



VESUVIUS



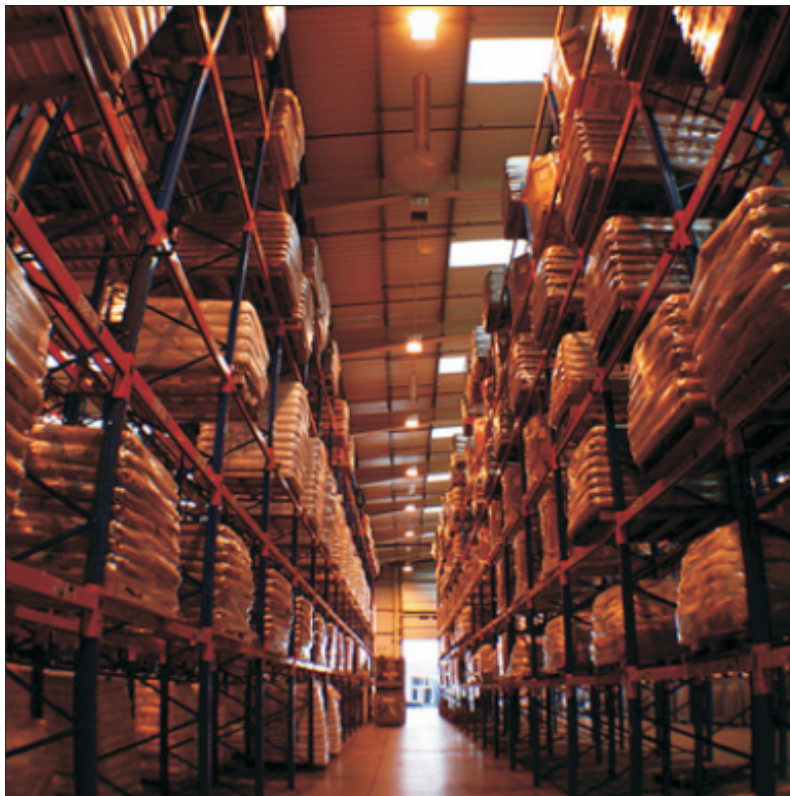
## Specialist provider of refractory products adopts a RFID-enabled INVENTORY MANAGEMENT SYSTEM

RFID based pallet and forklift tracking system increases efficiency of the warehousing process

Automated identification and optimum rack management

Facilitates QC processes and efficient FIFO utilization

RFID enabled silo operation and PLC integration



INSIDE:

Key Requirements  
Solution  
Implementation  
Working  
Benefits  
Links

### TECHNOLOGY

**Solution:**

EPC Gen2 compliant  
inventory tracking solution

**Tag Type:**

$\mu$ Metallica™ UHF Passive  
Metallica™ UHF Passive

**Reader/Antenna:**

Xtenna Proximity™  
Xtenna Hybrid™  
HandyScanna™

**Method:**

Multiple Tracking via Integrated  
Reader/Antenna modules  
Single Tracking via hand-held

**Integration Platform:**

**RFID Middleware:**

Xtenna™ WebToolkit  
Xtenna™ Studio

**Application:** Essen RFID's

Inventory Management System

**Database:** SQL Server 2005 Exp. ed.

**PLC Integration:** SCADA

**Tag Manufacturer/Supplier:**

Essen RFID, with US based chip inlay

**Reader/Antenna Manufacturer:**

Essen RFID, with US based module

**Systems Integrator:**

Essen RFID

For further details contact:

**Essen RFID**

24-B, Jolly Maker II  
Nariman Point  
Mumbai 400021 India  
[www.essenrfid.com](http://www.essenrfid.com)





## CASE STUDY

### KEY REQUIREMENTS:

Vesuvius has a long experience in the supply of refractories for all areas of the cement production process. Cement material is packed in large bags. When a truck is unloaded, bags are placed on pallets. These pallets are carried by forklifts into the warehouse for storage. A small sample is taken from each bag in a laboratory test jar for quality testing. When an order is received, a forklift collects a pallet from the warehouse and takes it to the silo that currently needs the cement for mixing.

Main challenges in implementation:

- Difficulty in identifying which forklift is available for use at any particular moment.
- Requires efficient storage rack management in the placement of pallets inside the warehouse at a very hectic pace.
- Ensuring that the FIFO process is adhered to during material utilization.
- Difficulty in locating a particular pallet within the warehouse.
- Requires efficient forklift management when orders are received for pickup and delivery to a particular silo.

### SOLUTION:

Essen RFID offered a solution for efficiently managing forklifts and accurately placing pallets in the warehouse. RFID tags are used for identification of bags, pallets and forklifts, which are assigned and located using HandyScanna™ antenna-readers. Test jars are tagged and grouped with the bag from which the sample is being taken. Tags are also affixed to each shelf in the warehouse so that their location can be identified through RFID. Using RFID based pallet and forklift tracking software allows Vesuvius to manage the placement of bags and pallets, as well as manage forklift operations and dispense material to the correct silo.



### IMPLEMENTATION:

Essen RFID deployed its  $\mu$ METALLICA™ tags for identifying each bag, pallet and forklift. A METALLICA™ tag is affixed to each location for its unique identification. Xtenna Proximity™ reader was used to register each bag and pallet, while a HandyScanna™ reader was used for reading the tags affixed to them. Xtenna Hybrid™ antenna-readers installed at the gate of the warehouse track forklifts leaving with the pallets. Forklifts are mounted with a Xtenna Hybrid™ and touchscreen for the operator. The solution uses SQL Server at the backend and a mobile based application is used on the HandyScanna™. When a tag is scanned, the updated details are sent by HandyScanna™ to the SQL Server via Wi-Fi connectivity.



## CASE STUDY



### WORKING:

Essen RFID's tracking system Suchishashtra™ consists of the following:

- Download GRN service
- Web application
- HandyScanna™ application
- Tablet application
- Download data from PLC



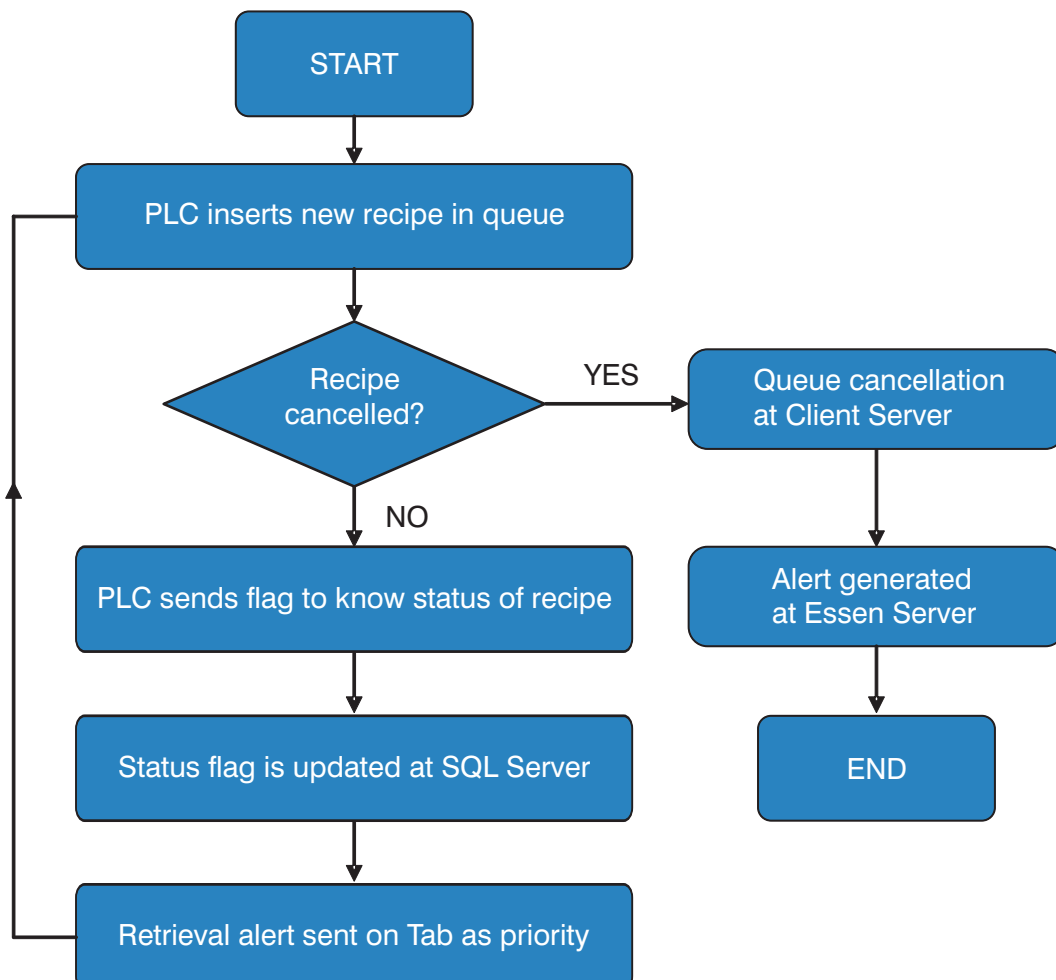
## CASE STUDY

### Download GRN Service:

The Download GRN service runs on the Essen Server. The service creates a connection between the Client Server and the Essen Server, and any new data found on the Client Server gets downloaded on to the Essen Server. The GRN service downloads material data, GRN (Goods Receipt Number) data and PO (Purchase Order) data into the SQL Server database.

### Download Data from PLC:

PLC programming is used by the client for managing the mixing recipe at silos. When a recipe transaction is created by the client, that data is downloaded into SQL Server using the Download Data from PLC service. Any new recipe transaction goes into the queue and the queue data is downloaded from the PLC. Once the data gets downloaded into SQL Server, the details of material retrieval are sent to the tablet and a retrieval alert is displayed on the tab screen. If a recipe transaction is cancelled through the PLC, the cancel information is provided by the PLC to the service and the data is updated at the SQL Server. Once data is updated, an alert message is sent to the tablet to stop the retrieval task of that recipe.

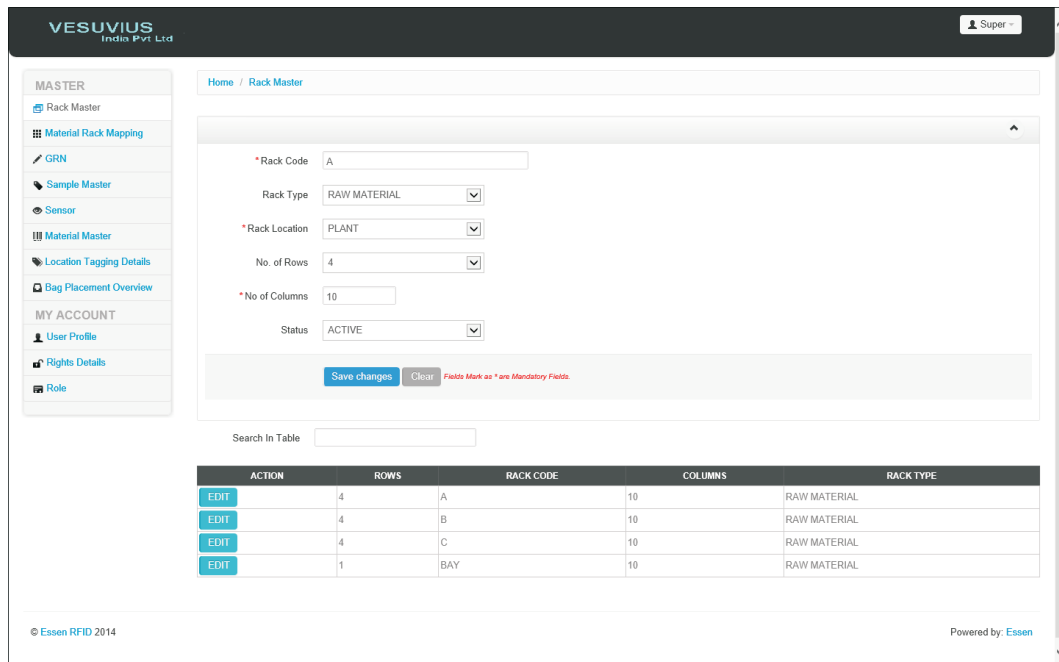




## CASE STUDY

### Web Application:

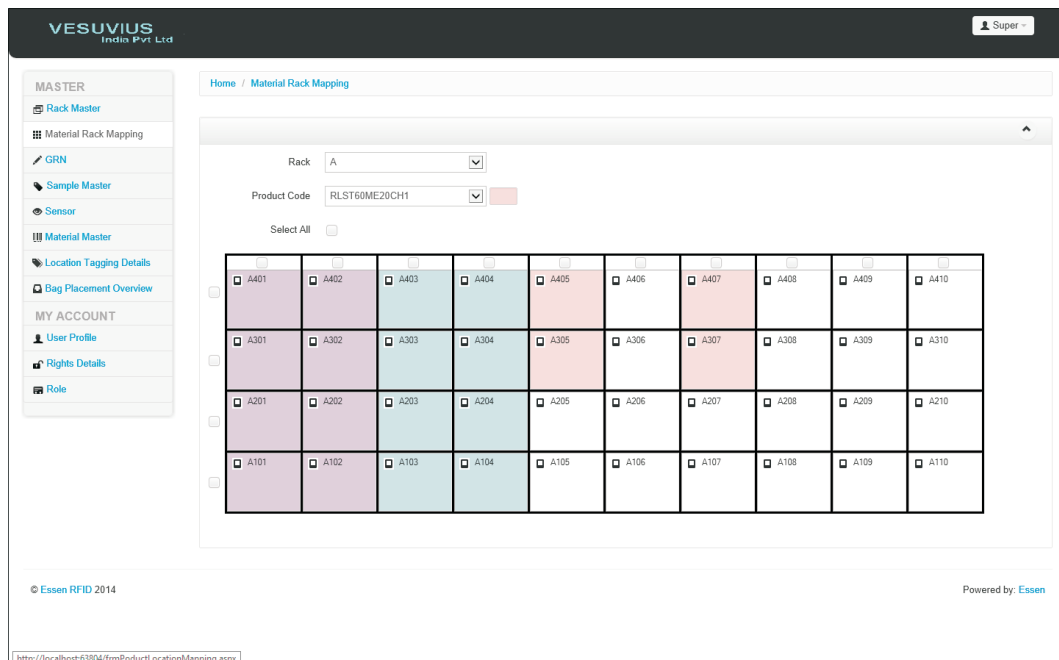
**Rack Master:** This is used for creating logical racks in the database. Raw material and discharge material bags are stored on these racks and the Rack Master creates a logical and pictorial representation of the racks in the system. The rack type is selected and columns and rows are used for creating the number of cells (racks) as per the physical racks.



The screenshot shows the 'Rack Master' web application interface. The top navigation bar includes the 'VESUVIUS India Pvt Ltd' logo and a user profile dropdown. The left sidebar contains a 'MASTER' menu with options like 'Rack Master', 'Material Rack Mapping', 'GRN', 'Sample Master', 'Sensor', 'Material Master', 'Location Tagging Details', and 'Bag Placement Overview'. The main content area displays the 'Rack Master' form with fields for 'Rack Code' (A), 'Rack Type' (RAW MATERIAL), 'Rack Location' (PLANT), 'No. of Rows' (4), 'No. of Columns' (10), and 'Status' (ACTIVE). Below the form is a table with columns: ACTION, ROWS, RACK CODE, COLUMNS, and RACK TYPE. The table lists four racks: A, B, C, and BAY, each with 4 rows and 10 columns, and a status of RAW MATERIAL. The footer shows '© Essen RFID 2014' and 'Powered by: Essen'.

ACTION	ROWS	RACK CODE	COLUMNS	RACK TYPE
EDIT	4	A	10	RAW MATERIAL
EDIT	4	B	10	RAW MATERIAL
EDIT	4	C	10	RAW MATERIAL
EDIT	1	BAY	10	RAW MATERIAL

**Rack Mapping Details:** The rack is displayed in rows and columns format. Once a rack is created and mapped, the user can assign materials to that particular rack and the rack is used for storing the assigned material.



The screenshot shows the 'Rack Mapping Details' web application interface. The top navigation bar includes the 'VESUVIUS India Pvt Ltd' logo and a user profile dropdown. The left sidebar contains a 'MASTER' menu with options like 'Rack Master', 'Material Rack Mapping', 'GRN', 'Sample Master', 'Sensor', 'Material Master', 'Location Tagging Details', and 'Bag Placement Overview'. The main content area displays the 'Material Rack Mapping' form with fields for 'Rack' (A) and 'Product Code' (RLST60ME20CH1). Below the form is a grid of 100 cells (10 rows by 10 columns) representing the rack layout. Each cell contains a unique identifier (e.g., A401, A402, A403, A404, A405, A406, A407, A408, A409, A410) and a checkbox for selection. The footer shows '© Essen RFID 2014' and 'Powered by: Essen'.

Row	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10
1	A401	A402	A403	A404	A405	A406	A407	A408	A409	A410
2	A301	A302	A303	A304	A305	A306	A307	A308	A309	A310
3	A201	A202	A203	A204	A205	A206	A207	A208	A209	A210
4	A101	A102	A103	A104	A105	A106	A107	A108	A109	A110



## CASE STUDY

**Location Tagging Details:** A METALLICA™ RFID tag is affixed to each rack. The tag is assigned to its respective rack using the HandyScanna™ application, after which the user can view the registered location details on this screen along with the total count.

**VESUVIUS**  
India Pvt Ltd

Super

MASTER

- Rack Master
- Material Rack Mapping
- GRN
- Sample Master
- Sensor
- Material Master
- Location Tagging Details
- Bag Placement Overview

MY ACCOUNT

- User Profile
- Rights Details
- Role

Home / Location Tagging Details

Location Type: REGISTERED

Total Locations: 130

Registered Locations: 20

Rack Code	Rack Location	TAG_ID	CREATED BY	CREATED ON
A	A401	0B0501413430310000000000	2	10/09/2014 1:12:34 PM
A	A301	0B0501413330310000000000	2	10/09/2014 1:12:34 PM
A	A302	0B0501413330320000000000	2	10/09/2014 1:12:34 PM
A	A201	0B0501413230310000000000	2	10/09/2014 1:12:34 PM
A	A202	0B0501413230320000000000	2	10/09/2014 1:12:34 PM
A	A203	0B0501413230330000000000	2	10/09/2014 1:12:34 PM
A	A204	0B0501413230340000000000	2	10/09/2014 1:12:34 PM
A	A101	0B0501413130310000000000	2	10/09/2014 1:12:34 PM
A	A102	0B0501413130320000000000	2	10/09/2014 1:12:34 PM
A	A103	0B0501413130330000000000	2	10/09/2014 1:12:34 PM

© Essen RFID 2014

Powered by: Essen

**GRN Details:** The GRN (Goods Receipt Number) is created at the Client Server. The Essen Server downloads the GRN details along with its respective mapping material and PO (Purchase Order). The user enters the bag count details against the GRN.

**VESUVIUS**  
India Pvt Ltd

Super

MASTER

- Rack Master
- Material Rack Mapping
- GRN
- Sample Master
- Sensor
- Material Master
- Location Tagging Details
- Bag Placement Overview

MY ACCOUNT

- User Profile
- Rights Details
- Role

Home / GRN Master

\* GRN No: 39199

\* GRN Date: 07/18/2014

\* Bag Count: 4

\* Supplier: CARB03

Remarks:

Status: ACTIVE

Map Material Map P.O.

ID: 1

Save changes Clear Please click on any mandatory fields

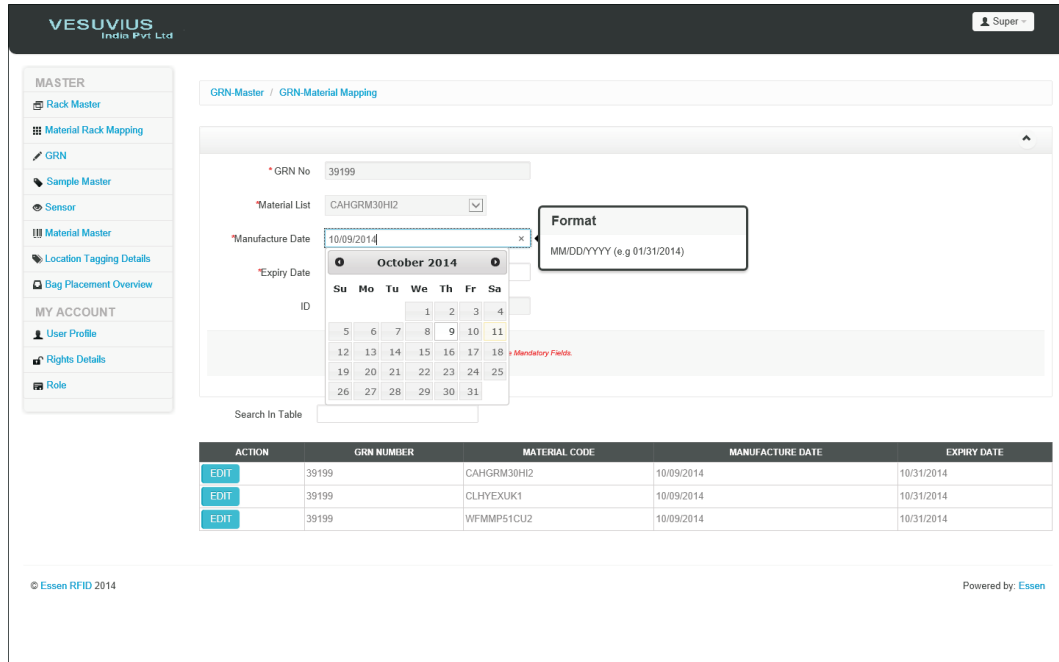
Search in Table

ACTION	ID	GRN NUMBER	GRN DATE(MM/DD/YY)	BAG COUNT	REMARKS	SUPPLIER	STATUS
EDIT	1	39199	07/18/2014	4		CARB03	ACTIVE
EDIT	2	39198	07/18/2014	2		MVEL01	ACTIVE
EDIT	3	39197	07/15/2014	2		DRKH01	ACTIVE
EDIT	4	39196	07/15/2014	2		ELKE07	ACTIVE
EDIT	5	39195	07/15/2014	4		SRIS22	ACTIVE
EDIT	6	39194	07/15/2014	0		ALCO08	ACTIVE
EDIT	7	39193	07/15/2014	0		VINA04	ACTIVE
EDIT	8	39200	07/18/2014	0		CARB03	ACTIVE
EDIT	9	39201	07/18/2014	0		CARB03	ACTIVE
EDIT	10	39202	07/18/2014	0		CARB03	ACTIVE



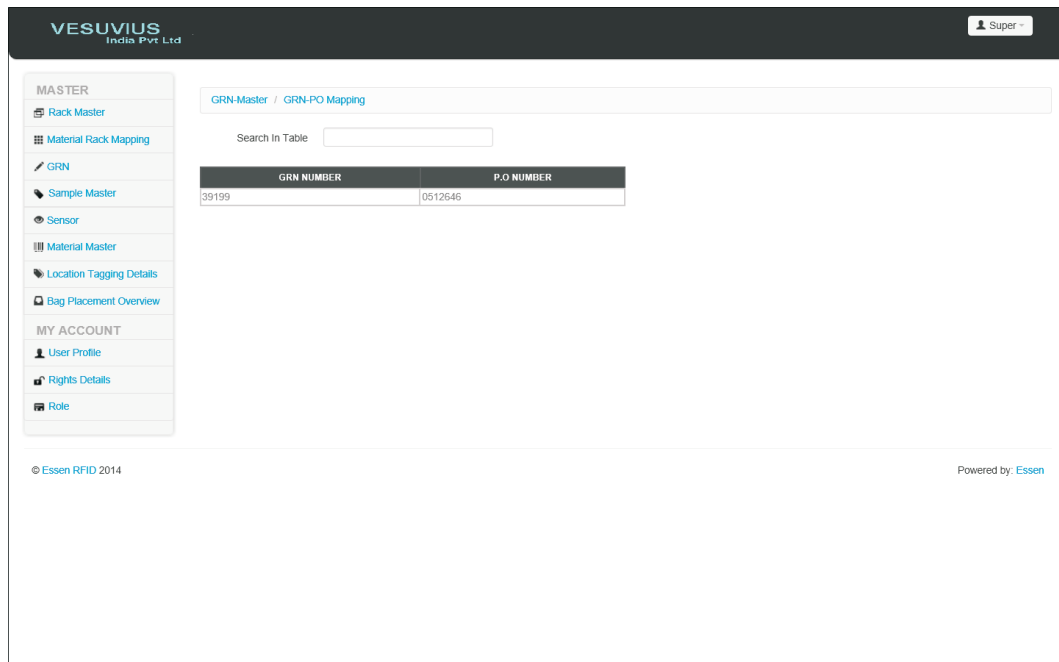
## CASE STUDY

**GRN Material Mapping:** Here the user selects the GRN material and selects the manufacturing date and expiry date.



ACTION	GRN NUMBER	MATERIAL CODE	MANUFACTURE DATE	EXPIRY DATE
EDIT	39199	CAHGRM30HI2	10/09/2014	10/31/2014
EDIT	39199	CLHYEXUK1	10/09/2014	10/31/2014
EDIT	39199	WFMPMP51CU2	10/09/2014	10/31/2014

**GRN PO Mapping:** The PO details are downloaded from the Client Server into the Essen Server along with the GRN. This screen allows the user to view the PO details within GRN. One GRN can have multiple purchase orders.



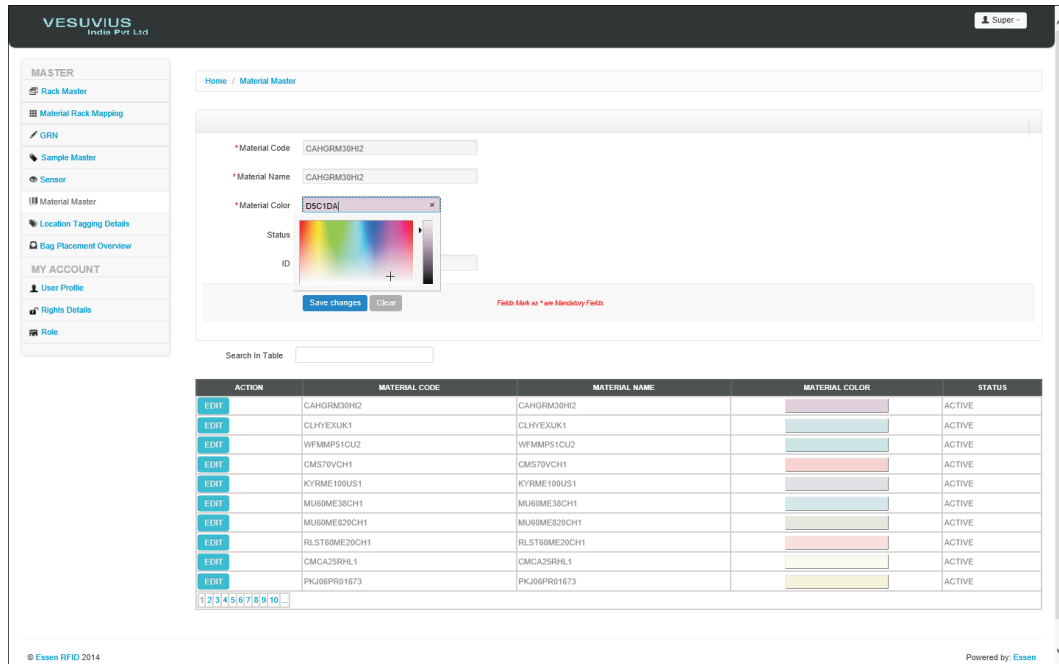
GRN NUMBER	P.O NUMBER
39199	0512646





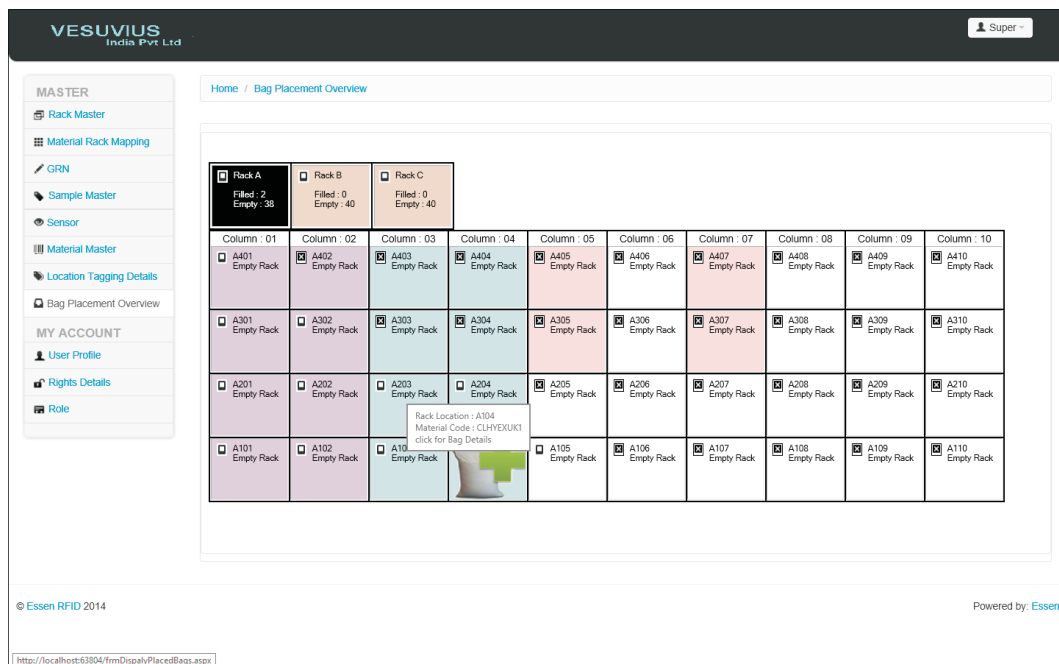
## CASE STUDY

**Material Master:** In this screen, the user selects a display colour for a particular material. This colour is displayed on the rack when that particular material is assigned to that rack. This helps in easily identifying the location of materials on the racks.



ACTION	MATERIAL CODE	MATERIAL NAME	MATERIAL COLOR	STATUS
EDIT	CAHGRM30H2	CAHGRM30H2		ACTIVE
EDIT	CLHYEXUK1	CLHYEXUK1		ACTIVE
EDIT	WFMMP51CU2	WFMMP51CU2		ACTIVE
EDIT	CMS70VCH1	CMS70VCH1		ACTIVE
EDIT	KYRME100US1	KYRME100US1		ACTIVE
EDIT	MU60ME38CH1	MU60ME38CH1		ACTIVE
EDIT	MU60ME20CH1	MU60ME20CH1		ACTIVE
EDIT	RLST60ME20CH1	RLST60ME20CH1		ACTIVE
EDIT	CMCA25RHL1	CMCA25RHL1		ACTIVE
EDIT	PKJ06PR01673	PKJ06PR01673		ACTIVE

**Bag Placement:** Bags are placed on the racks using forklifts and placement details are sent to the server through wi-fi connectivity. With this screen, the user can view the location of material without having to go to the actual warehouse storage room.



Column: 01	Column: 02	Column: 03	Column: 04	Column: 05	Column: 06	Column: 07	Column: 08	Column: 09	Column: 10
A401 Empty Rack	A402 Empty Rack	A403 Empty Rack	A404 Empty Rack	A405 Empty Rack	A406 Empty Rack	A407 Empty Rack	A408 Empty Rack	A409 Empty Rack	A410 Empty Rack
A301 Empty Rack	A302 Empty Rack	A303 Empty Rack	A304 Empty Rack	A305 Empty Rack	A306 Empty Rack	A307 Empty Rack	A308 Empty Rack	A309 Empty Rack	A310 Empty Rack
A201 Empty Rack	A202 Empty Rack	A203 Empty Rack	A204 Empty Rack	A205 Empty Rack	A206 Empty Rack	A207 Empty Rack	A208 Empty Rack	A209 Empty Rack	A210 Empty Rack
A101 Empty Rack	A102 Empty Rack	A103 Empty Rack	A104 Empty Rack	A105 Empty Rack	A106 Empty Rack	A107 Empty Rack	A108 Empty Rack	A109 Empty Rack	A110 Empty Rack





## CASE STUDY

**Sample Master:** This is a very important process for quality checking. An authorized person retrieves a sample quantity from the bag for testing. When testing results arrive from the laboratory, its status is modified through the Sample Master. The GRN is selected and its sample details are displayed on screen. The user selects the sample and enters details such as test date and lab expiry date. When the result arrives, its status is updated as 'Tested OK' or 'Tested Not OK'. Only those bags are sent for retrieval whose test results status is marked 'Tested OK'.

VESUVIUS  
India Pvt. Ltd

Super

MASTER

Rack Master

Material Rack Mapping

GRN

Sample Master

Sensor

Material Master

Location Tagging Details

Bag Placement Overview

MY ACCOUNT

User Profile

Rights Details

Role

Home / Sample

GRN No 39199

Sample Data:

Sample	Bag No	MAT CODE	Sample Date	Tested Date	Tested By	Lab Exp Date	Remarks	Test Result	ACTION
0000000001	2	CAHGRM30HI2	10/10/2014	10/10/2014		10/31/2014	Test	TESTED OK	<input checked="" type="checkbox"/> Update

Bag Data:

Bag No	MAT Code	Lab Exp Date	Test Result
2	CAHGRM30HI2	10/31/2014	TESTED OK <input checked="" type="checkbox"/>
3	CAHGRM30HI2	10/31/2014	TESTED OK <input checked="" type="checkbox"/>
15	CAHGRM30HI2	10/31/2014	TESTED OK <input checked="" type="checkbox"/>

Update Bag Data

© Essen RFID 2014

Powered by: Essen

**Sensor Master:** All tablets and HandyScanna™ details are saved into the Sensor Master.

VESUVIUS  
India Pvt. Ltd

Super

MASTER

Rack Master

Material Rack Mapping

GRN

Sample Master

Sensor

Material Master

Location Tagging Details

Bag Placement Overview

MY ACCOUNT

User Profile

Rights Details

Role

Home / Sensor Master

\*Sensor Code HANDY-001

\*Location PLANT

\*Sensor Type HANDYSCANNA READER

Sensor Desc handyScanna 1

\*Device ID 354720054418012

Status ACTIVE

ID 1

Save changes Clear Fields Mark as \* are Mandatory Fields

Search in Table

ACTION	SENSOR TYPE	SENSOR CODE	DESCRIPTION	DEVICE ID	STATUS	LOCATION NAME
EDIT	HANDYSCANNA READER	HANDY-001	handyScanna 1	354720054418012	ACTIVE	PLANT
EDIT	TABLET DEVICE	TAB-01	TABLET-01	192.168.123.119	ACTIVE	PLANT
EDIT	TABLET DEVICE	TAB-02	TABLET-02	192.168.123.112	ACTIVE	PLANT
EDIT	TABLET DEVICE	TAB-03	TABLET-03	192.168.123.113	ACTIVE	PLANT
EDIT	HANDYSCANNA READER	Handy-002	handyScanna 2	22222	ACTIVE	PLANT
EDIT	HANDYSCANNA READER	Handy-003	handyScanna 3	111111	ACTIVE	WAREHOUSE

© Essen RFID 2014

Powered by: Essen



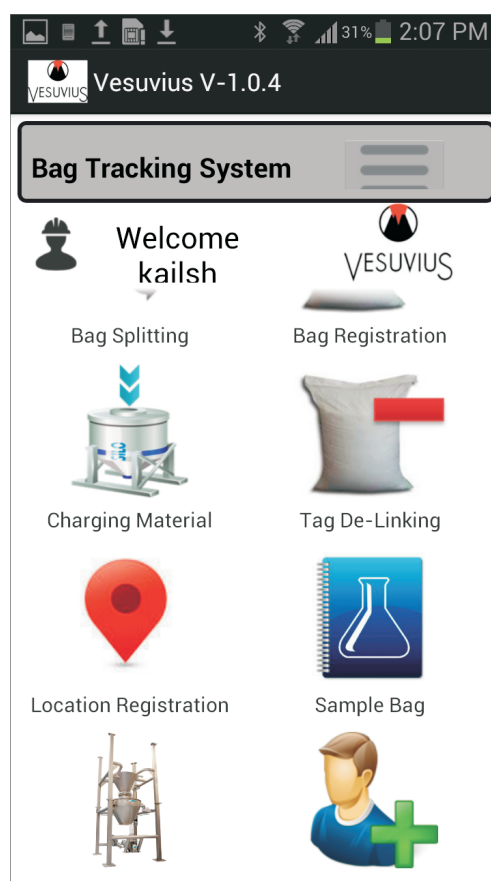
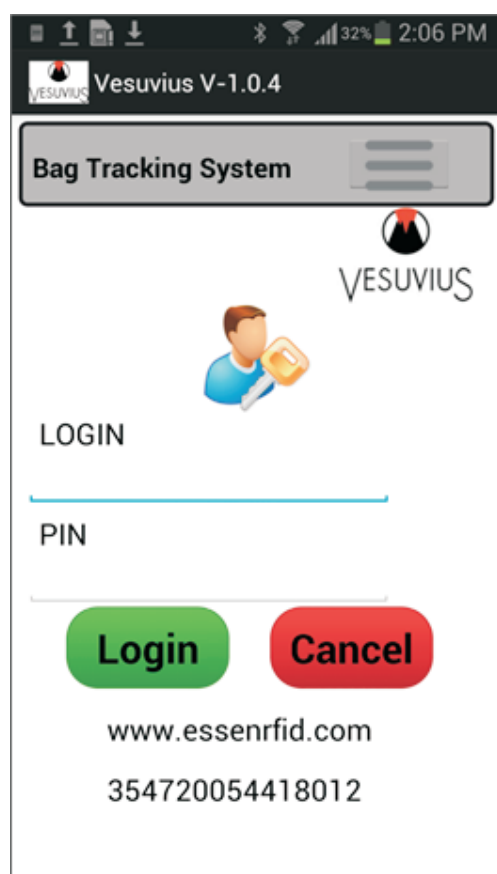
## CASE STUDY

### HandyScanna™ Application:

The HandyScanna™ hand-held device performs the following functionality:

- Location Registration
- Bag Registration
- Sampling
- Bag Splitting
- Charging
- Discharging
- Tag De-linking

Login: Only an authorized user can log into the HandyScanna™ application.



**Location Registration (Rack Tagging):** After the web application has created the racks, the data is downloaded into HandyScanna™ through wi-fi. The user searches the rack code and scans the RFID tag of each rack and saves the data, which is then sent back to the server via wi-fi connectivity.



## CASE STUDY

Vesuvius V-1.0.4

**Rack Tagging**

Enter Rack Code **FIND**

Location Code

A401
A402
A403
A404
A405
A406
A407
A408
A409
A410

Saving screenshot...

Vesuvius V-1.0.4

**Rack Tagging**

Enter Rack Code **FIND**

**Selected Location**  
A403

**Calculated Tag Id**  
0B0501413430330000000000

**Current Reading Tag**  
Read TagID using Green Button

**Write**

**Verify** **Cancel** **Clear**

**Bag Registration:** The GRN and PO of the bag is selected and the bag weight is read from the weighing scale by HandyScanna™. The RFID tag is then assigned to the bag.



Vesuvius V-1.0.4

**Bag Registration**

BAGS Total=0, Registered=0, UnRegistered=0

Select GRN 39193

Select PO 0512583

Select Material PKJ06PR01673

Vendor Vendor

BagNumber BagBumber

Weight **GetWeight**

Mfg\_Date

Exp\_Date

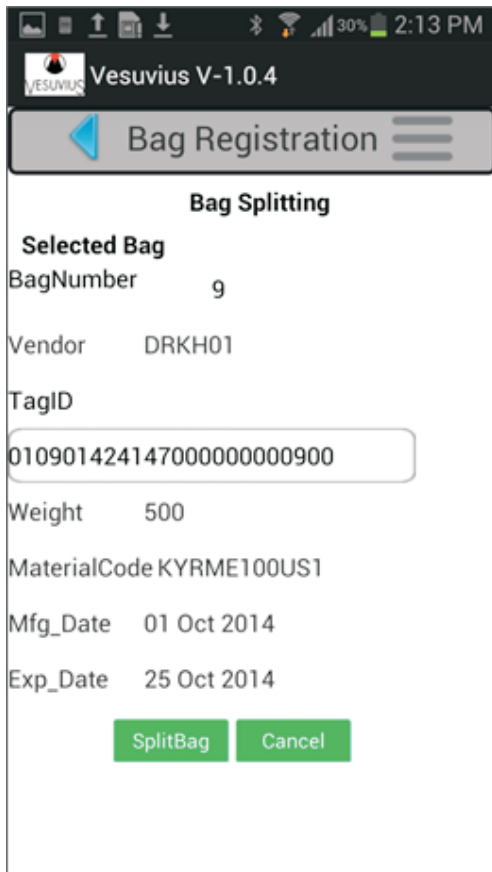
**Next**



## CASE STUDY

**Sampling:** When a GRN is created, some material is removed from the bag for sample testing. When the sample is created, this entry is logged by the HandyScanna™ and a printout is generated.

**Split Bag Registration:** If during retrieval a bag is required to be split, then the bag is taken to the splitting area and the required quantity is removed and placed into a new bag which is registered using the HandyScanna™ device.



Vesuvius V-1.0.4

Bag Registration

Bag Splitting

Selected Bag

BagNumber 9

Vendor DRKH01

TagID

010901424147000000000900

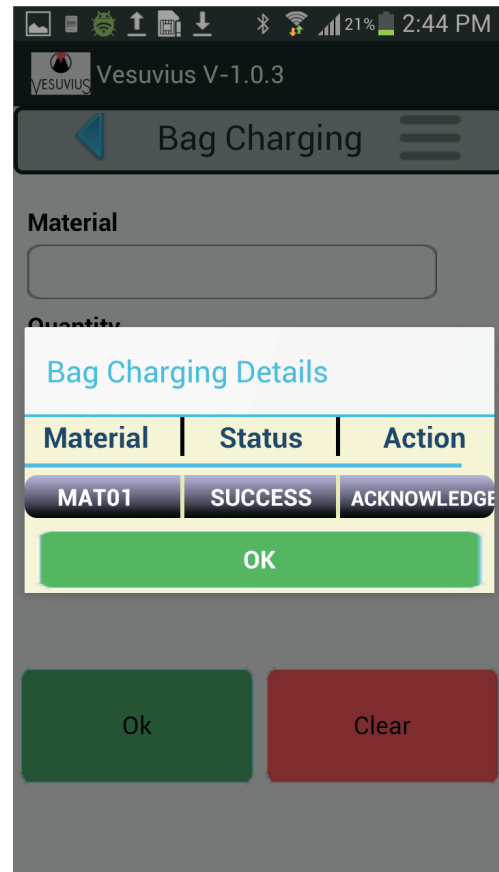
Weight 500

MaterialCode KYRME100US1

Mfg\_Date 01 Oct 2014

Exp\_Date 25 Oct 2014

SplitBag Cancel



Vesuvius V-1.0.3

Bag Charging

Material

Quantity

Bag Charging Details

Material	Status	Action
MAT01	SUCCESS	ACKNOWLEDGE

OK

Ok Clear

**Charging Material:** After material is retrieved from the warehouse, it is sent through the forklift for charging (preparing the mixing recipe). When the bag arrives for charging, the user scans the bags with the HandyScanna™ and sends this information to the Essen Server. The server validates the data and the charging material details, on which the user confirms that the material is successfully charged.

**Discharging Material:** If after the recipe is prepared, some raw material remains, then the raw material is put back into the bag and a discharging entry is made for that material by the HandyScanna™ into the Essen Server, after which the bag is sent back for placement.



## CASE STUDY

Vesuvius V-1.0.3

Discharging

Select System System-01

Material code CAHGRM30HI2

OK

Vesuvius V-1.0.3

Discharging

Select System System-01

Material Data successfully Uploaded

OK

**Tag De-linking:** When the bags are emptied after charging, the user scans each bag's RFID tag with the HandyScanna™ and de-links it from the bag in the server database. These tags can now be reused and reassigned to new bags.

Vesuvius V-1.0.4

Tag-DeLinking..

Scan Bag

<input checked="" type="checkbox"/>	3
<input checked="" type="checkbox"/>	4
<input checked="" type="checkbox"/>	9
<input checked="" type="checkbox"/>	15
<input checked="" type="checkbox"/>	2
<input checked="" type="checkbox"/>	5
<input checked="" type="checkbox"/>	8
<input checked="" type="checkbox"/>	11

Ok Clear



## CASE STUDY

### Tablet Application:

The tablet is affixed to the forklift to enable the forklift operator accomplish his tasks. The tab application performs the following tasks:

- Placement
- Re-shelving
- Retrieval

**Tab Login:** Before starting, the forklift operator shows the tag to the RFID reader, which reads the tag and displays the name. The operator enters the password, thus only an authorized person can log in to the tab application.

VesuviusTab 1.0.3

SUCHISHASTRA™ - BAG TRACKING SYSTEM

**RFID ENABLED BAG TRACKING SYSTEM**  
**CODE: FLT-HM01**

**LOGIN**

**Pin**

**Login** **Cancel**

**STATUS: Connected** **Boot Successfully** **0100**

**Reader Settings:** The application lets the operator adjust the settings of the RFID reader mounted on the forklift.

VesuviusTab 1.0.3

**Reader Setting**

3000 3000

Bistatic Full

Default None

S0 European\_Union3

**BACK** **SaveXtennna**

**Xtenna™**

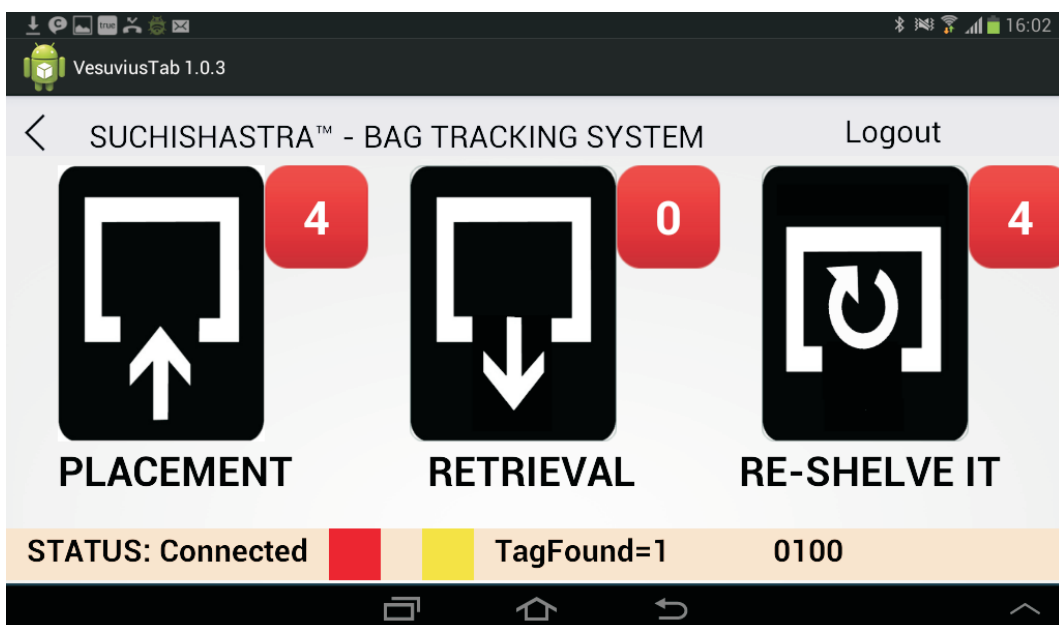


## CASE STUDY

**Synchronization:** This allows the operator to download Essen Server data on to the tab and upload tab data back to the Essen Server.



**Home Page:** After login, the tab displays the home page with all alerts displayed on the screen. When any placement, retrieval or re-shelving tasks are created by the Essen Server, the server sends alerts to the forklift tab application for completing these tasks.

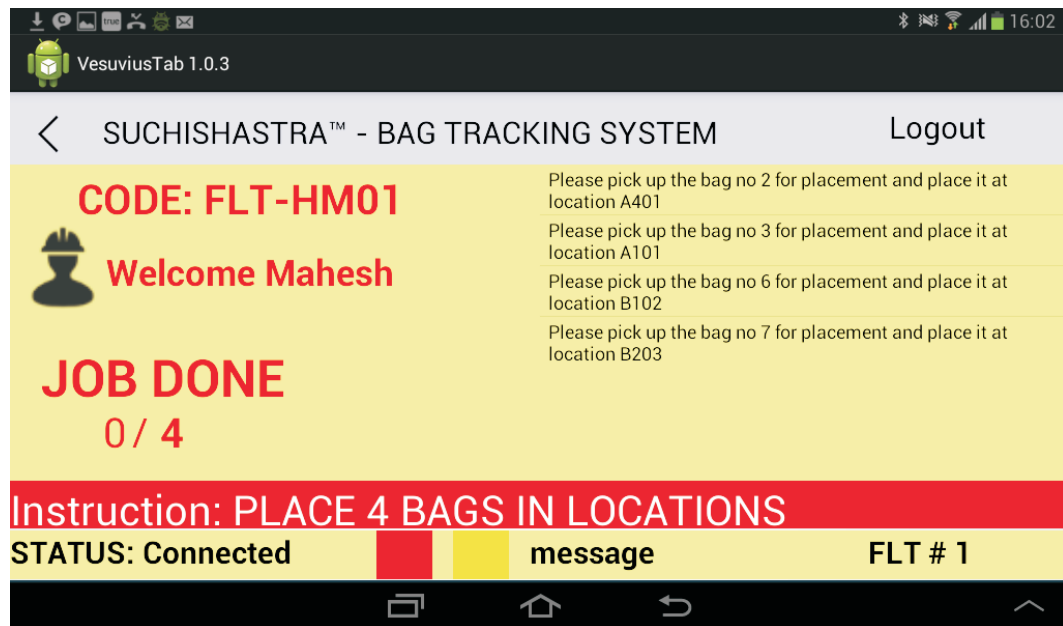




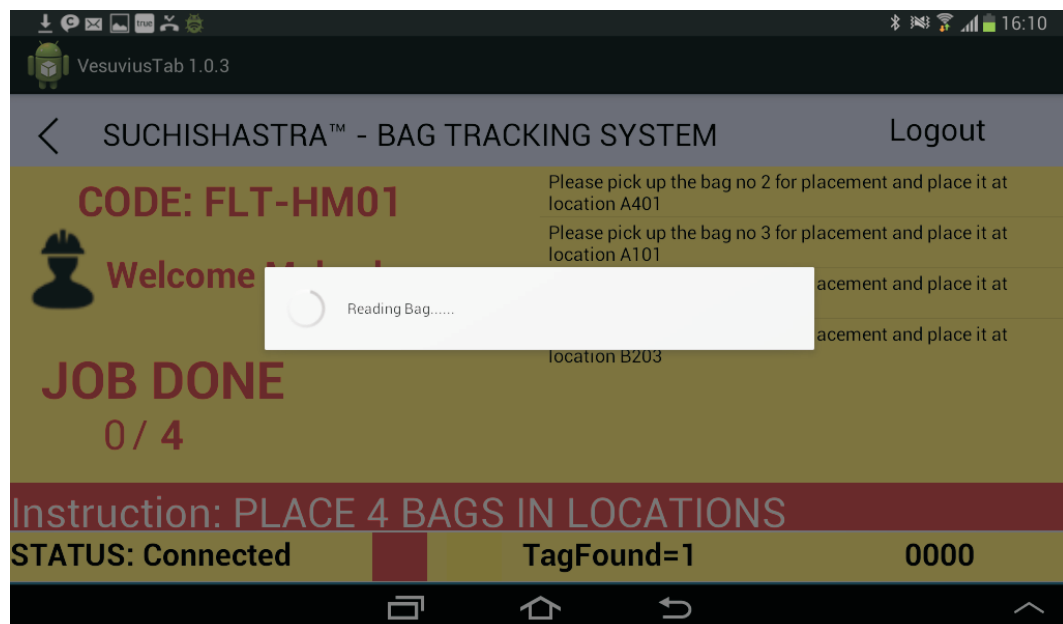


## CASE STUDY

**Placement:** When HandyScanna™ registers a bag it sends the information to the Essen Server. The server then sends an alert to the forklift tab application to place the bag at its proper location. The application also suggests the correct location for placing the bag.



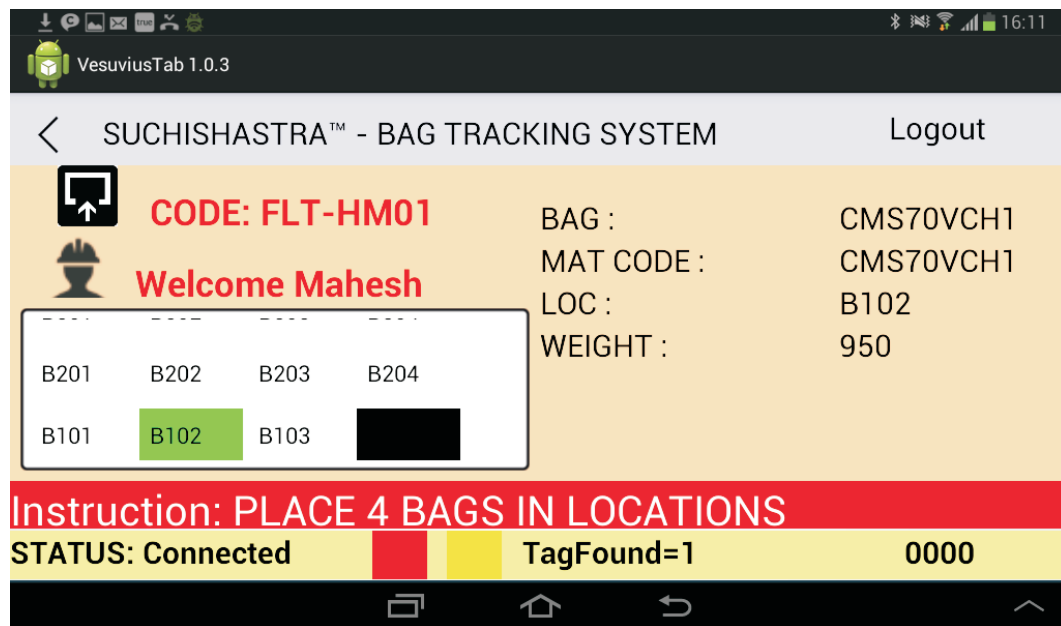
The forklift reader then starts to read the bag tags.



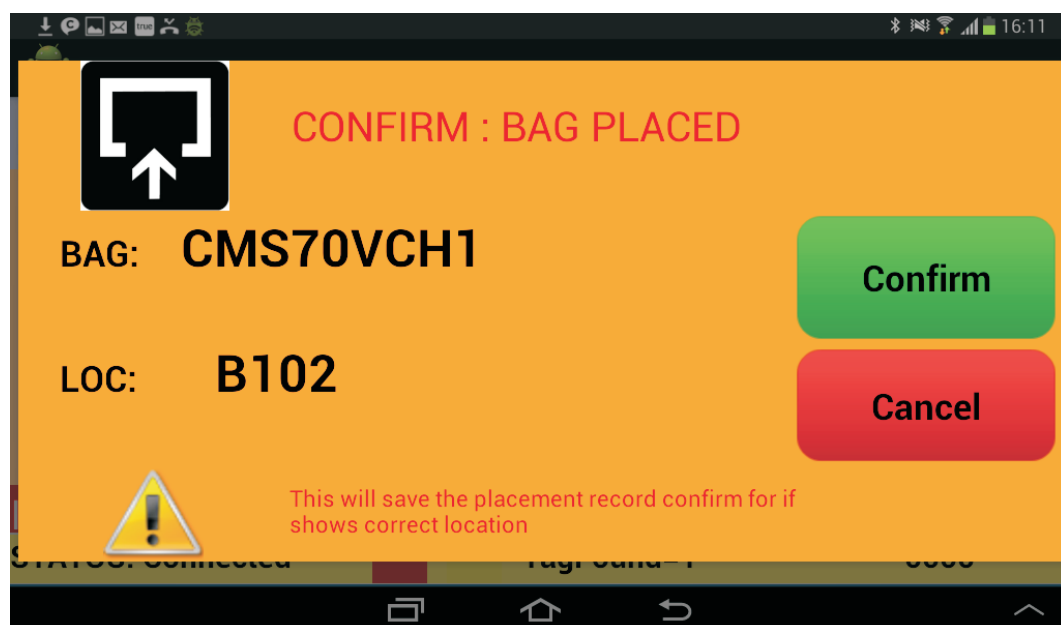


## CASE STUDY

Once the bag is read by the forklift's RFID readers, its information is displayed on the tablet screen along with the rack available for placement of the bag. On screen, the black colour block indicates that this rack is occupied by other bags, while the green colour shows the suggested location for bag placement.



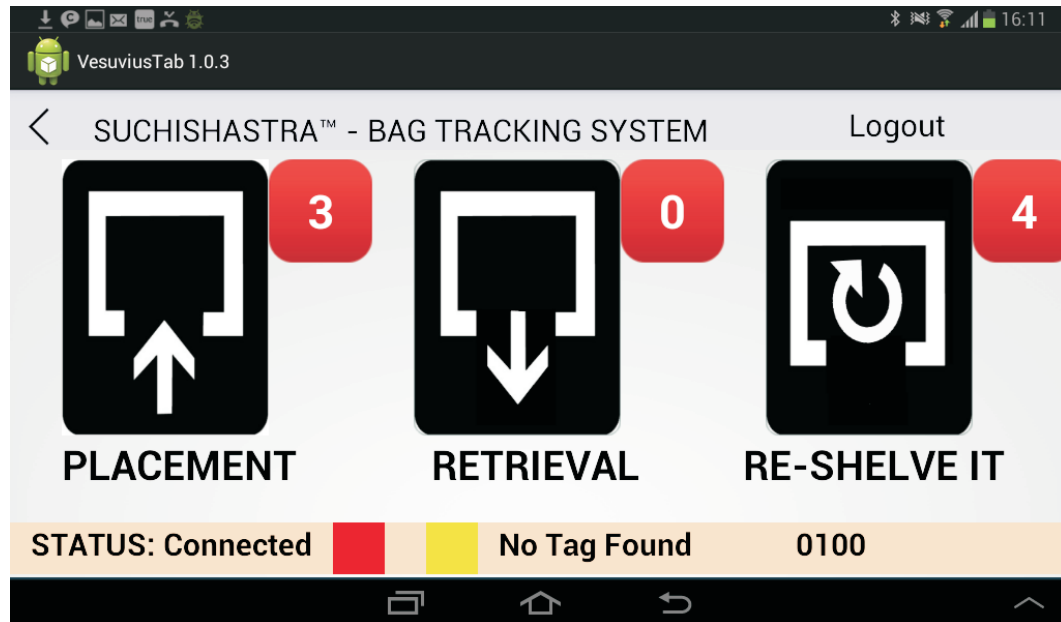
When the bag is placed at its location, the reader reads the location tag and a confirmation screen is displayed by the tab. The operator confirms on the screen that the placement is at the correct location. Once the bag placement has been confirmed, the placement alert count gets decreased.



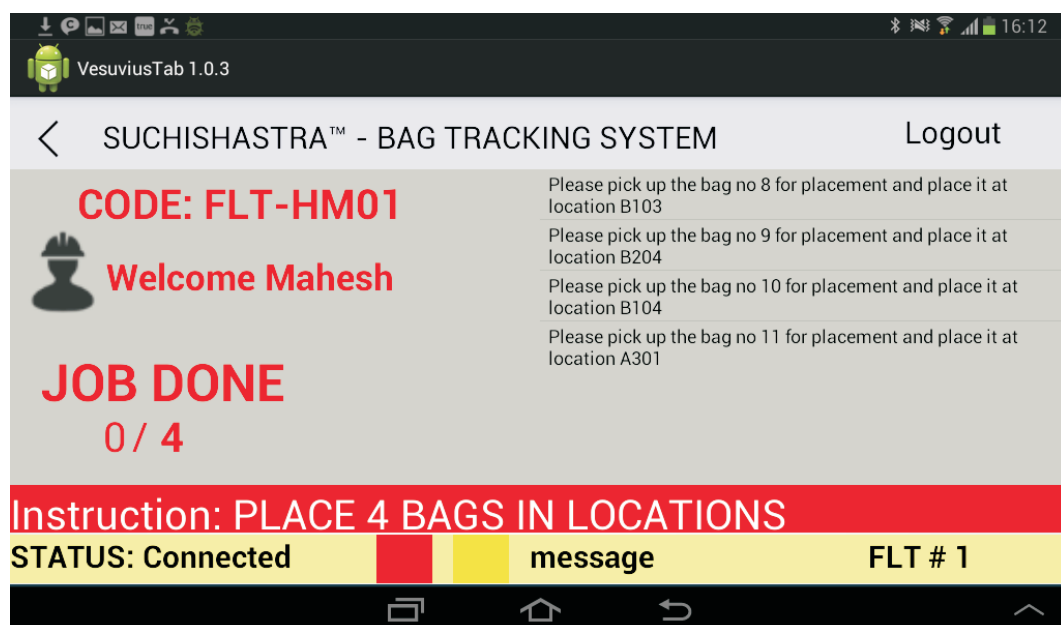


## CASE STUDY

Once the bag placement has been confirmed, the placement alert count gets decreased.



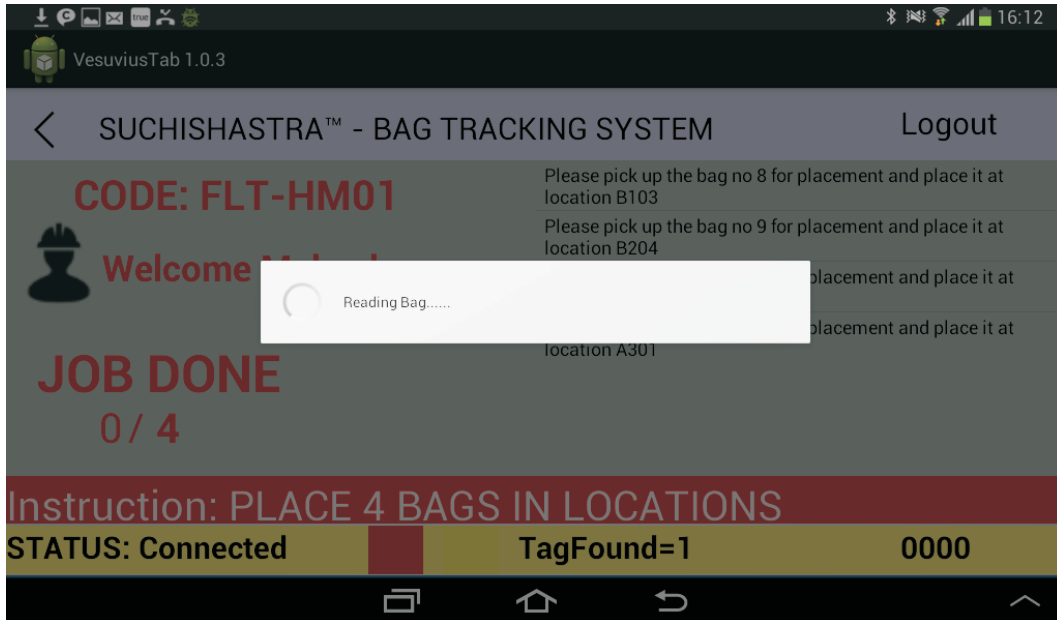
Re-shelving: After a bag has been split, the new bag is registered through HandyScanna™ and its data sent to the server. When this data reaches the server, it sends an alert to the forklift tablet for re-shelving. The forklift operator selects the re-shelve alert and all re-shelve tasks are displayed on the screen along with their suggested locations.



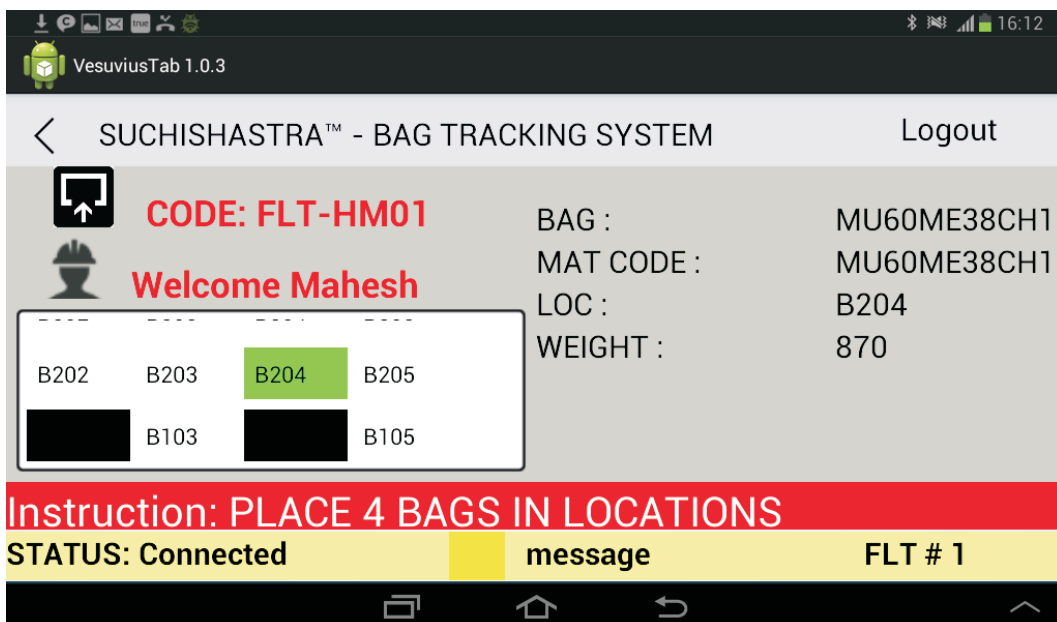


## CASE STUDY

The forklift RFID reader reads the bag's tags.



The bag's details are displayed on screen and the operator places the bag at the proper location.

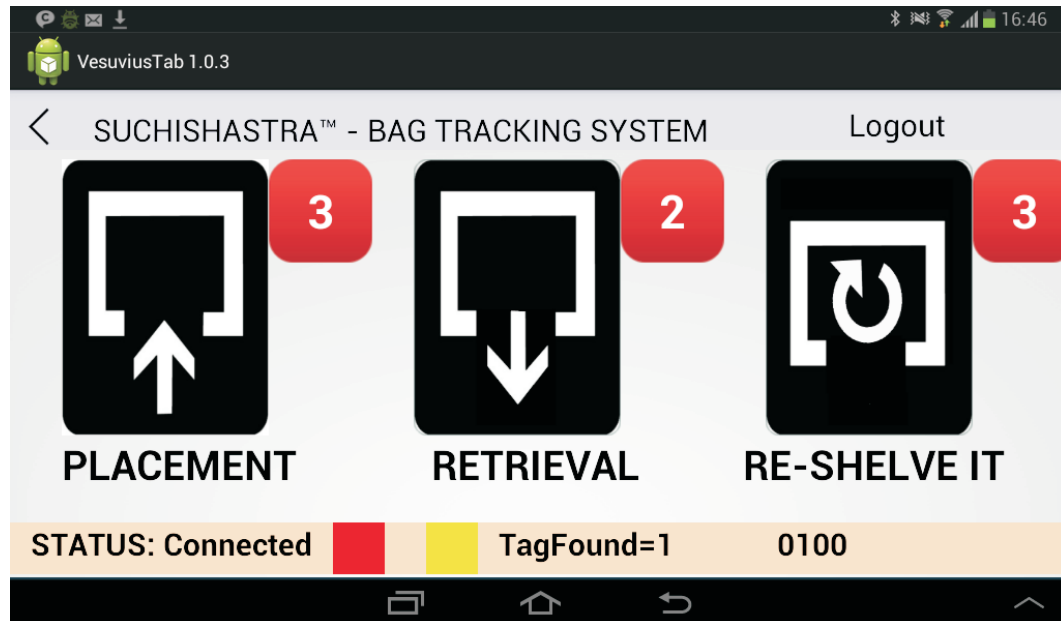


After bag placement, the location tag is read and the operator is asked for placement confirmation. After confirmation, the re-shelving alert count gets decreased.

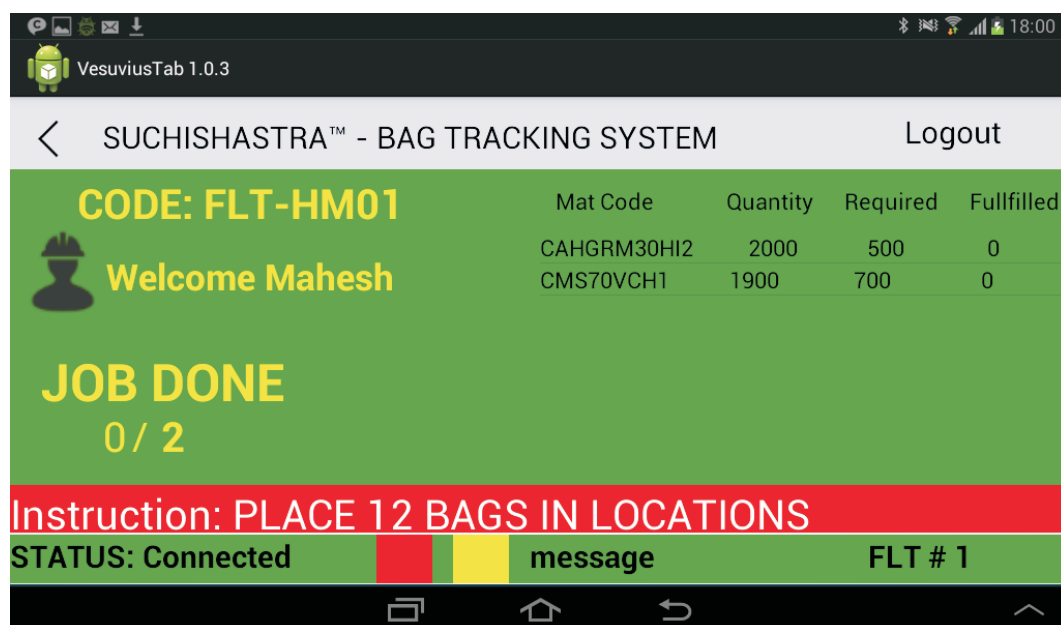


## CASE STUDY

**Retrieval:** Material mixing recipes are created by the PLC and this data is downloaded by the Essen Server. Once the server receives this data, it knows which recipe is in process and the quantity required for preparing the recipe. The server sends alerts to retrieve material for the current recipe and this alert is posted on the forklift tablet along with the alert count.



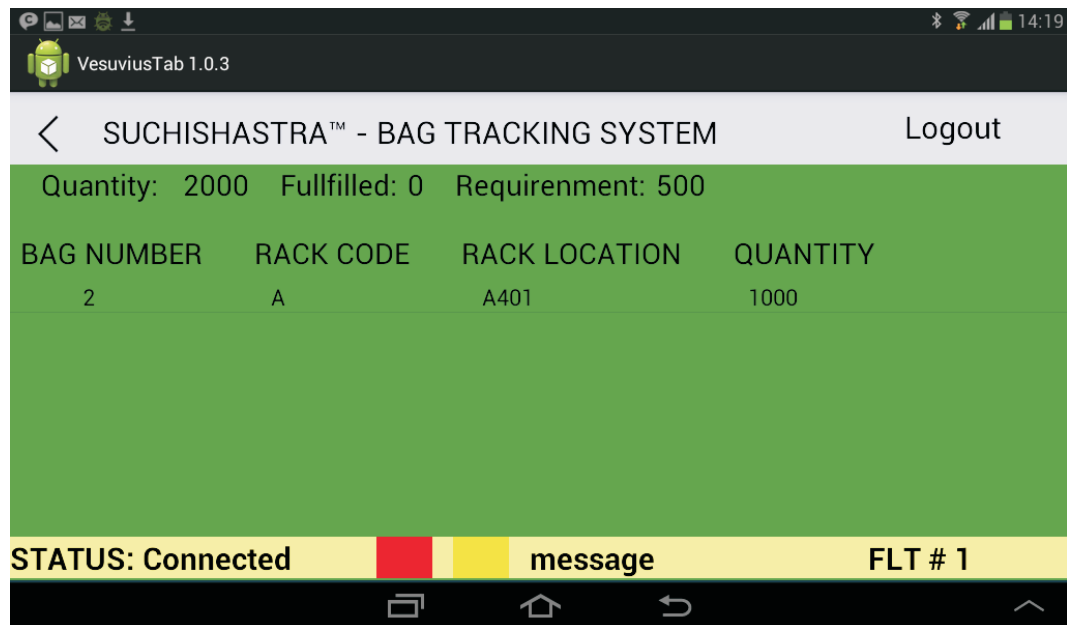
The operator selects the retrieval alert and the retrieval list is displayed on the screen. The list shows the material code with the available quantity and the required quantity.



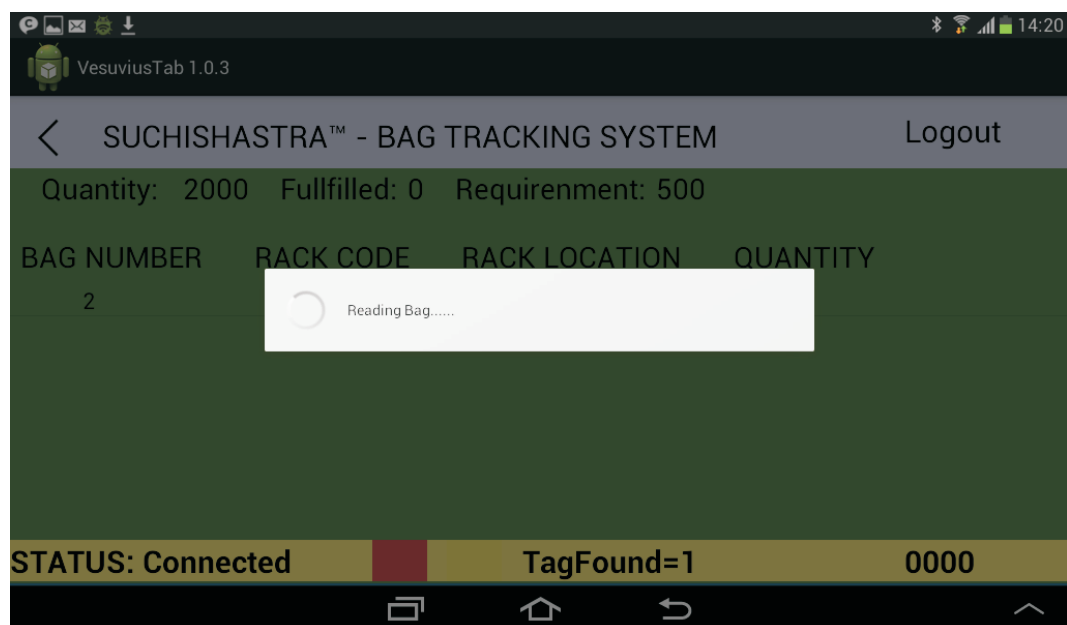


## CASE STUDY

The selected task is displayed along with retrieval location and the quantity at that location. The server sends details of bags nearest to the expiry date, so that such bags are utilized first.



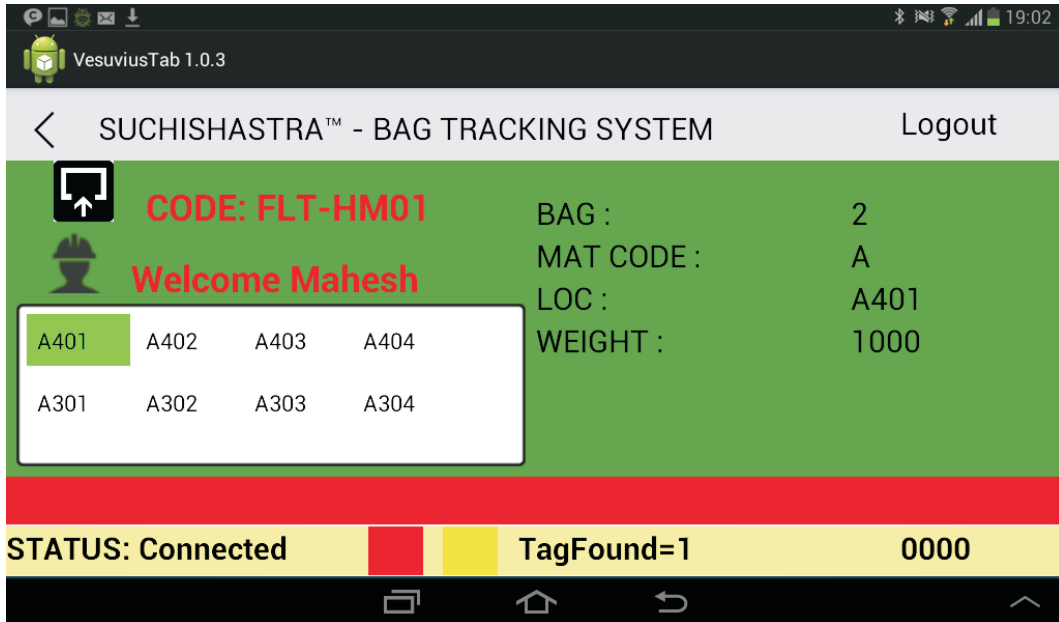
The forklift goes to the location where the bag is stored. When the forklift lifts the bag, its reader reads the bag's RFID tag.



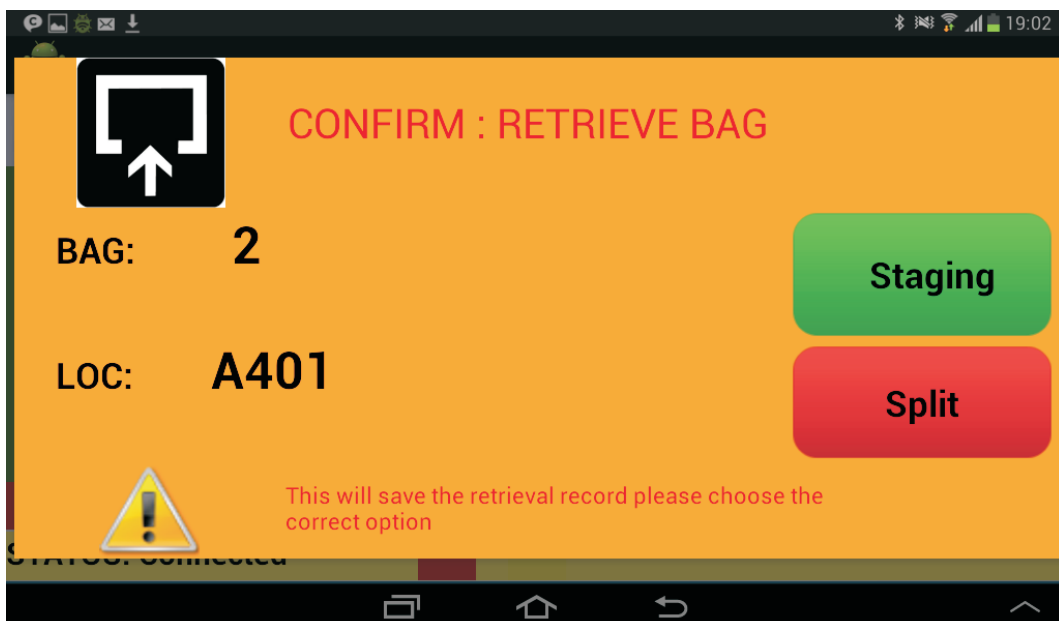


## CASE STUDY

When the bag's tag is read, its information and location details are displayed on the forklift's tablet screen.



The forklift then reads the location tag and the retrieval confirmation screen appears on the tablet with Staging and Split options. The operator selects the required option as follows: When a full bag is required for fulfilling the required quantity, the bag is brought to the staging area for lifting (charging) the material into the silo. When the required quantity is less than the full bag quantity, the material is brought to the splitting area and split into a new bag.

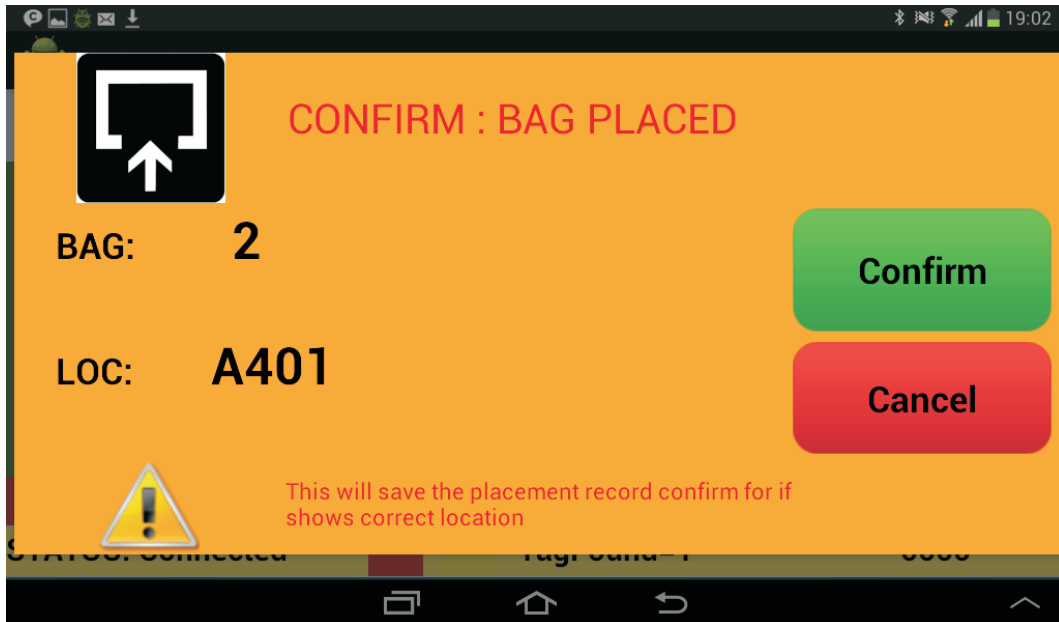




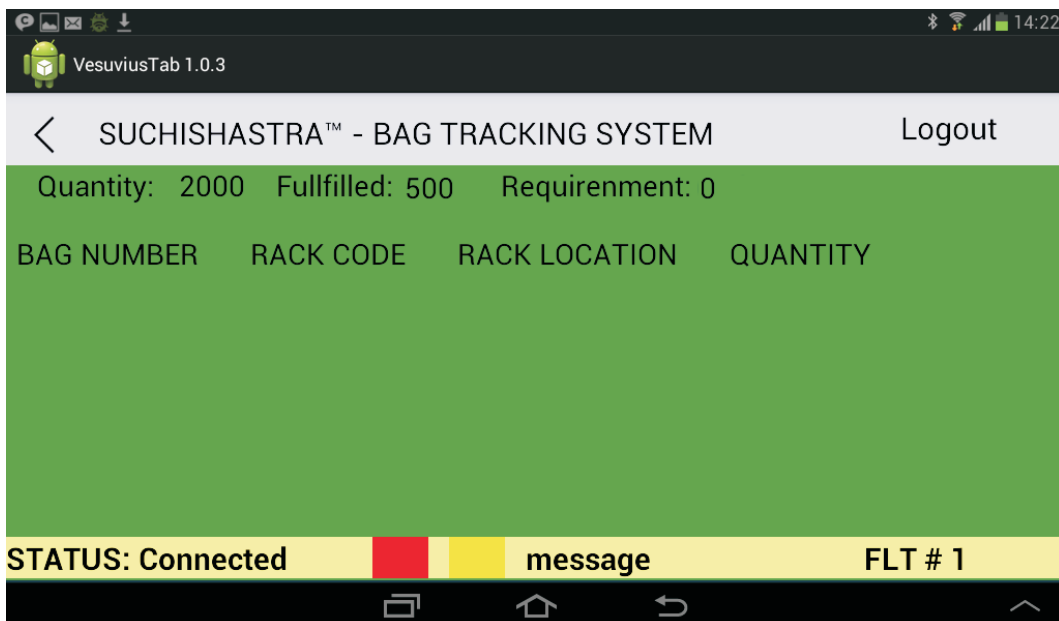


## CASE STUDY

The operator then takes the bag to either the staging or splitting area. After selecting the appropriate option, the confirmation screen will be displayed on the forklift tablet.



At the time of fulfilling the required quantity, the current status is displayed on the forklift tablet helping the operator know the balance quantity required for retrieval. When the required quantity becomes zero, the alert count is removed.





## CASE STUDY

### BENEFITS:

- Automatic tracking resulting in accurate and efficient management of stock.
- Efficient stock distribution at designated locations in warehouse.
- Logical representation on screen of physical rack storage locations.
- Easy identification of stock required for current order.
- Optimum rack management and efficient FIFO stock utilization.
- Ease of use via touchscreens for directions to forklift operators.
- Easily identify forklifts available for current order.
- Efficient forklift management putting them to optimum use.
- Silo operations integrated with stock dispensation and verification.
- Automated report generation of stock and deliveries.

### LINKS:

#### Hardware:



#### Tags:



#### Software:



#### Reference Example:

<http://www.essenrfid.com/Mailer/manufacture-flash-demo.pdf>