



Large State co-operative federation pilot module for RFID-based FERTILIZER TRACKING SYSTEM

Automatically and efficiently tracks fertilizer stock in hand

Easily tracks stock distribution till the farmer level,
preventing unaccountability and pilferage

Wireless data communication across components

Database integration with farmer's biometric ID



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TECHNOLOGY

Solution:

EPC Gen2 compliant
inventory tracking solution

Tag Type:

μMetallica™ UHF Passive

Reader/Antenna:

Xtenna™
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 Tracking System

Database:

SQL Server 2005 Exp. ed.

Cloud:

Windows Azure

Tag Manufacturer/Supplier:

Essen RFID, with US based chip inlay

Reader/Antenna Manufacturer:

Essen RFID, with US based module

Systems Integrator:

Essen RFID

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CASE STUDY

KEY REQUIREMENTS:

The Karnataka State Co-operative Marketing Federation Ltd. (KSCMFL) is a State institution that functions as the apex body providing services to member co-operatives for marketing of agricultural produce as well as bulk buying and distribution of various agricultural inputs to farmers. It has a wide distribution and sales network throughout the state. It is also a premier institution in the state through which the State Government channelizes facilities and subsidies to farmers.

However due to the inherent shortcomings of the manual process and its susceptibility to misuse, it is observed that these benefits often do not reach the intended recipients and are taken advantage of by others. KSCMFL sells fertilizers in bags to farmers across the state. It needs to keep track of fertilizer stock lying in its warehouses and PAC godowns, and also confirm that the fertilizer is going to the correct persons. Ensuring that each farmer gets the right type of fertilizer he needs is a herculean task. It is also unmanageable to keep manual records and reports of such a large process.

To overcome these shortcomings, the institution required an automated system that could track various fertilizer stock and allocate which type of fertilizer was to be dispatched to which location. It also had to ensure that it was given only to legitimate farmers and not siphoned away, and that all undistributed stock remained in the warehouse.

SOLUTION:

Essen RFID offered a suitable solution for tracking fertilizer bags. Using RFID technology, its fertilizer tracking system efficiently tracks these bags and also maintains an accurate inventory of stock. Stock data (including GPS location) is transmitted to a central cloud server running Windows Azure through GPRS connectivity. Distribution of fertilizer bags is based on a process that combines biometric authentication of recipient farmers and RFID tracking of stock.



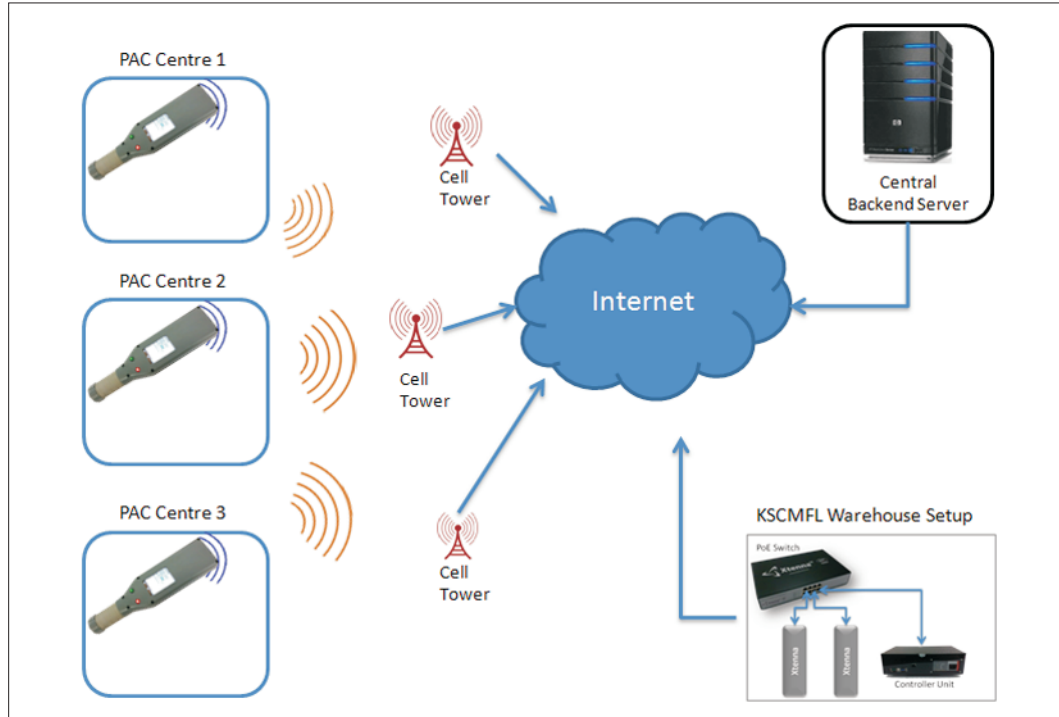
IMPLEMENTATION:

A μ METALLICA™ RFID tag is attached to each fertilizer bag. Xtenna™ is used for registering the bags into the database. Xtenna™ antenna-readers are mounted and configured at the Entry/Exit of each warehouse. HandyScanna™ hand-held devices are used for scanning individual bags. They are connected via Wi-Fi within the warehouses and to a cloud server via GPRS when used outdoors. Each PAC godown is provided with a HandyScanna™ device.

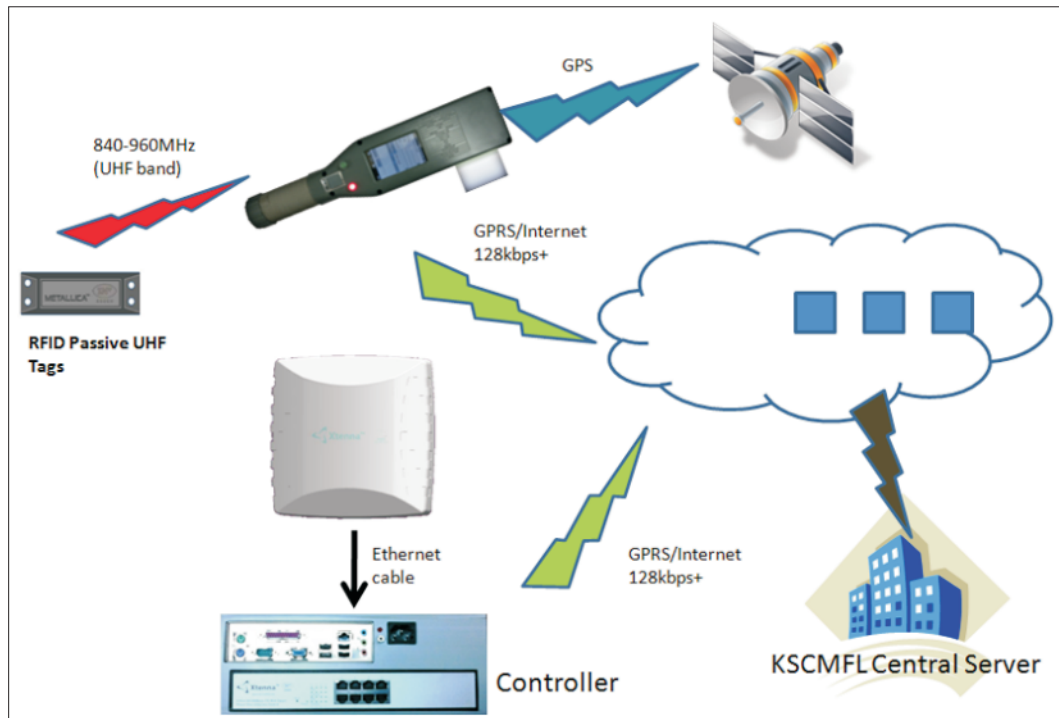


CASE STUDY

Infrastructure schematic



Wireless communication across components



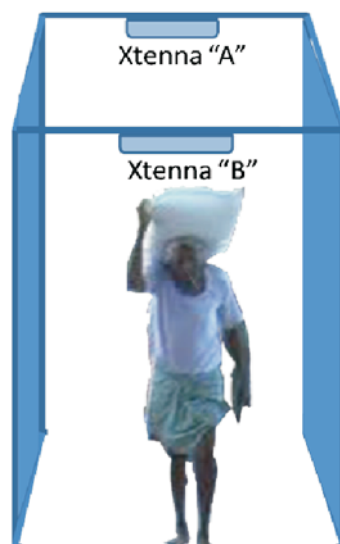


CASE STUDY

WORKING:

The Fertilizer Tracking System uses RFID technology to achieve the following functionality:

- Assigning the tags to bags:
The Xtenna™ antenna-reader reads the tags that have been affixed to fertilizer bags along with the fertilizer type entered. It then assigns each tag to its respective fertilizer bag in the database.
- Fertilizers moving into warehouse:
When fertilizer bags enter the warehouse, the Xtenna™ antenna-reader mounted at the entrance detects their tags. The tags can also be individually scanned by the HandyScanna™ hand-held device.
- Fertilizers moving out of warehouse:
The Xtenna™ mounted at the exit reads the tags on bags sent out from the warehouse.
- Fertilizers moving into PAC godown:
At the PAC, a HandyScanna™ hand-held device is used for individually scanning the tags of incoming bags.
- Distribution to farmer at PAC godown (normal scenario - offline biometric authentication using finger prints on smart card):
When fertilizer bags are delivered to a farmer, the tags on these bags are read by the HandyScanna™ device and are associated with the farmer's ID in the database.



Process Flow:

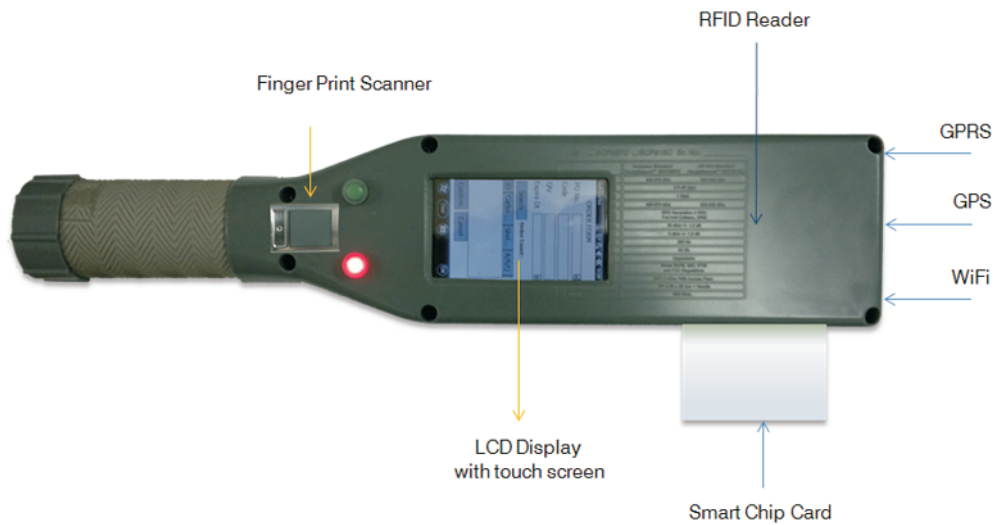
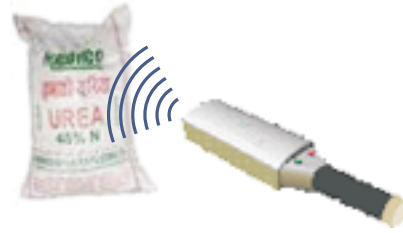
KSCMFL employs one person per PAC for daily operations. In the event a farmer comes to buy fertilizer, then the following process takes place:

1. The employee fetches the bag of fertilizer out from storage. He then uses the HandyScanna™ hand-held device to detect the tag attached to the bag. This results in an 'Out' entry for the stock in the database.
2. The bag is distributed to the farmer based on a combination of biometric authentication of the person and RFID tracking of the fertilizer stock. The HandyScanna™ has a built-in finger print reader that scans the finger print of the farmer, which is then matched against the database or the smart card inserted into it.



CASE STUDY

- The operator presses the button on his HandyScanna™ hand-held device and points to the fertilizer bag. The in-built RFID reader captures the tag ID.
- It then fetches the GPS co-ordinates so that the location of that bag is stored in the database.



- On successful completion, a receipt is generated with the tag ID, fertilizer type, GPS co-ordinates and the farmer's ID printed on it.

BENEFITS:

- Automatically tracks the quantity of stock in hand, and where and to whom it is being delivered.
- Real-time visibility of fertilizer stock at any time at any location.
- Tracks the distribution of fertilizer down to the farmer level.
- Accurate stock flow data enables better planning.
- Prevents unaccountability and pilferage of fertilizers.
- Automated reporting functions provide item-wise daily/weekly/monthly sales reports for each warehouse/PAC.



CASE STUDY

LINKS:

Hardware:



Tags:



Software:



Reference Example:

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