



Returnable Shipping Asset Tracking System

WHITE PAPER



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INTRODUCTION

The mismanagement of returnable containers, such as crates, pallets, carts and other shipping containers can have massive effects on the time, labor and costs associated with their shipment and return from the customer.

Companies often have several locations and at each location there are thousands of crates. In the past, when the crates were shipped out, it was difficult to find out which customers they were sent to, how long they have been at customer’s site and when and if they were returned. This created problems, when there were not enough crates to fill new orders. Consequently, the company had to procure more crates, wasting money and time. To address this issue, the customer approached RFID4U to create a returnable asset management control system to provide complete visibility of their shipping containers.

Solution Overview

A full real-time visibility of returnable assets can be achieved by deployment of a Returnable Shipping Asset Tracking System (RSATS), which provides this capability through the use of cloud based applications, forklift mounted tablets, UHF RFID Tags, RFID enabled portals, RFID handheld scanners and bar code scanners. Let’s review the system components more closely.

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1. Solution Overview

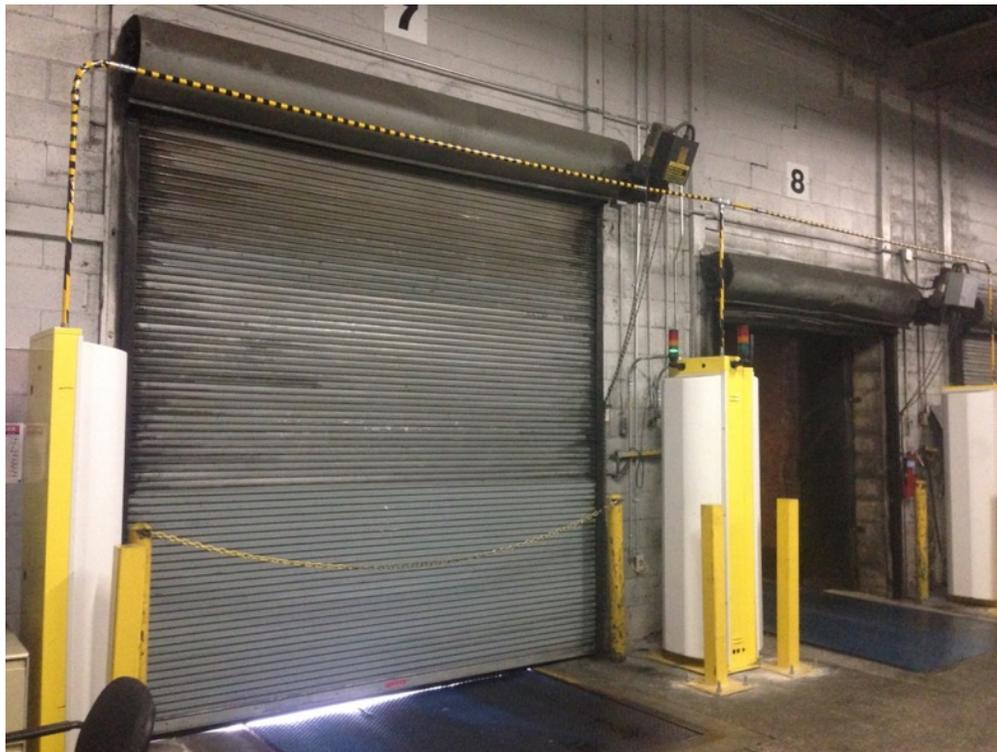
Returnable Shipping Asset Tracking System (RSATS)

A **cloud based application** is the heart of the system. We designed an RFID RSATS based on our **TAGMATIKS™ Rapid Development Platform**, that has been performing following tasks:

- Provide inventory control for returnable assets
- Interface with the corporate asset tracking system (VESTIGO) to download the shipping information
- Automatically collect the crate tracking data from RFID tags attached to crates using RFID portals
- Upload the RFID collected asset tracking data to the corporate asset tracking system
- Commission the UHF RFID tags and bar code labels through an easy to use application (Bar Code Printer Application)
- Provide secure user access and visibility controls
- Create and distribute dashboard information and reports

To enable tracking individual crates, **UHF RFID tags** were affixed to each crate, lid of the crate and inside divider. Each tag has a unique serialized ID number and a barcode printed on a label. The choice of a particular tag was based on the container material, material of what's inside the container, reading distance, need for visible markings such as barcode and other considerations.

In order to capture the information from the RFID tags, **RFID portals** were installed. These were placed at dock doors. For mobile reading and verification, **RFID handhelds and barcode scanners** were deployed as well.



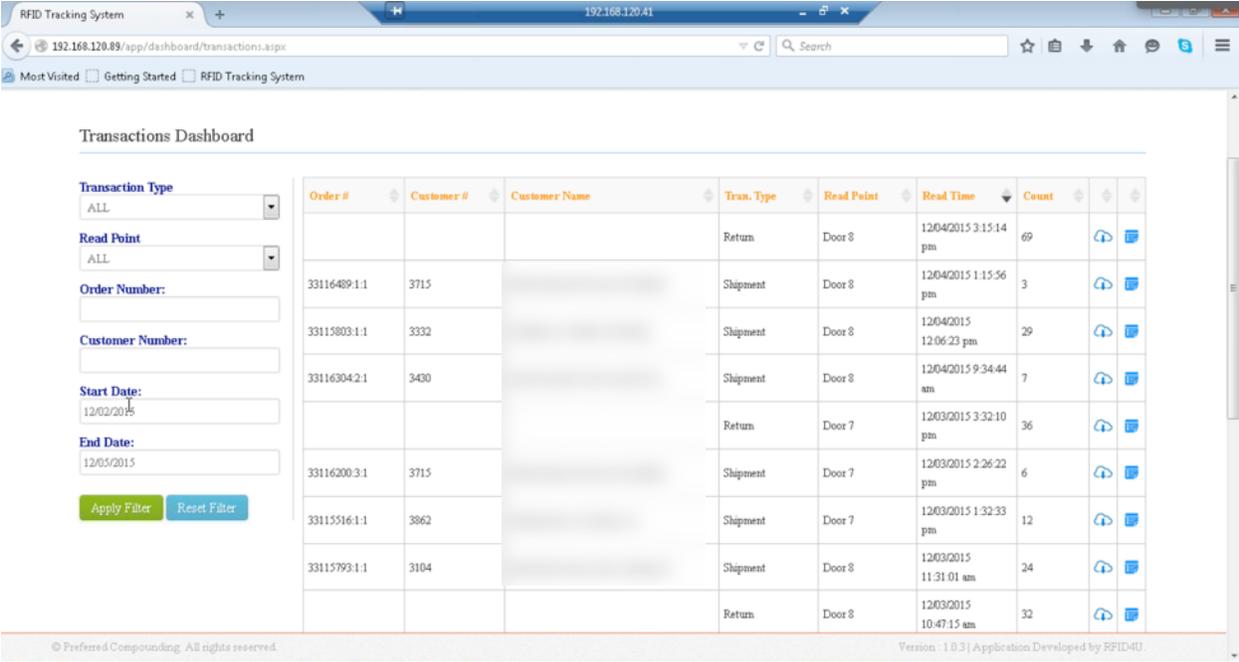
We have, also, helped develop **business operational procedures** for efficiently functioning system using our platform and technology.

2. Dashboards and Reports

The RSATS system creates a number of real-time dashboards and reports, that are updated automatically from the task data. These dashboards and reports reside in the cloud and are updated as data is collected by the RFID, barcode or mobile devices.

Dashboards can be exported to Excel or PDF format. The reports can be generated in any format including Excel and PDF.

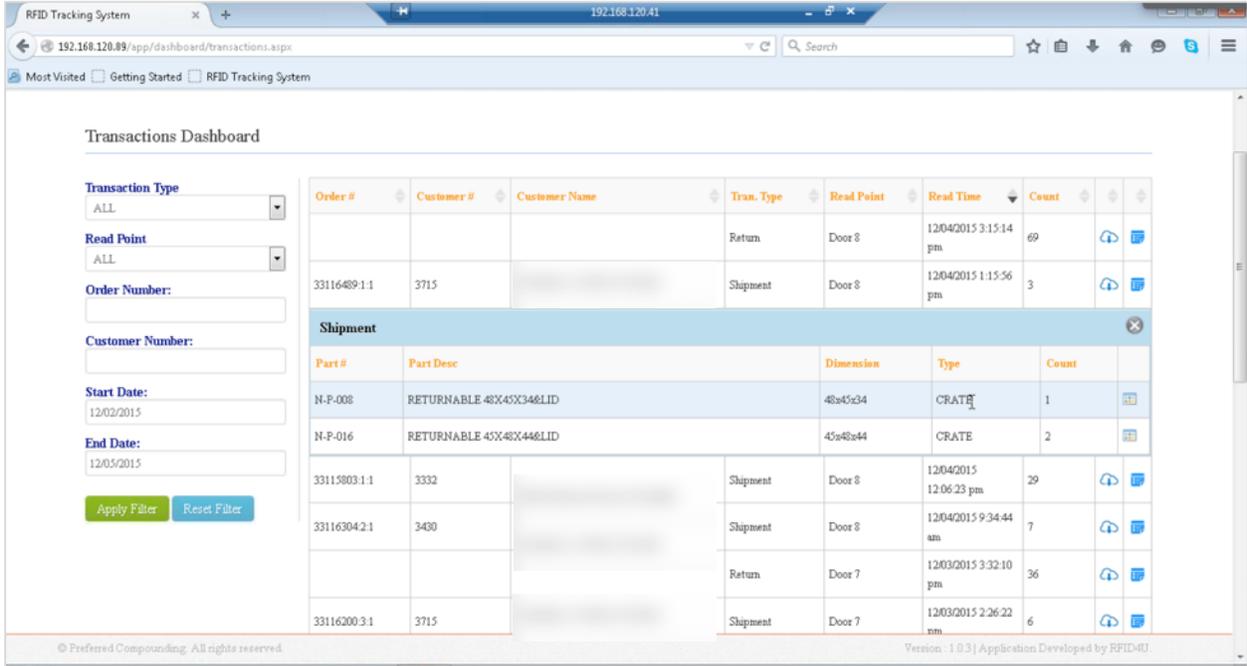
The reports are automatically distributed to the end user via a production and distribution schedule. The reports can also be distributed “On Demand”. Below is an example of Transactions Dashboard, which is sortable and filterable by Transaction Type, Read Point, Order Number, Customer Number, Start and End Date.



By clicking on a Cloud icon, you can see details of the particular order shipped including crate type, dimensions, count, all the way to part numbers of materials shipped (by clicking on the Calendar icon within the Shipment window).

By clicking on a Calendar icon you can see serial number, device, source antenna and time of reading. This is the RFID read point information.

Since each crate, lid, divider, etc. has a unique serial number the Return transactions don't require customer information. The individual components are automatically logged out of the customer site and returned to available inventory.



3. Interface to Corporate Systems

Returnable Assets, in order to be tracked, must be associated with the customer shipment. RSATS provides the capability at the time of shipment to extract customer shipment data from corporate systems and data repositories. The customer shipment number can be collected by reading the customer order number from a bar code printed on the shipping documents or manually entered via the tablet or RFID handheld.



To create a shipment, the shop order information is located and downloaded from the corporate order management system to the RSATS. By entering the shop order number, followed by the release number and sequence number, which identify a unique customer order, the customer order information automatically populates into their respective fields. The system allows for changing the shop order number and, if necessary, manually entering the customer data.

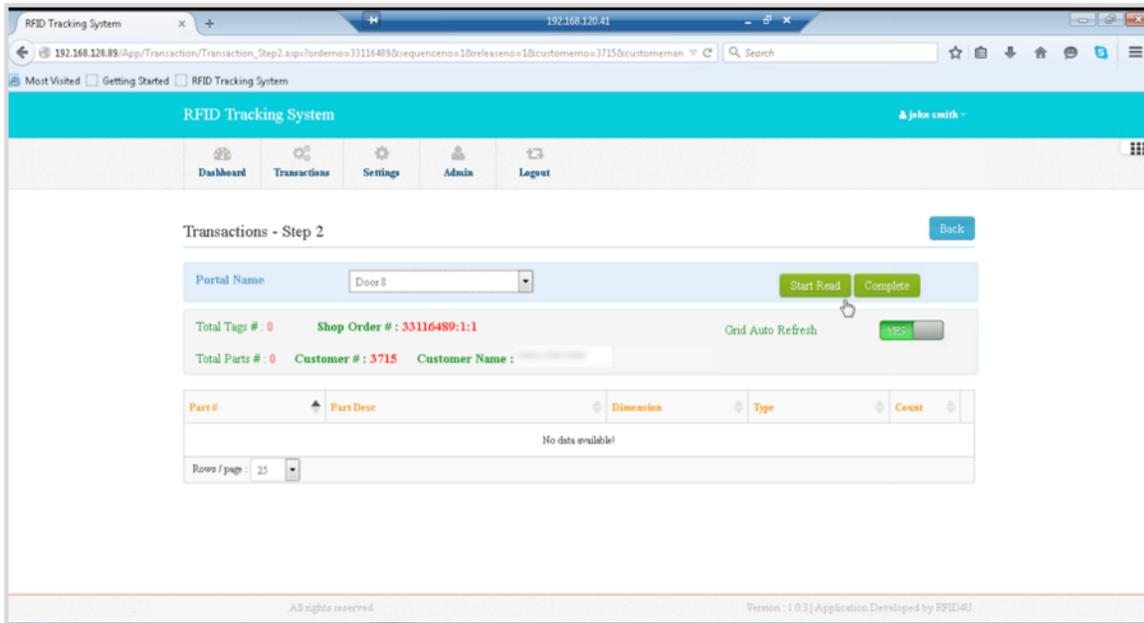
The customer data retrieved is displayed on any computing device with a display screen, including tablets, laptops, smart phones, PCs, handhelds, etc. Once displayed, the information on the shipping documents can be compared to the retrieved data to ensure the shipment is going to the correct customer.

Step 1: Shop Order

The screenshot shows the 'RFID Tracking System' web application. The browser address bar displays '192.168.128.85/App/Transaction/Transaction_Step1.aspx'. The page has a teal header with the system name and a user profile 'John Smith'. Below the header is a navigation menu with 'Dashboard', 'Transactions', 'Settings', 'Admin', and 'Logout'. The main content area has two tabs: 'Scan Shop Order' and 'Manual Entry', with 'Manual Entry' selected. A 'Back' button is in the top right. The form includes a 'Site Name' field with 'Burbeton Site 10'. Below this is a search bar with fields for 'Shop Order #' (containing '331164011'), 'Release #' (containing 'Release #'), and 'Sequence #' (containing 'Sequence #'). There is a 'Search' button and a 'Change Shop Order #' checkbox. The form also contains several input fields for 'Order No:', 'Release No:', 'Sequence No:', 'Customer No:', 'Customer Name:', 'Ship To Address:', 'Customer PO:', 'Recipe No:', 'Recipe Description:', and 'Salesman:'. At the bottom right of the form are 'Confirm' and 'Reject' buttons. The footer of the page reads 'Version: 1.0.3 | Application Developed by RFID4U'.

Step 2: Registration (reading) of shipment

Once the shop order is found, it is now read and validated. The Dock Door is selected and when the Start Reading button is pushed, the RFID tags on the crates are read and the data about the order (crates and other tagged containers or parts associated with the items inside) are shown in the same format as on the Dashboard screen. After all items are read, the Complete button is pressed, the transaction is finished and the collected data is sent to the corporate asset tracking system. Grid Auto Refresh allows for refreshing the item list every 5 seconds.



For returns – there is no need for a customer, RFID tag is read and the ID is matched with the asset management system and asset marked as Returned.

The data from the actual shipment can be collected through the use of RFID portals, RFID hotspots and RFID handhelds. Once collected, the data is edited, verified and then passed, automatically, in near real time, to the appropriate corporate system or database.

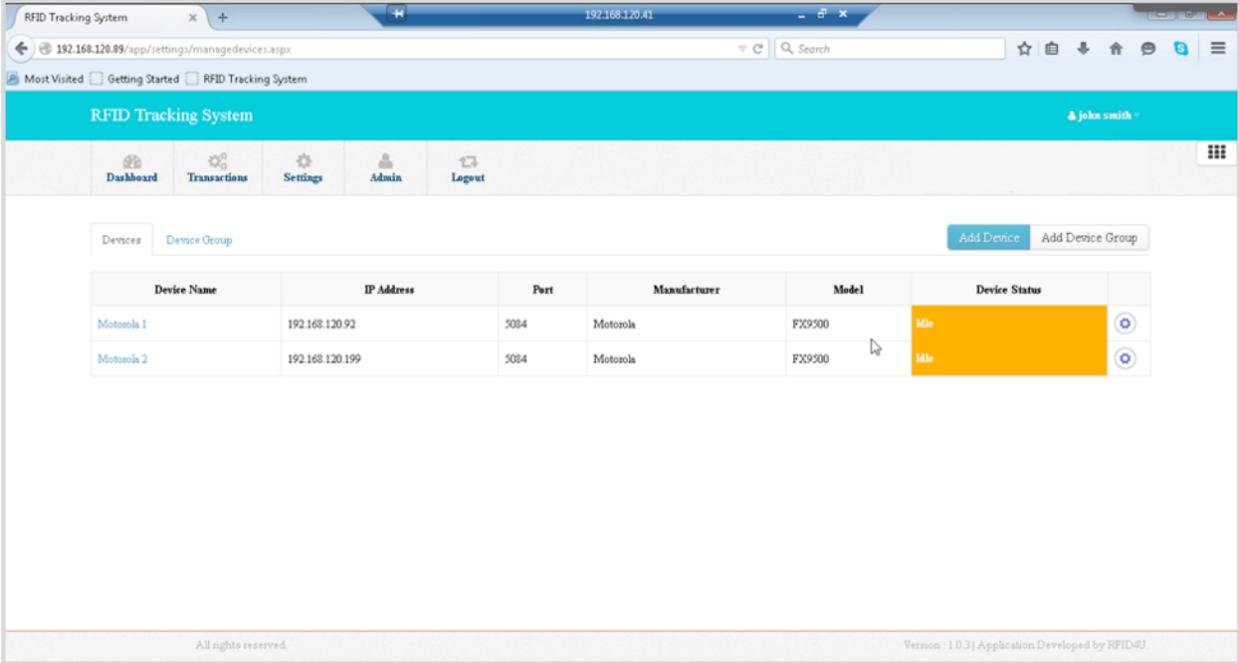
4. Asset Data Collection

RSATS provides the capability to collect the asset data with a variety of technologies including:

1. Bar Codes
2. RFID
 - a. Portals
 - b. Handhelds
 - c. Hot Spots
3. Mobile Devices
 - a. Smart Phones
 - b. Tablets

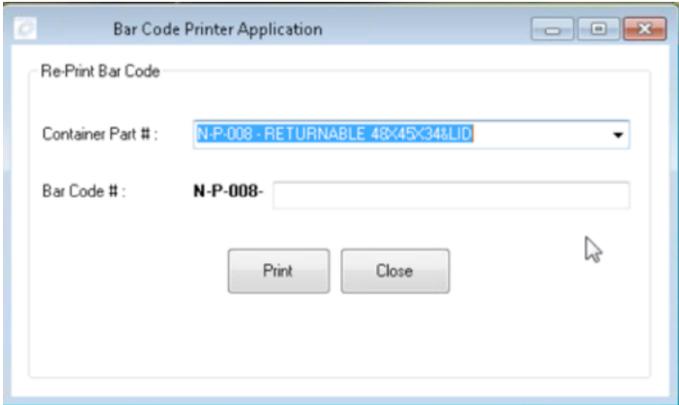
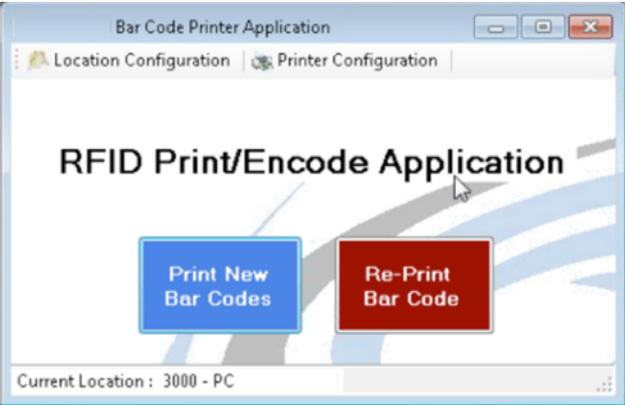
5. Device Management

The system also allows for device management, which shows the type of the device and its status such as Reading, Idle and Stopped. Here you can also add new devices as well as associate devices to reading portals, e.g. Dock Door XYZ.



6. Tag Commissioning and Creation

The RSATS system provides a simple application to create, print and encode generic or serialized asset identification numbers. Physical barcode labels and RFID tags can be printed and encoded via any Bar Code and RFID Printer/Encoders.

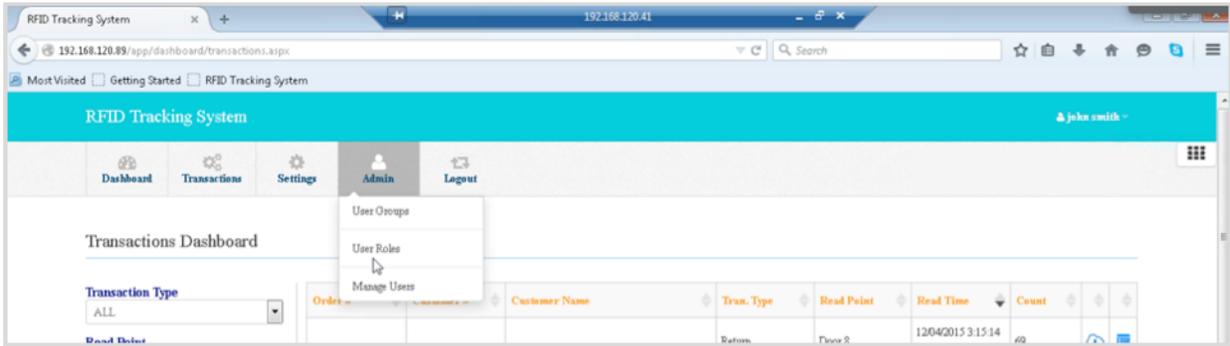


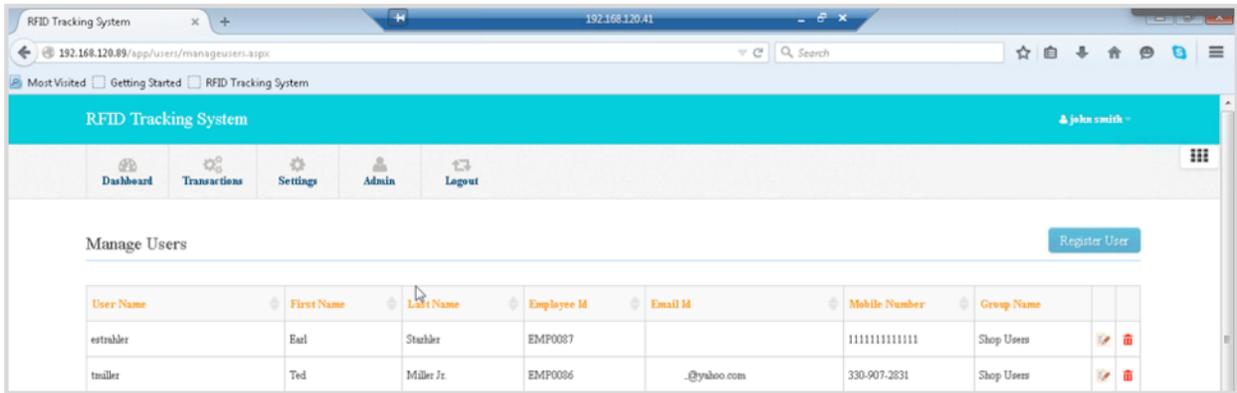


7. Secure User Access

Two sets of personnel security tables have been created to provide access control and task assignment management. Both, together, control what an individual can see on the device screen and what task can be seen or assigned.

The first set of tables provide encrypted and secure logins with ID and password. The second set of tables controls what task each individual is authorized to perform and which tasks he/she can assign.





8. Benefits

The RSATS system provides a complete visibility of the returnable assets within the supply chain. Based on the tracking information, it is easy to manage container inventory, to see which containers are in inventory and which out at the customer.

RSATS provides a complete container history, including the time they were shipped or returned. This prevents unnecessary manual searches, investment in additional containers and increases efficiency of container usage.

Crates not returned within the scheduled time frame, create alerts, which direct the sales staff to contact the customer to remind them of the return.

The system also makes it possible to quickly verify that the containers carry the correct shipment and go to the right customer thus increasing shipment accuracy and customer satisfaction.