

# Introduction to RFID

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NAPMM

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A stylized silhouette of a mountain range in a teal color, located in the bottom right corner of the slide.

# Radio Frequency Identification

It is already used in many applications including:

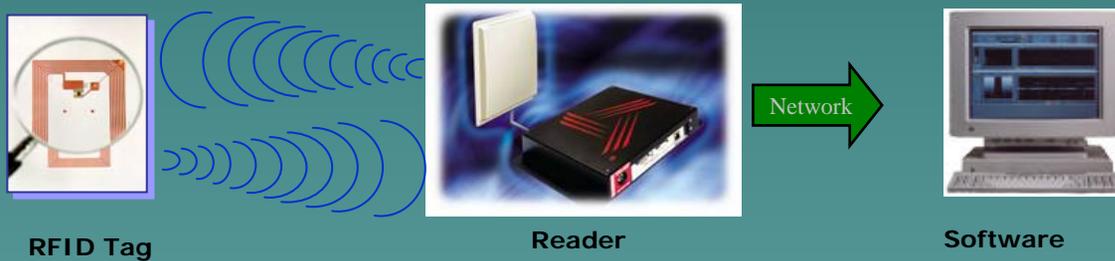
- ◆ Electronic Toll Collection
- ◆ Rail cars identification and tracking
- ◆ Intermodal container identification
- ◆ Access control
- ◆ Animal identification
- ◆ Automobile immobilizing

# Recent developments with RFID adoption:

- ◆ Wal-Mart issued a mandate to its top 100 suppliers to start delivering their products with RFID tags to five distribution centers serving 500 stores by January 1, 2005
- ◆ Department of Defense, Wegmans, Royal Ahold, Piggly Wiggly Carolina and many others are implementing the technology
- ◆ It is estimated that global expenditures on RFID technology will increase from approximately \$1 billion in 2001 to around \$3 billion by 2007 and around \$20 billion in 2015.

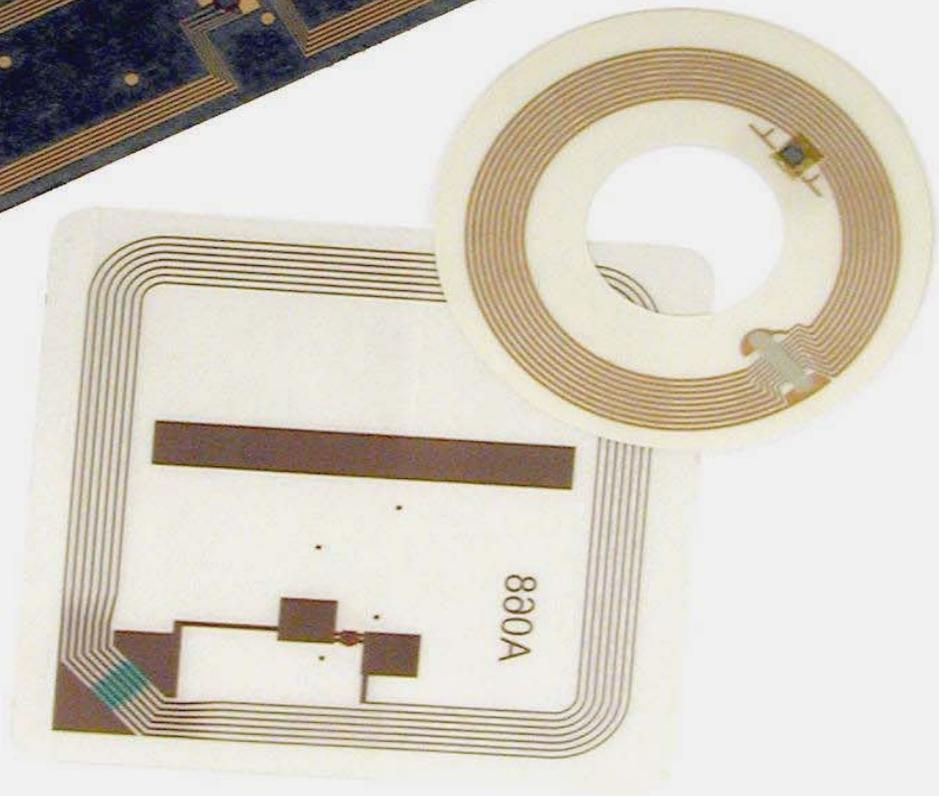
# How it works?

- ◆ Wireless exchange of information between a RFID tag and a reader





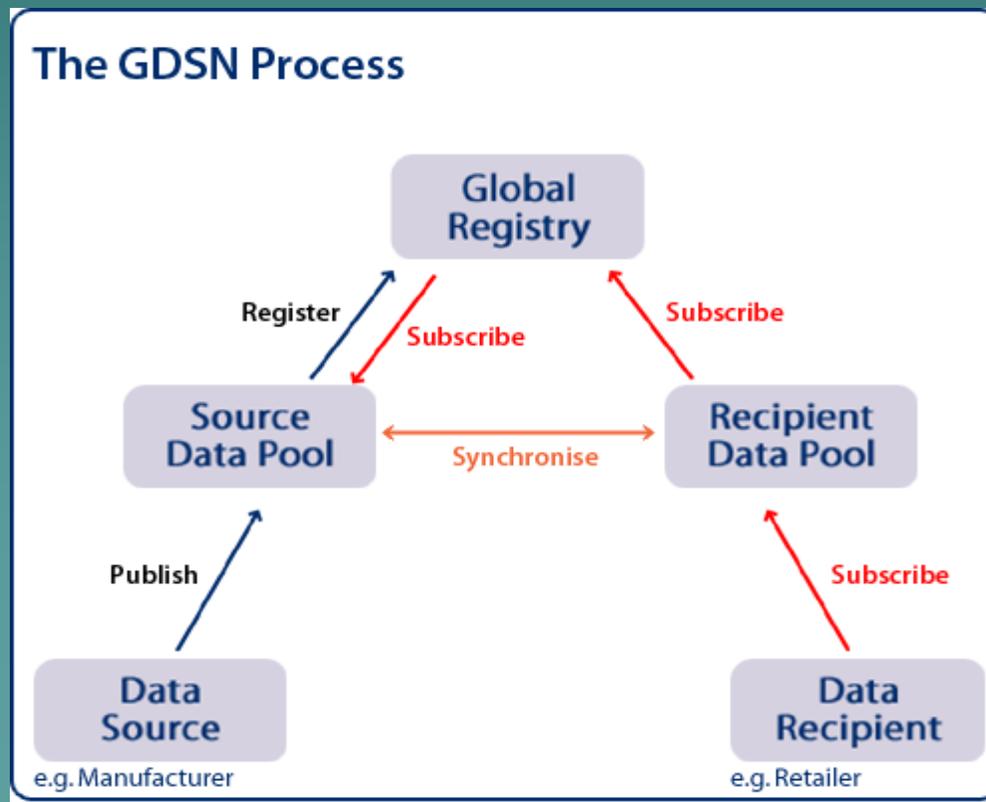




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# How it is used?

- ◆ Global Data Synchronization Network (GDSN) allows buyers and suppliers to exchange data about the products in real time via third party access services



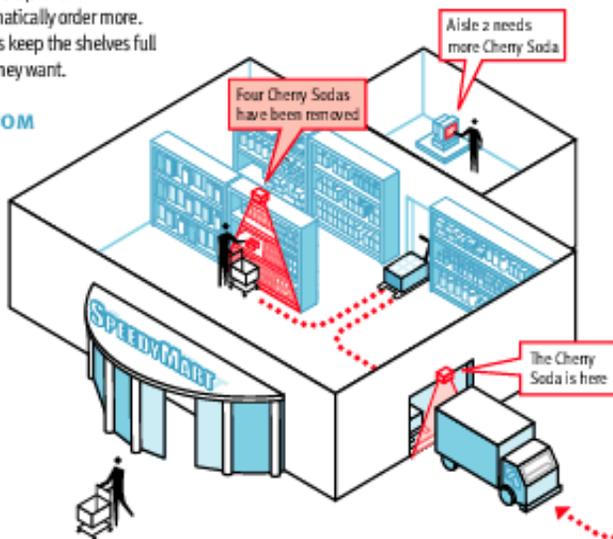
The EPC<sup>™</sup> Network can track individual items throughout the supply chain, from manufacture to sale. This will revolutionize the way people buy, sell and distribute products. Here's how it works.

### 1. ON THE RETAIL FLOOR

The moment a customer takes a product from the shelf, "smart shelves" automatically order more. Stock people and distributors keep the shelves full so customers can buy what they want.

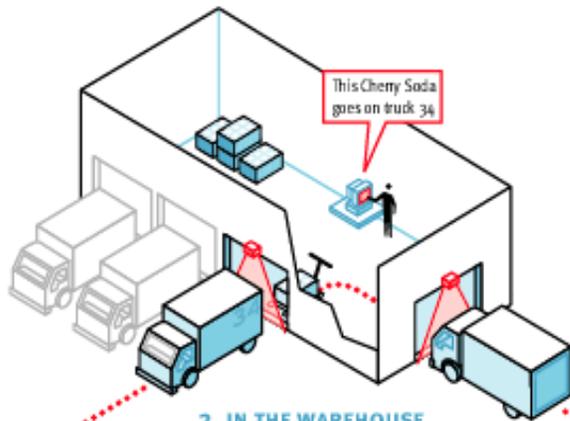
### AND IN THE BACK ROOM

The EPC<sup>™</sup> Network tells the retailer exactly what's on the shelf and in the stock room as well as what's rolling off the truck. There is no need for clerks to maintain costly buffer stock or manually break a pallet down in order to check every case.



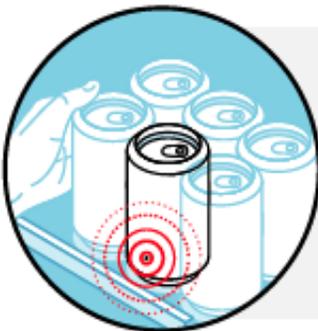
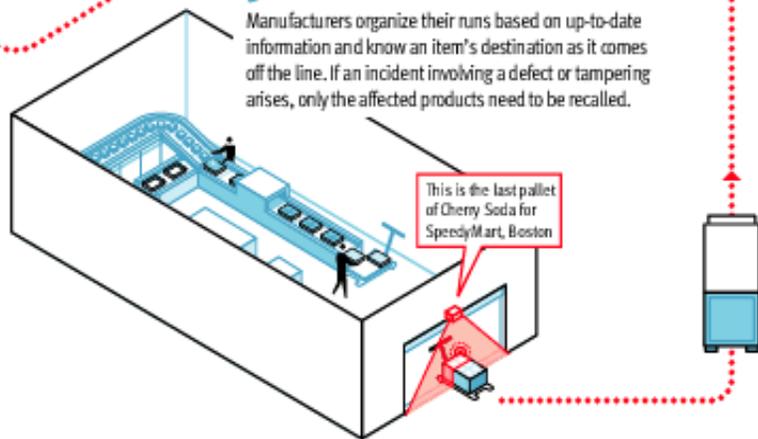
### 2. IN THE WAREHOUSE

The warehouse manager quickly routes shipments to the right place because he can look up what's in the warehouse and on every truck. Duplicate and missed shipments are a thing of the past.



### 3. IN THE PLANT

Manufacturers organize their runs based on up-to-date information and know an item's destination as it comes off the line. If an incident involving a defect or tampering arises, only the affected products need to be recalled.



### HOW IT WORKS

Every item contains a microchip with a unique identifier — called an Electronic Product Code (EPC<sup>™</sup>). This Radio Frequency Identification (RFID) tag allows precise tracking of the product. Cases and pallets can carry their own unique tags. Learn more about the EPC<sup>™</sup> Network at the Auto-ID Center's web site at [autoidcenter.org](http://autoidcenter.org).

# Benefits from RFID technology

- ◆ Unique identification of products
- ◆ Real-time product tracking
- ◆ Flexibility of tag placement because the orientation and positioning of the tags does not matter
- ◆ Simultaneous and automated reading of multiple tags, which permits greater reading speed and frees personnel to do other things
- ◆ The technology suitability for harsh environments
- ◆ Improved security and product authentication as long as it remains difficult to counterfeit. To gain access to these systems knowledge of algorithms and encryptions is needed.
- ◆ Memory capability of tags which allows information to be written and changed several times

# Limitations to RFID technology include:

- ◆ Insulation by some materials—especially water and metals—which absorb radio frequency signals
- ◆ Susceptibility to interference from other radio transmissions
- ◆ Sensitivity to interference from frequency changes

# Applications of RFID (systems):

- ◆ Reduction of inventories
- ◆ Safety, security and traceability
- ◆ Reduction in out-of-stocks
- ◆ Automated proof of delivery
- ◆ Reduced shrinkage
- ◆ Identifying expired products
- ◆ Shipment tracking
- ◆ Product recalls

# Retailers struggle with problem of organized theft

The Denver Business Journal - April 28, 2006

by [Amy Fletcher](#)

Denver Business Journal

- ◆ Colorado retailers are facing a new breed of thief that costs stores \$30 billion a year nationwide, driving up prices for consumers.
- ◆ The increase in crime is prompting stores to install special devices, limit how many products they keep on their shelves and lobby for state legislation designed to help crack down on criminals.
- ◆ "It is big problem and it has been for awhile," said Dave Thomas, executive director of the Colorado District Attorney's Council, which represents the state's 22 district attorney offices. "It cuts into the profit margin."
- ◆ Stores long have dealt with shoplifters, but organized retail theft (ORT) is a newer crime that's more sophisticated and costly.
- ◆ [Safeway](#) estimated organized retail theft accounts for 75 percent to 80 percent of its losses, amounting to \$100 million nationwide a year.
- ◆ "The last 10 years, we've seen the problem escalate," Safeway spokesman Jeff Stroh said. "Every cost is ultimately reflected in consumer prices."
- ◆ ORT usually involves multiple people who steal products, not for their own personal use, but to sell through fencing operations, flea markets and swap meets. In some cases, they sell it back to the same retailer from which they originally stole.
- ◆ "Sometimes we buy our own product back," said Jim Stein, director of security and loss prevention for Safeway in Denver.
- ◆ ORT also generally involves higher quantities of stolen goods.

# Guidelines for Radio Tags Aim to Protect Buyer Privacy

New York Times, May 1, 2006

By BARNABY J. FEDER

- ◆ Some of the opponents in the debate over the potential privacy abuses of identification and tracking systems using tiny radio tags have come together to draft best-practices guidelines that are to be released today at a technology trade show in Las Vegas.
- ◆ Radio tagging technology, called RFID for radio frequency identification, is already widely used in wireless toll collection systems and to control access to buildings, track livestock and manage industrial assets. It is also rapidly spreading into libraries, hospitals and systems that track consumer goods through the retail supply chain. Radio tags, which are based on microchips, carry more information than bar codes, and large numbers of them can be scanned at the same time.
- ◆ Among other things, the guidelines say that consumers should be notified when goods have radio tags, which can be invisibly buried in labels, packaging or the goods themselves. The guidelines also say that it should be clear to consumers how to disable disposable forms of the tags and that it should be easy to do so once items with such tags have been purchased. Businesses are called on to notify consumers about how information gathered from the tags will be used.
- ◆ The guidelines were the work of a group of businesses and consumer advocates. Among the participants who are expected to endorse the guidelines are Procter & Gamble, I.B.M., Microsoft, Visa USA and the National Consumers League.
- ◆ "This is a really good start," said Susan Grant, vice president for public policy at the National Consumers League, a nonprofit advocacy group in Washington.
- ◆ However, some participants in the drafting are not endorsing the result, including the National Retail Federation, the nation's largest retailing trade group, and the Electronic Frontier Foundation, a nonprofit group that was the most vocal privacy advocate.
- ◆ "We are calling it an interim draft for a reason," said Paula J. Bruening, staff counsel for the Center for Democracy and Technology, a policy organization in Washington that orchestrated the effort. "There's a clear sense the guidelines will have to be reconsidered in the future."
- ◆ A survey last year found that 7 percent of 89 retailers and 11 percent of 120 consumer products manufacturers had delayed or scaled back RFID investments because of privacy concerns, according to Christine Overby, who follows the technology for Forrester Research, a market research company based in Cambridge, Mass.
- ◆ The technology got a major boost two years ago when Wal-Mart endorsed a standard developed by an industry consortium and researchers at the Massachusetts Institute of Technology for tagging consumer goods, and said that it would begin requiring suppliers to tag cartons and pallets shipped to it. That standard, called E.P.C. (for electronic product code), is now administered by EPCglobal, which is based in Brussels. EPCglobal has issued its own privacy guidelines.



