

# SEEBURGER

## BUSINESS INTEGRATION

### **RFID Workbench Whitepaper:**

**Understanding the Basic Functionality  
Required For an RFID Enabled Supply Chain**

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## 1.1 Summary

The use of RFID has shown a remarkable increase in the United States and in Europe during the past few months as a larger number of companies have been able to appreciate the benefits of applying this technology to their production, logistic, as well as sales and planning processes. The participants in a supply chain classically exchange information based on computer data exchange (CDE) and bar code data exchange. This approach has enabled productivity increases that no one today would have imagined possible. The same process is now ongoing with RFID, in areas where bar codes reach their limitations.

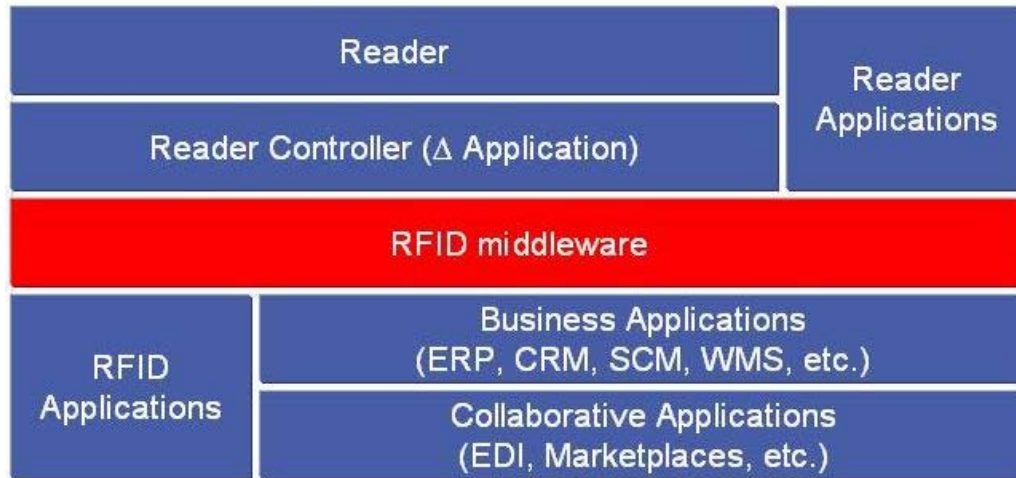
The limitations of bar codes are well known:

- Around 10% reading error
- Linear reading (one code follows another), therefore slower than a broadcast reading
- The reading often requires human intervention (moving and orienting the object for scanning etc.).
- The need for the bar code to be visible
- The impossibility to apply a bar code in a problematic environment (dust, mud, vapour etc.) and to reduced size objects or to those with improper shape for sticking on a paper label
- The impossibility to use bar code to overcome shoplifting.

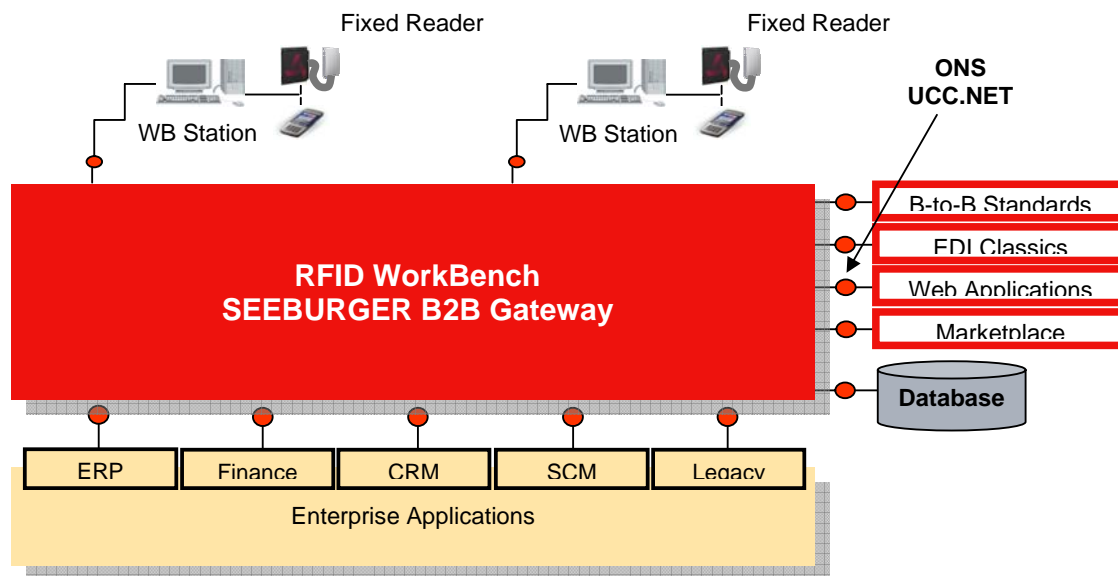
Today, a second generation of workbench technology enables us to move beyond these limitations. RFID helps actualize a vision of perfectly integrated logistical and commercial chains. However, the stages to surpass before getting there must be evaluated in a pragmatic way. Using RFID in your organization implies direct changes concerning the processes involved and the information you'll have at your disposal in RFID processes. RFID changes the way your employees work. It has a direct impact on their productivity and your investments' productivity. It also enables you to base your decisions on more accurate information. However, the real impact RFID can have on your bottom-line is not easy to quantify.

Just as setting up bar codes required tests and full-scale models, setting up RFID is undergoing a validation test that, in itself, enables us to certify the concrete impact of this technology on your profession. The best method to grasp these changes in your environment in a concrete way is to test them on a defined perimeter and involving the processes that have the most direct impact on your activity.

RFID (Radio Frequency Identification) is a state-of-the-art technology, which has become a central discussion point for applications such as logistics, material management, industrial automation and services. An RFID system is composed of a transponder, a reader with antenna and the application software.



The RFID Workbench is a client/server system which provides visualization, analysis and processing of RFID Data through any phase of an RFID project, i.e. evaluation and simulation to backend integration. The RFID Workbench is accessible via a web browser, such as Microsoft Internet Explorer or Mozilla Firebird. The RFID Workbench enables the user to realise complete RFID business processes. These processes can integrate with the customer's backend system using EDI or ERP proprietary formats or protocols such as IDOCs or RFCs.



## 1.2 Common Questions in RFID

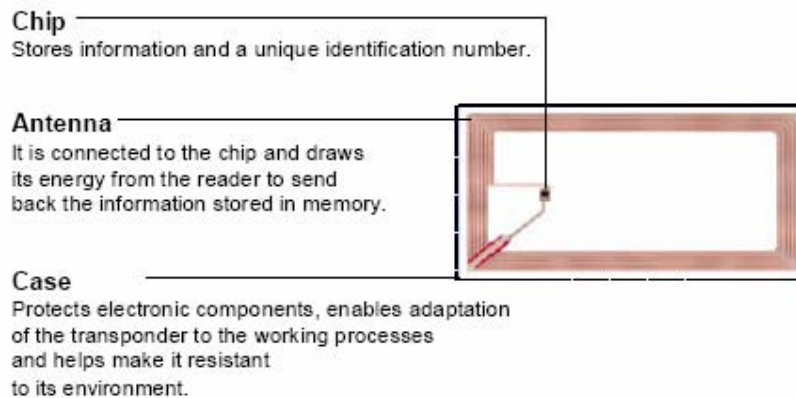
### What is RFID?

Radio-Frequency Identification (RFID) is a technology that enables the identification, localization and tracking of goods, people, animals and any sorts of objects. It enables immediate data reception by means of radio waves. A RFID system is mainly composed of three basic elements:

- Transponder (pins, card or label)
- Reader/scanner with an antenna
- Software application

### What is a transponder?

The transponder is composed of three elements:



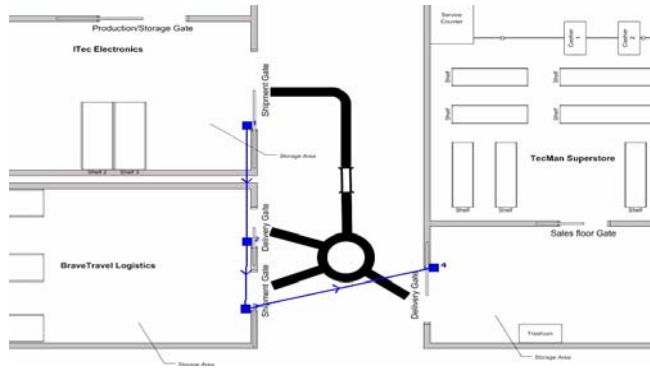
The main component of a RFID transponder is the chip (integrated circuit). The chip has a memory section that stores the identification code or other data. The content of the memory is sent to the reader when the chip is activated. The quantity of data storable on the chip depends on the type of the circuit. Most chips can comprise between 64 bits and 2 kilobytes of data. The transponder's antenna enables the communication between the chip and the reader. The packaging protects the transponder and is designed to make it resistant to its environment. Objects that are equipped with a transponder are called "smart objects", because they can signal their identification number and other useful properties to a processor.

### What is the identification code best suited to a RFID object?

It is necessary to use generators that create identification codes that are unique in the world. Methods such as EAN UCC's GTIN (Global Trade Identification Number) or MIT's ePC (electronic Product Code) are particularly suited. However, it is possible to use any other identification code, provided that it is unique on a global scale.

### What is a node?

In a RFID system, the smart objects are located by the readers. Each location is a node. A node can be a production unit, a storage place, a vehicle equipped with a smart object, a warehouse, a sales point as well as any reader unit or group of RFID readers.

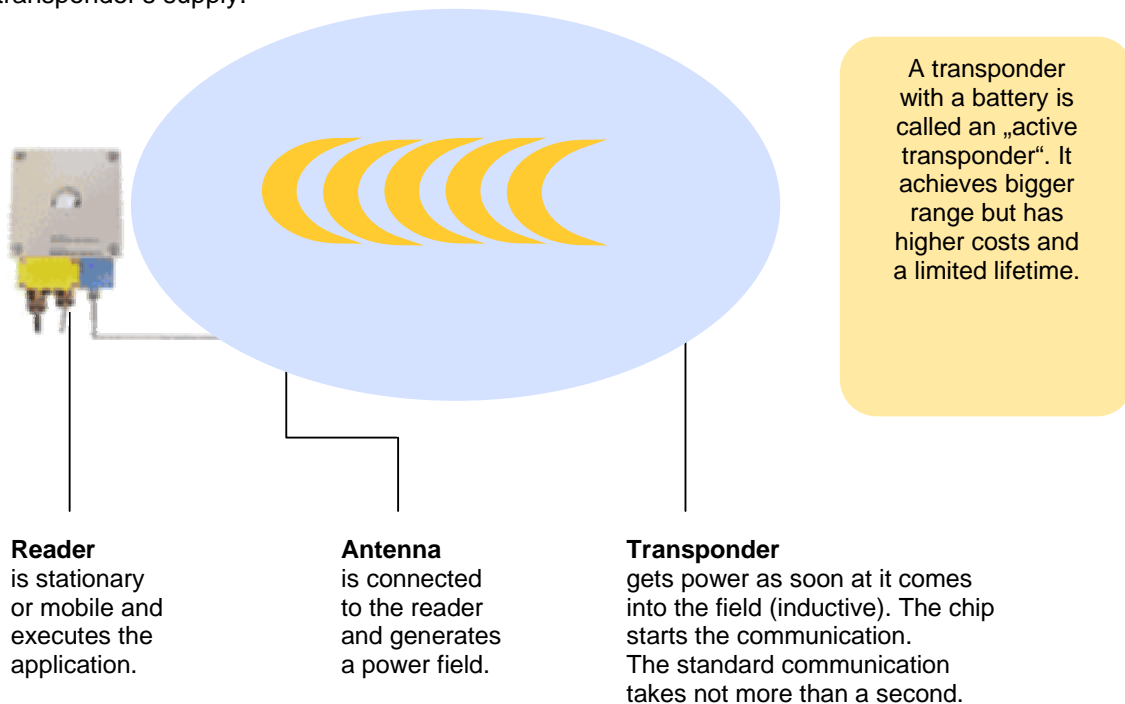


Just like the objects, the nodes must have an identification code that is unique on a worldwide scale. It is this which guarantees an event registered on a particular node will not be mixed with other events. The unique identification of a node also helps reduce the data volume and subsequently the system's complexity. The identification code can be associated with complementary data, such as location, address, meaning,

and this additional data doesn't need to be sent along with each event. This (unique) double identification, of the object and of the node, associated with temporary data (transitory data in the node) constitutes a minimum quantity of data that is necessary to describe every RFID event.

### How do the transponder and the reader communicate?

When a transponder goes through a specific electric field created by the reader, the transponder detects the signal and starts to send the data stored from the transponder to the reader. The signal generated by the reader usually supplies id data, and a sufficient amount of energy for the transponder's supply.



## Can a transponder be read through any type of material?

Yes, it can be read through almost any type of material. The tags can be read through plastic, wood, partition walls, dust, paint, vapour, mud, water and almost any conceivable material. The only materials that require analysis or more advanced tests are metals and liquids. For the metals, there is a 125-kHz technology that allows tagging on or inside the metal, enabling transmission in a metallic environment. For certain systems, it is possible to apply a transponder in milled metallic pieces with a single exposed surface. However, there still are physical limitations to these materials.

## What are the technical characteristics of a RFID solution?

The analysis of your environment, of your processes and applications allows you to determine:

- The frequency
- The chip technology
- Memory dimensions
- The particular characteristics of the chip
- The transponder's size and shape
- The reader's antenna
- The middleware computer
- The type of data communication

## What are benefits of RFID usage against bar code usage?

RFID is not intended to replace the bar code in all its applications but to provide for its limits. Its main benefits are:

- Identification without contact (even beyond visual range)
- Reading through materials such as cardboard, wood, etc.
- Identification takes less than a second
- Reading of several transponders at the same time (anti-collision principle)
- Endurance in difficult environments (extreme temperatures, humidity, etc.)
- Adaptable size and shape
- The transponder can be completely integrated in a product
- High security: password and data transfer of encrypted data anti-copy protection

The main benefit of RFID is that it eliminates reading lag and reading errors.

## What does a RFID solution imply?

In order to establish the input of RFID applications we have to consider several elements:

- Fast and reliable processing by automating production management, logistics, storage and sales administration, follow-up warranty services, etc.
- Error suppression (for example through automated identification of the goods the moment they enter in stock)
- Improved data flow enabling "real time" data retrieval, a better anticipation aiming toward production on demand
- Significant cost deductions by eliminating manual reading of bar codes

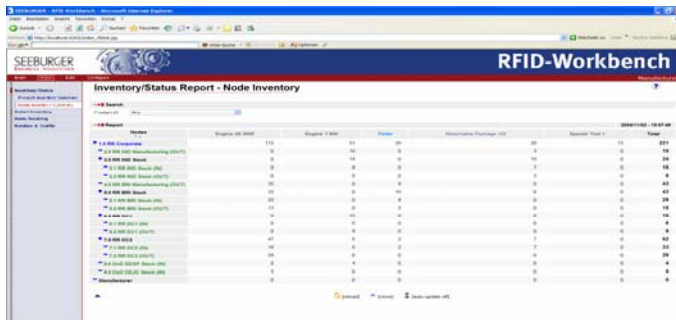
### 1.3 SEEBURGER RFID Workbench Functionality

#### Administration and Role-Based Access



The RFID Workbench uses a User Management system to ensure that users of the system are authenticated and that their defined roles only have access to specified parts of the solution.

Additionally, users can define their own 'look and feel' regarding displayed contents, columns, sort orders and other user-dependent display and processing options.

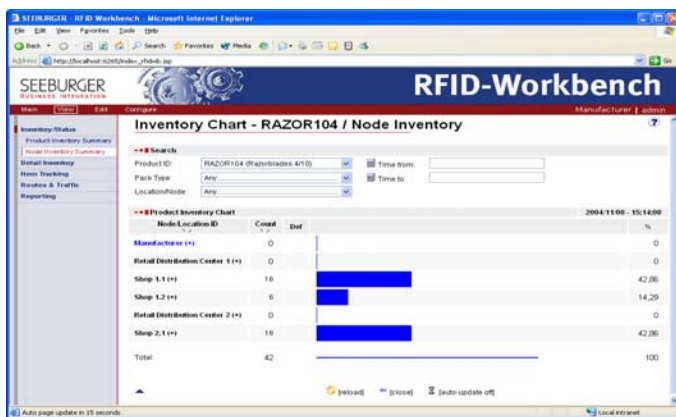


#### Inventory Views

The RFID Workbench provides an overview and online status report for all RFID-tagged items with present location and item status in the defined system. RFID Workbench enables users to produce reports on inventory levels and stock movements in real-time. This

includes the complete supply chain (across company boundaries) that is tracked using RFID-tags.

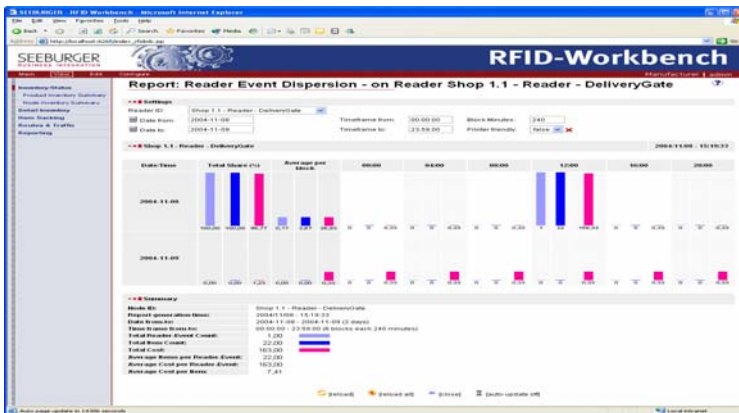
#### Inventory Details



The RFID Workbench dramatically reduces the time taken to count stock and report on stock levels. RFID Workbench supports reports and various printing functions like stock movements, inbound or outbound shipping processes etc.



### Reports & Statistics



The RFID Workbench provides a set of reports which allow the user to analyse almost any aspect of the processed (RFID) data and the expenses of the taken activity. Such reports also allow users to determine peak points (of processing) or determine reader-location and reader-types required to process the RFID data appropriately.

### Tracking and History

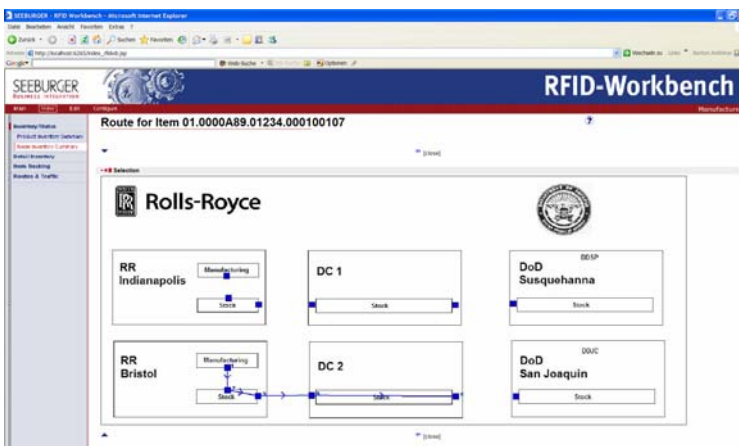
The screenshot shows the "Item Tracking - Item 01.0000A89.01234.000100107" page. It contains a table with columns for Event Time, Type, Reader, Product ID, Item ID, and Time at Location. The table lists several tracking events with their respective details.

Event Time	Type	Reader	Product ID	Item ID	Time at Location
2004-10-17 10:41:37	Out	1.0.0000A89.01234.000100107	Engine AC 2000	01.0000000.01234.000100107	20 min
2004-10-17 10:42:00	In	1.0.0000A89.01234.000100107	Engine AC 2000	01.0000000.01234.000100107	12 min
2004-10-17 10:42:10	Out	1.0.0000A89.01234.000100107	Engine AC 2000	01.0000000.01234.000100107	13 min
2004-10-17 10:42:20	In	1.0.0000A89.01234.000100107	Engine AC 2000	01.0000000.01234.000100107	13 min
2004-10-17 10:42:41	Out	1.0.0000A89.01234.000100107	Engine AC 2000	01.0000000.01234.000100107	27 days 20 hours 10 min 50 sec

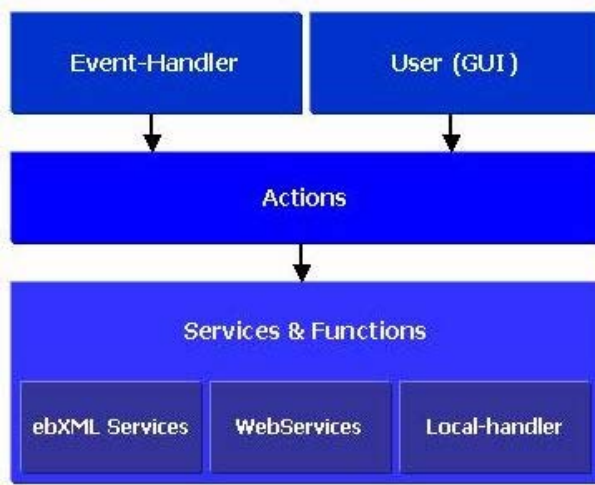
Each RFID-tagged item can be tracked across the supply chain. All involved companies/readers in the supply chain system are recorded and details show which reader and when it was passed by an item.

### Visual Tracking

The RFID Workbench provides a graphical view that shows the user where items are in the supply chain.



**Event Management**

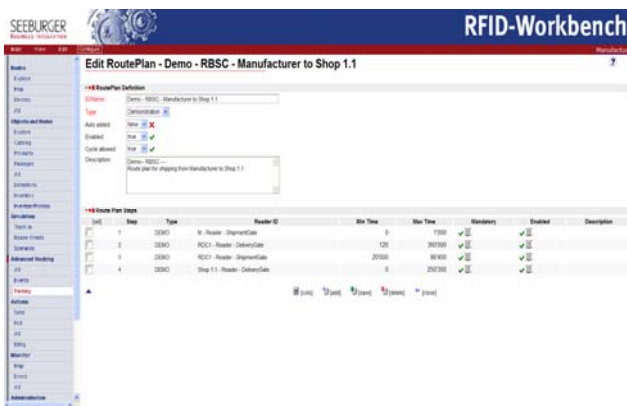


The RFID Workbench includes a complete event management system to combine situations/events around tagged items with according action steps. This allows an easier and improved control of processes.

A combination of events (a specified reader, location, item amount, item status, date, time etc.) can be used as an event trigger for according actions, error messages and alerts.

Example: Event management can be used to exclude incorrect delivery processes or prevent inventory processes from not following a 'FIFO-principle'.

**Planning Management**



Specific planning processes within RFID Workbench can be combined with defined process steps. This enables the definition of minimum/maximum times for processing of specific supply chain steps, and consequently triggering alerts in case of errors.

Example: Prevents items being stored longer than a defined period in a defined location.

## 1.4 RFID Workbench – Meeting Industry Mandates

The majority of major retailers including Wal-Mart, Target, Albertson's, as well as the Department of Defense are instituting mandates for compliance by their major suppliers. These organizations will not be the last. Movement toward RFID initiatives can already be seen in other industries including Healthcare, Medical Devices, Automotive, and Pharmaceuticals. These new mandates leave many suppliers with two core questions:

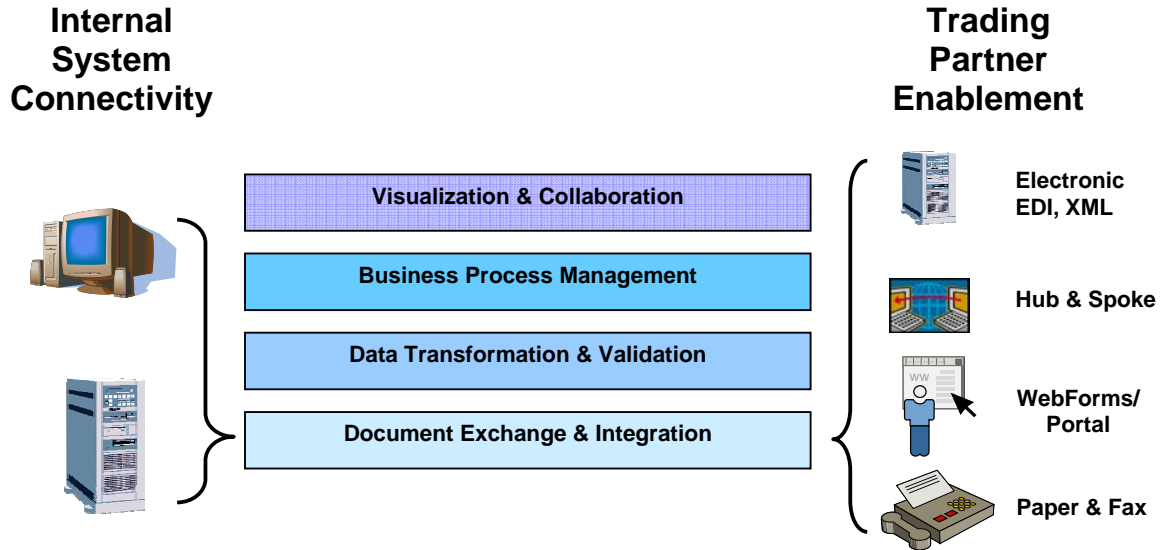
1. What do we have to do in order to comply?
2. How can we turn this cost into a positive investment?

The emergence of radio frequency identification (RFID) technology as a force in the supply chain has created the need for middleware that can manage the flow of data between tag readers and enterprise applications in order to facilitate intelligent use of information generated by RFID tags. Multiple vendors are entering the RFID middleware space, but most lack the ability to provide an end-to-end solution that can serve basic needs such as reader connectivity as well as more advanced requirements such as application integration. SEEBURGER's RFID Workbench is designed to address the full spectrum of RFID middleware needs, enabling an organization to implement RFID on a phased basis without changing middleware packages or engaging multiple providers.

### RFID Workbench- Compliance Functionality

- **Connecting to Hardware:** Workbench communicates directly to printers and devices allowing organizations to seamlessly program and link EPC and UPC codes.
- **Programming of RFID Infrastructure:** Workbench provides validation and authentication functionality ensuring the tags are working correctly and can be programmed with the required EPC Codes.
- **Data Catalog– Logging your Compliance:** For mandates driven by companies such as Wal-Mart, an organization must validate that the tags which are being transferred work correctly. By storing them in our system catalog you can verify that when they left your facility, they did in fact work. Therefore, your company avoids penalties or additional fees. Additionally, Workbench provides a searchable time log if research requests are initiated by the receiving organization.
- **Tag Consolidation:** Throughout the RFID process, case data must be consolidated to pallet tags. In Workbench, cases are read during packing and the combined data is matched to a single pallet tag. This is necessary as it is very difficult to get a 100% read of packed cases on a full pallet due to interference caused by packaging, tag locations, and load types (i.e. liquids can cause interference during the reading procedure).

## 1.5 SEEBURGER B2B Gateway – Platform Support for RFID



### The B2B Gateway Advantage

SEEBURGER's B2B Gateway is the most comprehensive and cost-effective business integration platform in the industry. Designed to cut administrative costs and accelerate business processes by automating trading relationships throughout the supply chain, it is the only middleware solution capable of integrating 100% of an organization's applications and trading partners --- including smaller customers and suppliers that still do business on paper. Over 6,500 customers in 35 countries utilize SEEBURGER's business integration solutions.

### Unique B2B Gateway Features and Capabilities

- 100% trading partner integration, with special solutions that automate document exchange via email, Web portal and even paper in order to extend connectivity to smaller trading partners that are not electronically enabled.
- Automated processing of paper transactions, including faxed documents, through a combination of OCR, artificial intelligence and data validation/exception handling that dramatically reduce manual data entry.
- One-platform architecture, with all components and adapters developed in-house by SEEBURGER to ensure compatibility, provide a common work environment, and simplify maintenance across the extended supply chain.
- Rapid deployment, typically two to three times faster than other solutions, via thousands of reusable industry-specific processes and templates, an extensive library of adapters, and a rapid implementation process.
- Reduced integration costs, achieved through a broad range of processes and components preconfigured for different industries and B2B/EDI standards, resulting in a faster return on investment.
- Modular implementation options, including the ability to deploy point solutions for Paper2ERP conversions or RFID data management, or implement a new protocol, without a full-blown application integration project.
- Extensive installed base and ERP vendor relationships, including the distinction of being the only B2B/EDI provider resold by SAP, Peoplesoft, and SSA Global.

## Key B2B Gateway Components

- *Configuration console* providing one view to establish and administer integration scenarios and trading partner relationships
- *Adapters and connectors* for seamless integration of applications, databases, marketplaces and/or portals.
- *Conversion engine*, a drag-and-drop tool for mapping any-to-any message conversions and creating rules for message standards and relationships.
- *Communication gateways* for establishing connections to external business partners, providing transport and transmitting required acknowledgements.
- *Business process & workflow designer* for defining, modifying and running rules-based business integration processes.
- *Monitoring tools* that track business integration processes, flag problems requiring user intervention, and facilitate document searches.
- *RFID Workbench*, an optional tool for managing RFID data, tags and hardware and integrating data into core systems.

## B2B Connectivity Options for Smaller Trading Partners

- *Paper2ERP*, enabling faxes and other paper documents to be processed electronically to reduce the time and error risks of manual data entry.
- *XMLMail*, offering two-way interactive email integration that automatically converts pre-configured populated forms sent by email into XML documents.
- *WebForms/Portal*, permitting electronic data exchange via Web browser with automatic generation of shipping notices, bar codes and other documents.
- *Hub & Spoke*, a centrally managed add-on component installed by smaller partners that integrates with the SEEBURGER B2B Gateway as well as the supplier's back-end application for seamless collaboration.

## B2B Gateway Business Benefits

- *Reduced handling costs*, achieved through end-to-end electronic transaction processing that eliminates manual data entry even for smaller partners.
- *Reduced inventory levels*, with associated cash flow benefits, produced by the availability of up-to-the-minute information along the value chain.
- *Faster transaction processing*, resulting from automation of all processes and the elimination of bottlenecks associated with manual data entry.
- *Shorter lead times and faster time to market*, made possible by the accelerated availability of information to all members of the supply chain.
- *Reduced IT maintenance expense*, provided by a simpler infrastructure that eliminates point-to-point connections and multiple integration technologies.

## Widespread Adoption

SEEBURGER's business integration solutions have been adopted by thousands of customers around the globe, including automotive OEMs and their suppliers as well as enterprises in the aerospace/defense, chemical, consumer packaged goods/ retail, energy/utilities, finance, insurance, manufacturing, paper, pharmaceutical/healthcare, and high-tech/telecommunications industries. U.S. clients range from Hyundai to Whirlpool, Chevron Philips Chemical, Bosch-Siemens, C&H Sugar and Goodyear.

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