpretation of data between applications and organizations.

G

GPM

Graphical Process Modeler (GPM) is a stand-alone graphical interface tool used in the application to create and modify business processes. The GPM converts the graphical representation of business processes to well-formed BPML (source code) and saves you the effort of writing code.

group

Group, in EDI, is a looping structure that contains related items, which repeat in sequence either until the translation service has processed all the data in the group or it has repeated the loop maximum number of times allowed.

Group, in the application role-based security, enables you to maintain access permissions for multiple users from a central location, minimizing the amount of work involved with maintaining accounts. You can associate many permissions to different users by creating groups for each job function, instead of each user.

H

human interaction

Human interaction is any action taken by a human being on a business process as it executes.

I

identity

Identity describes the trading partner and contains information referenced by the application when it executes a business process involving the trading partner.

L

license

License is a file downloaded from the Self-Service Licensing site and installed in the application. The license enables the application components that a customer has purchased (for example, Sterling e-Invoicing).

P

permissions

Permissions provide access to different modules within the application and are the foundation of role-based security.

predefined business processes

Predefined business processes are business processes that are ready to use upon installation of the application.

S

Service Level Agreement (SLA)

Service Level Agreement (SLA) is an agreement between two parties. It is a contract that exists between a customer and its service provider, or between service providers, which defines the understanding of both parties regarding the level of service that will be provided, including services, priorities, responsibilities, guarantee, and so on.

Simple Object Access Protocol (SOAP)

Simple Object Access Protocol (SOAP) is a lightweight protocol for the exchange of information in a decentralized, distributed environment. It is an XML-based protocol with three parts: an envelope that defines a framework for describing what is in a message and how to process it, a set of encoding rules for expressing instances of application-defined data types, and a convention for representing remote procedure calls and responses.

source map

Source map contains the mapping instructions for translation. A source map file has the extension .mxl or .map.

system administrator

System administrator is the technical expert on the hardware, connections, and software that the application needs to work, and is responsible for administering the application.

T

trading partner

Trading partner is a company or business entity within a company that participates in the exchange of business application data.

U

user account

User account contains the groups that the application user belongs to and the permissions associated with each group or user.

V

value added tax (VAT)

Value added tax (VAT) is a tax applied by most countries to the value added to goods and services in each step of the economic chain. Most countries use a VAT code. Within the European Union, the initial two characters of the VAT registration numbers are the country codes.