

**vizinex** RFID  
the way you imagined

**XTREME** RFID  
a cascade engineering company

GUIDE

# Beyond Barcodes

TRACKING RTIs & THEIR CONTENTS WITH RFID



## The Current State of the Industry

Returnable transport items (RTIs) – also called returnables and reusable containers – are utilized in myriad industries. RTIs, essentially, are present any time items of value must be packed and shipped. Their use can help ensure consistent, safe packaging of assets, dramatically reduce shipping costs, and standardize practices within complex supply chains.

There is, however, a problem when it comes to RTIs – and it extends across every vertical, from manufacturing to agriculture, food service to pharma. Simply put, there are so many returnable containers in use – some companies have millions – that keeping track of them (and what they contain) is extremely difficult. This results in inefficiency, diminished visibility into mission-critical areas of the supply chain, and unnecessary spending on the transport items themselves, both in replacing shrinkage and bloated inventory.

Imagine, for instance, a company that processes and packages fresh fruit and vegetables. This company will, naturally, want to control its supply chain at an extremely granular level, in order to ensure quality and safety. Fruits and vegetables are packed in RTIs in the field, and delivered to processing plants. The containers are emptied, and returned to the farmer for a future shipment.

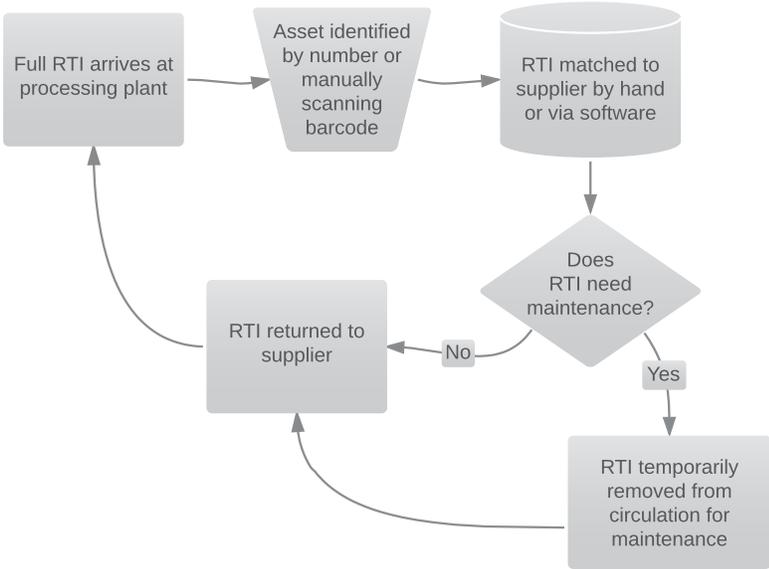
Ideally, the company in our example will want to be able to match a container to a farmer, allowing for full visibility into the RTIs contents from field to final packaging. Traditionally, they would have attempted to do this through one of two methods:

1. By hand, tying a unique identification number on the RTI to a record of where it was shipped
2. Scanning a barcode on the RTI when it arrives and before it is shipped out again

Problem is, both of these methods require a high degree of manual intervention; a human must read a number or physically scan a barcode. To do so, the RTIs must be separated and inspected every single time they arrive at or leave the manufacturing plant. Either way, it's a slow, fallible system constantly subject to operator error, with few failsafes to prevent shrinkage. Worse still, an RTI that requires maintenance triggers yet another manual workflow as it's temporarily removed from circulation.

While highly effective, consistent tracking of RTIs is coveted, it's difficult to obtain using manual or barcode tracking systems. Fortunately, there's a better way: radio frequency identification, or RFID.

**Figure 1: Legacy RTI Tracking in Food Processing**



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## Where We're Going

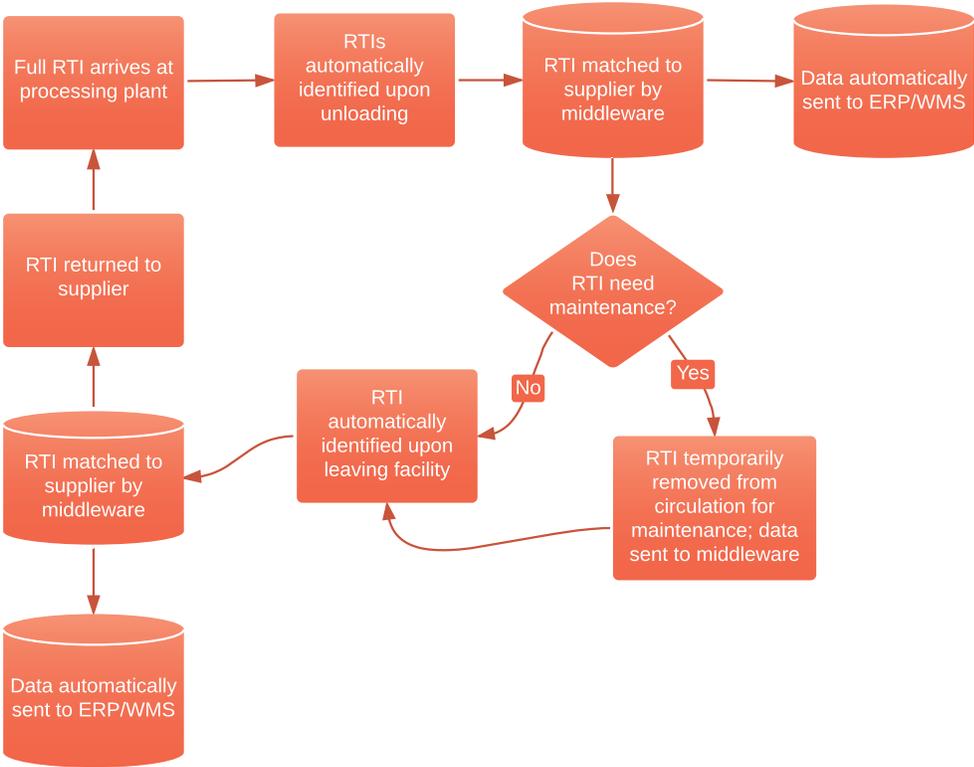
In the most basic terms, RFID technology allows RTIs (and their contents) to be automatically identified when they're in proximity to a moving or stationary reader. Essentially, passive RFID tags are intelligent barcodes that use radio signals, rather than line of sight, to deliver information about the asset. That means multiple RTIs can be identified at once, in a totally automated fashion – the tag and the reader communicate with little human intervention.

To return to our previous example, the food processor could deploy stationary RFID readers and antennas at each loading/unloading bay door. When a tagged RTI passes through the door (on a truck or off), its identity, presence and direction is noted. Thus, real-time information about the container and its contents become automatically available to decision makers. Both the quality and the timeliness of supply chain information is improved with extremely low levels of labor or manual intervention. Our hypothetical food processor is able to track discrete components of individual shipments at an extremely granular level.

Further checkpoints can be positioned throughout the facility (or other facilities associated with the supply chain) to capture even more detailed information about what items are where. Such an automated asset management system allows the company to:

- Dramatically increase visibility into the location of assets
- Identify and rectify choke points and bottlenecks
- Reduce loss of RTIs and optimize inventory
- Track the lifecycle cost of the returnable, and improve upon its design and/or use

**Figure 2: RFID RTI Tracking in Food Processing**



## How to Get There

Clearly, RFID-based automated RTI tracking creates significant benefits for the enterprise. Better yet, deploying the technology is significantly easier than many realize.

The core of an RFID asset management solution is the RFID tag. Tags should be durable enough to last the lifetime of the returnable container, and either designed specifically for the job at hand or configured to meet the same set of needs. One major consideration here is “read range” – quite literally the distance at which a reader can interface with the tag. Too small a read range and RTIs will be missed; too long and they’ll be picked up by multiple readers, possibly leading to inaccurate data. In the scenario described before, when reading portals are positioned in bay doors, the sweet spot is roughly 10 feet – bigger than a standard 8-foot door, but not in range of multiple readers.

There are two potential ways to attach such an RFID tag to the RTI. The first, embedded RFID, begins at manufacturing; a ruggedized tag is literally built in to the reusable. This is an extremely efficient method of adding RFID traceability to an RTI (and it’s a tremendous way for manufacturers of the container to add value for the end-customer), but it does require significant foresight on the part of the OEM. The other option is adding an external RFID tag “in the field.” This is typically done by the company that owns the RTI, with the help of a system integrator. While this option does not require that RFID be included in the product design at the time of manufacture, it is more expensive – largely due to the labor involved in attaching the tag to the RTI.

The rest of the required infrastructure required for the creation of an RFID asset management program – readers, antennas and software – is best designed by an experienced RFID solution consultant. System integrators specialize in evaluating workflows to create and implement supply chain visibility solutions that meet the needs of the enterprise while minimizing the disruption to existing processes and business procedures.

## ABOUT VIZINEX RFID

Vizinex RFID, headquartered in Allentown, PA, designs and manufactures RFID tags for diverse asset tracking applications from rugged environments in the oil industry, to medical devices requiring repeated sterilization, to long-range vehicle tracking. With prototyping and manufacturing located in the U.S., our time from concept to delivery is unmatched. Vizinex RFID maintains a tradition of innovation, superior functionality and outstanding customer support, allowing us to deliver RFID ... the way you imagined.

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## ABOUT XTREME RFID

Xtreme RFID is an expert in rugged RFID tag manufacturing for extreme environment applications. We have been encapsulating RFID inlays in one-piece plastic housings, allowing system integrators to utilize RFID in new markets since 2005. We have the experience and know-how needed to assess your application's requirements and provide the right solution for your RFID needs.

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