Operational Improvements with RFID: Making the Business Case for RFID

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Who are we?

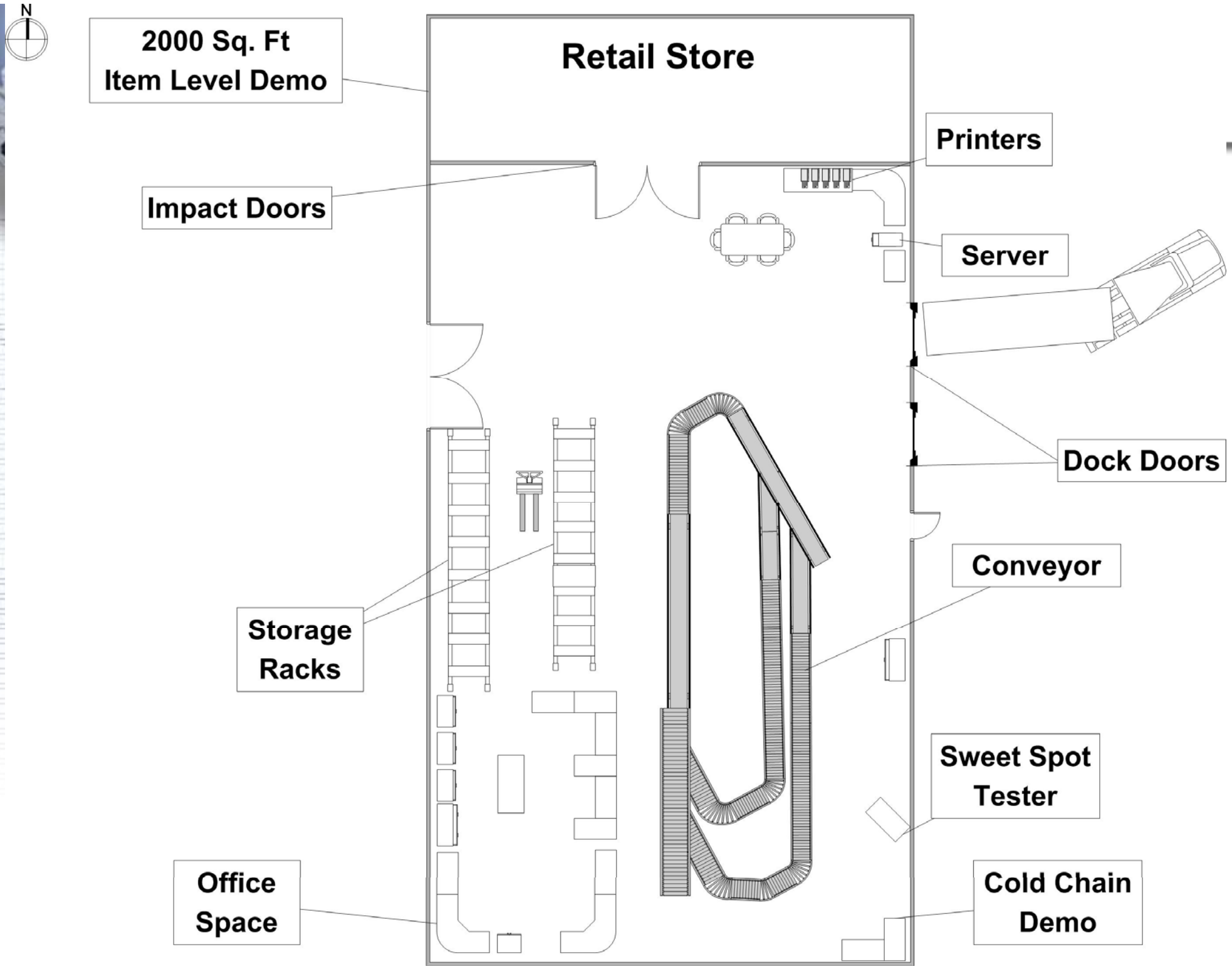
UNIVERSITY of ARKANSAS
1871 ®
RFID RESEARCH CENTER

- *Purpose: to investigate the business value and implications of RF technologies*
- ~ 15 faculty and ~100 students
- Privately funded: more than 50 companies provide funding and equipment for the Center
- Founding member of GRFLA

Global RF Lab Alliance

RFID Lab

- 10,000 sq. ft. lab in Hanna's Candle Co.
- 4,500 sq. ft. lab in Zero Mountain (cold storage facility)
- Replicates RFID in supply chain: dock doors, conveyor, impact doors, forklifts, pallet wrappers, item level, etc.
- Serves as research and teaching facility
- Provides services to the industry (tag type, tag placement, reader/antenna type)
- *EPCglobal Accredited Performance Test Center*


N
2000 Sq. Ft
Item Level Demo
Retail Store
Printers
Impact Doors
Server
Dock Doors
Conveyor
Storage
Racks
Sweet Spot
Tester
Office
Space
Cold Chain
Demo

RFID Lab

Lab simulates the complete retail supply chain from supplier's shipping dock to store shelf

RFID Lab

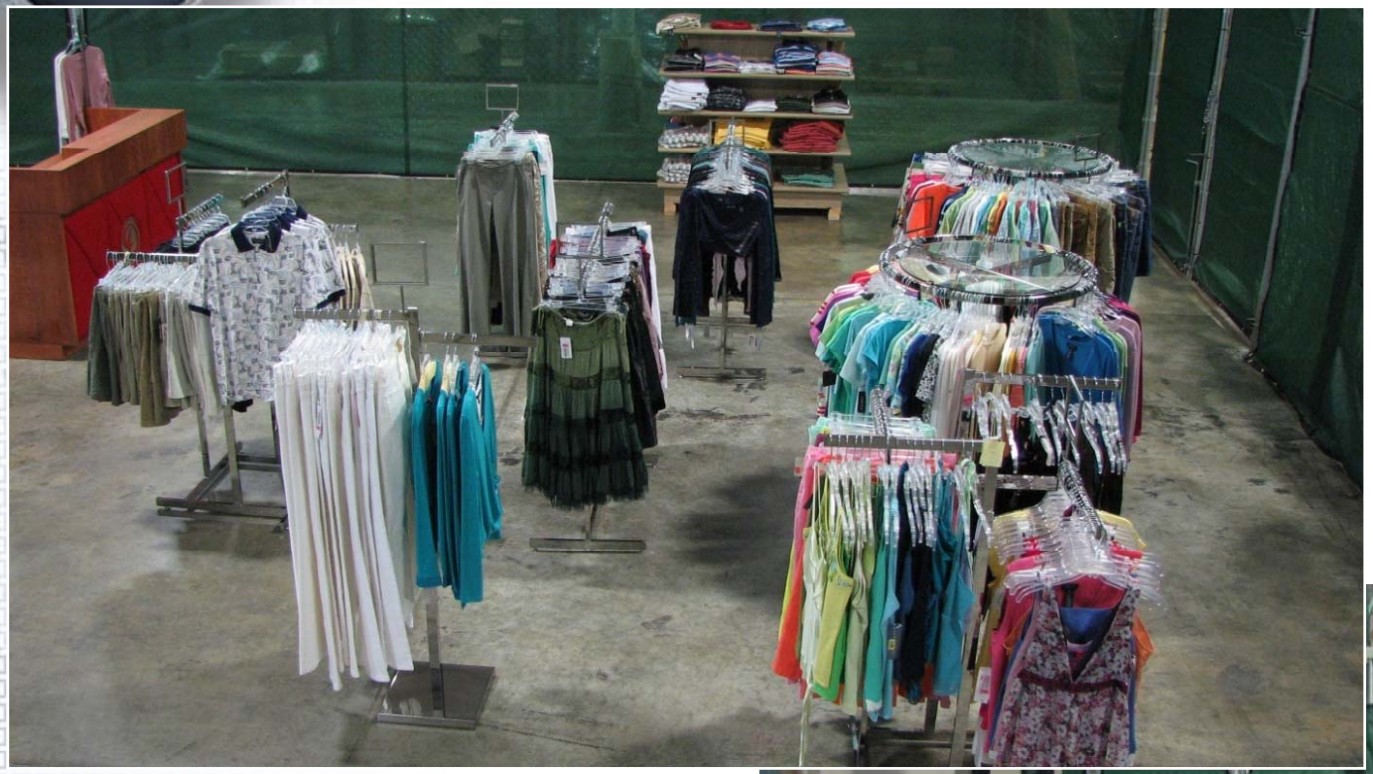
"The [University of Arkansas] RFID Lab is the most advanced of any owned by a university …"

Mark Roberti, Editor of *RFID Journal*,

RFID Lab

In the past year, more than 1100 people from 500+ companies visited the lab

RFID Lab

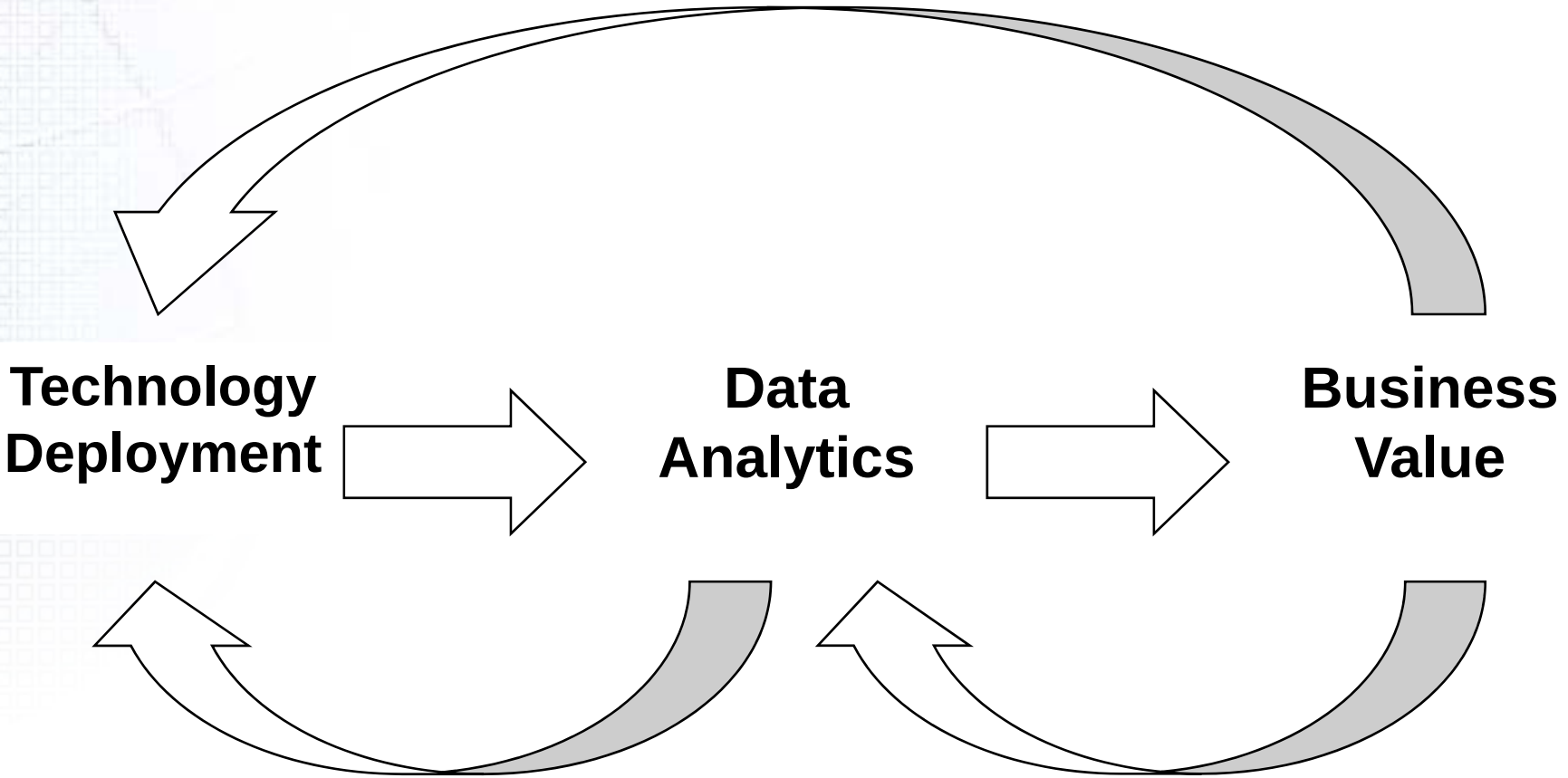


RFID Lab

Cold storage facility:

-10 degrees F

36 degrees F

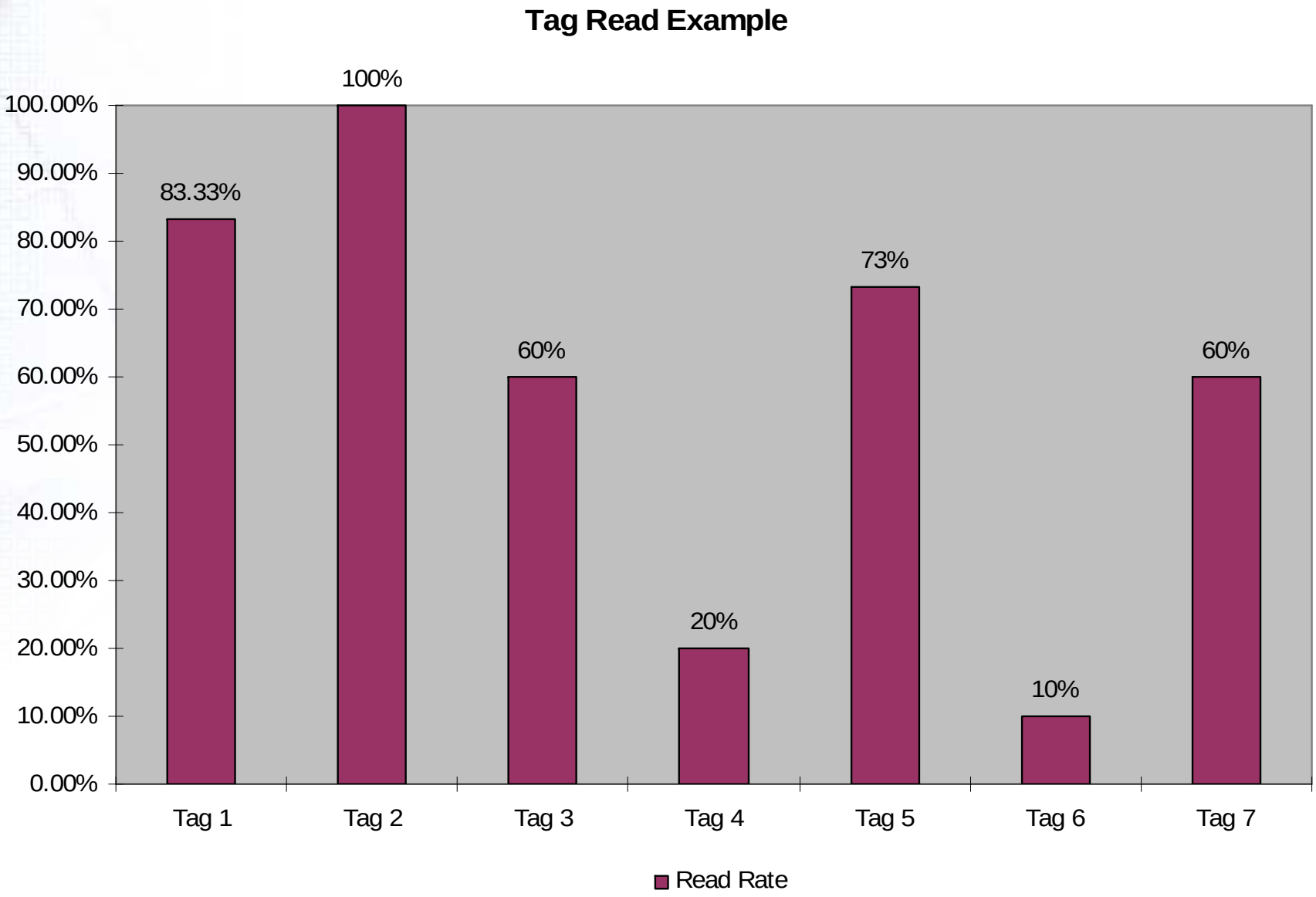

Technology Deployment
Data Analytics
Business Value

Technology

Some important trends and issues:

- More mobile, less static
- Environmental sensors
- Directionality
- RTLS
- Plug-n-play
- Item level
- Smaller, better, faster, cheaper …
- Tag type and tag placement matter

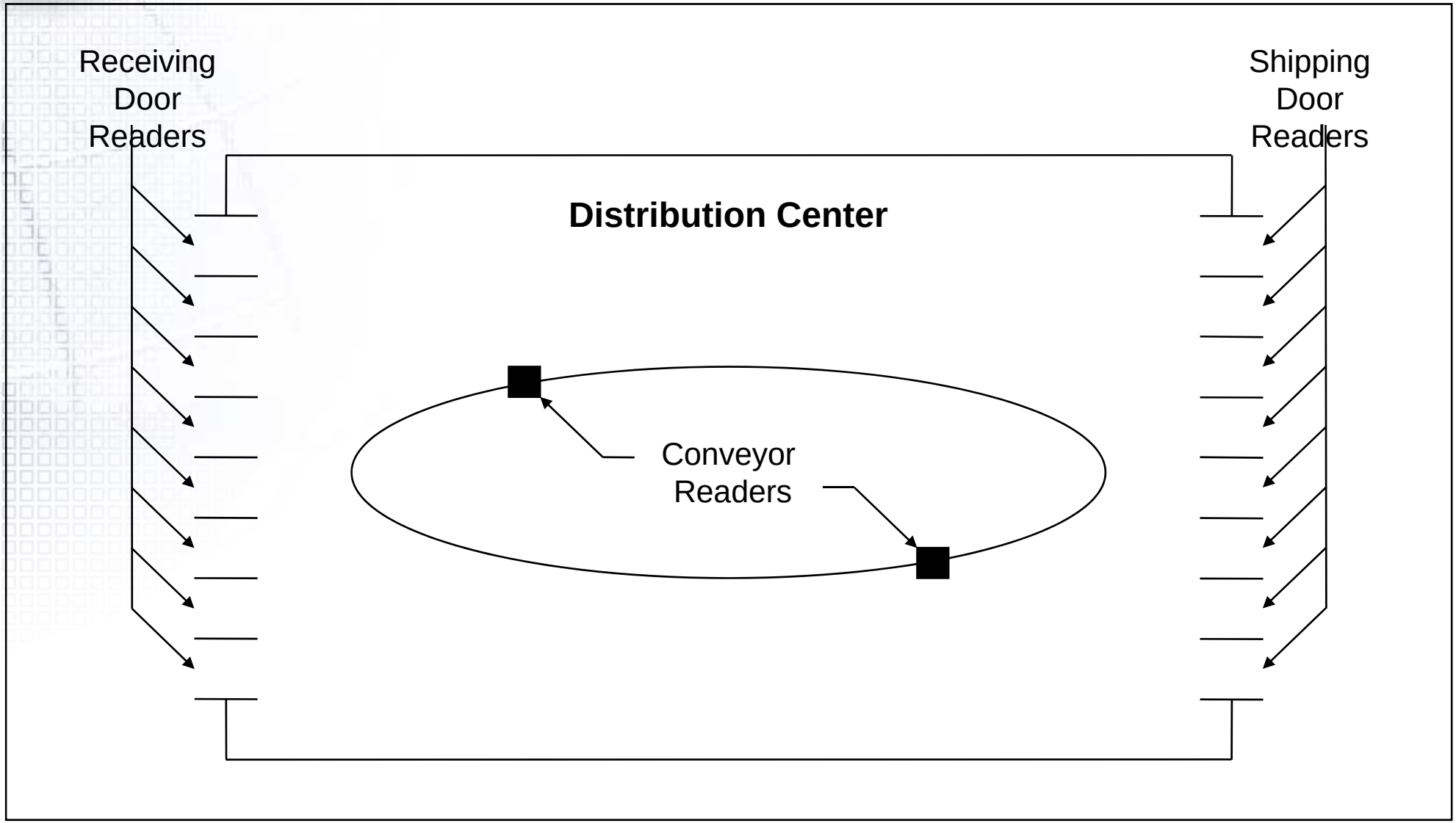
Importance of tag type / placement



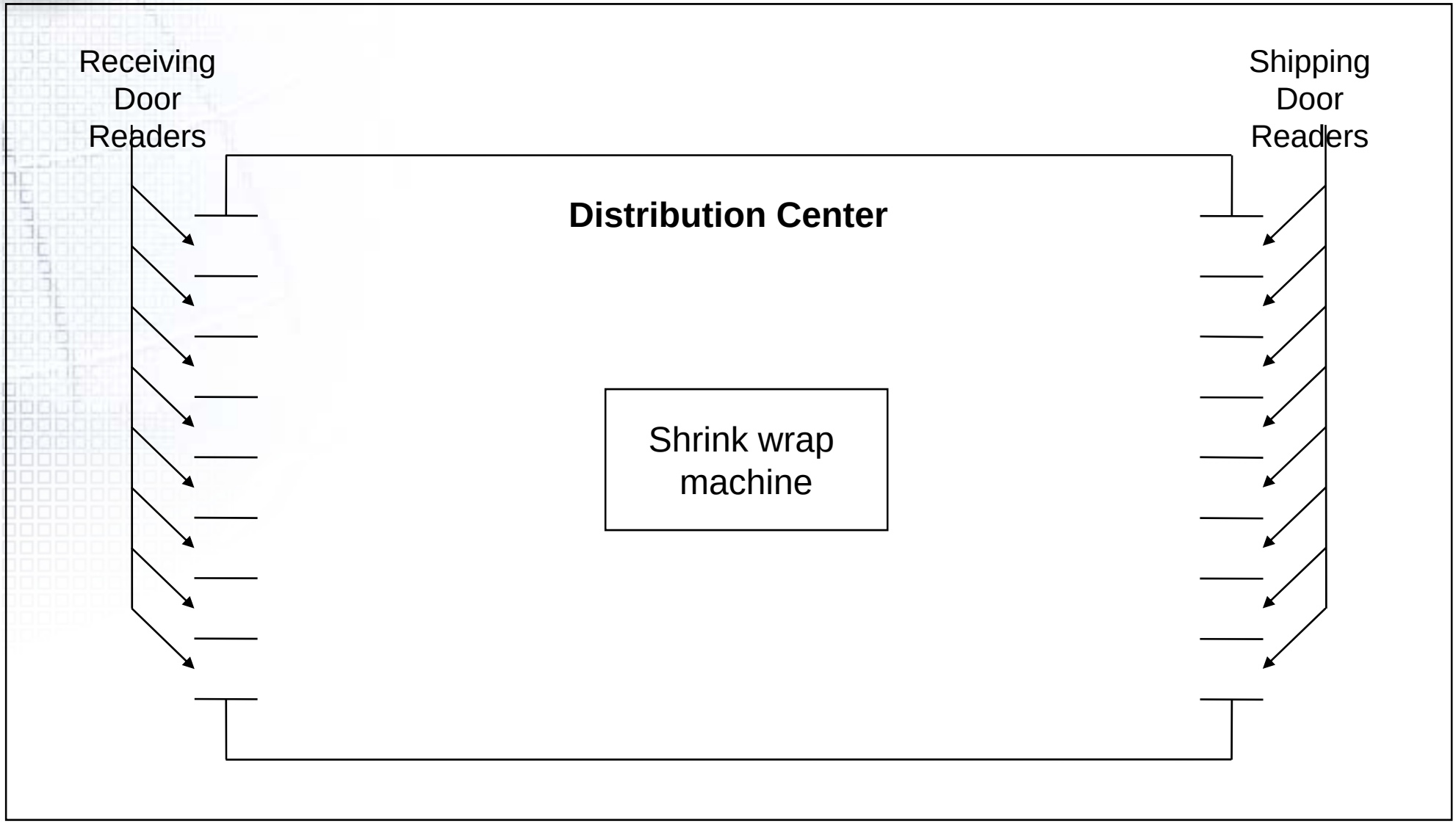
Data

- Very important link in the ROI chain
- Perhaps the weakest link at this point
- Variety of issues to consider

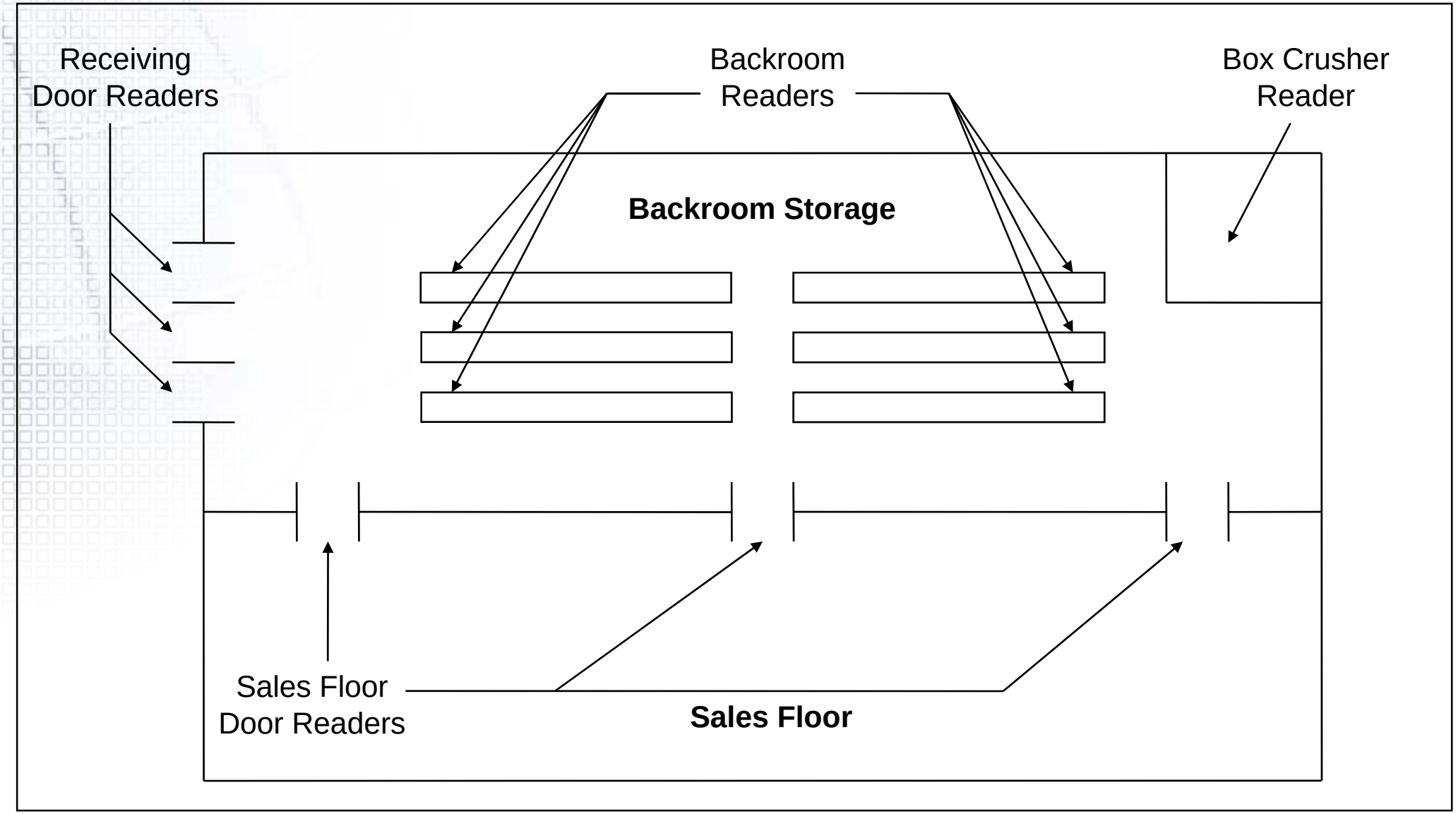
Read points - Generic DC (gm)



Read points - Generic DC (groc)



Read points - Generic Store



Read points

Location	EPC	Date/time	Reader
DC 123	0023800.341813.500000024	08-04-06 23:15	inbound
DC 123	0023800.341813.500000024	08-09-06 7:54	conveyor
DC 123	0023800.341813.500000024	08-09-06 8:23	outbound
ST 987	0023800.341813.500000024	08-09-06 20:31	inbound
ST 987	0023800.341813.500000024	08-09-06 22:14	backroom
ST 987	0023800.341813.500000024	08-11-06 13:54	sales floor
ST 987	0023800.341813.500000024	08-11-06 15:45	sales floor
ST 987	0023800.341813.500000024	08-11-06 15:49	box crusher

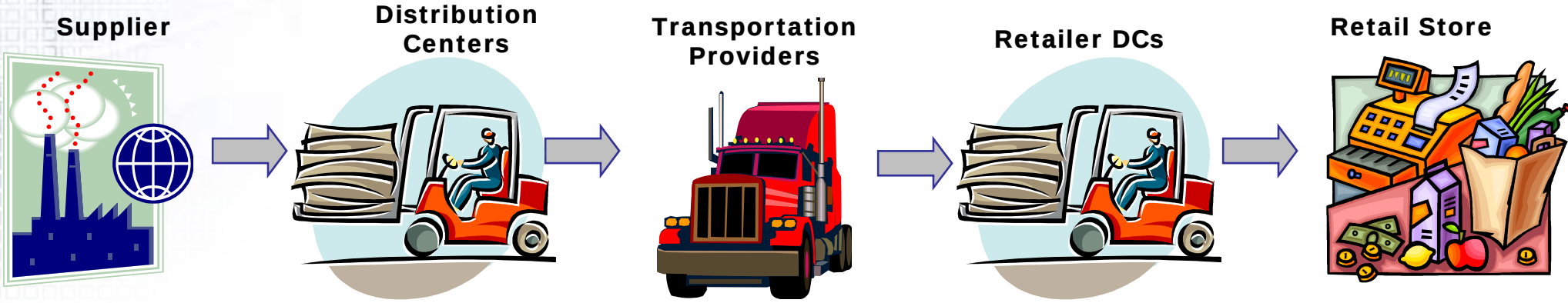
Data

- 100% read rates?
- How much data?
- Data quality
- Additional data challenges with
  - mobile readers
  - environmental sensor data (e.g., temp)
  - item level
  - RTLS

Business Value

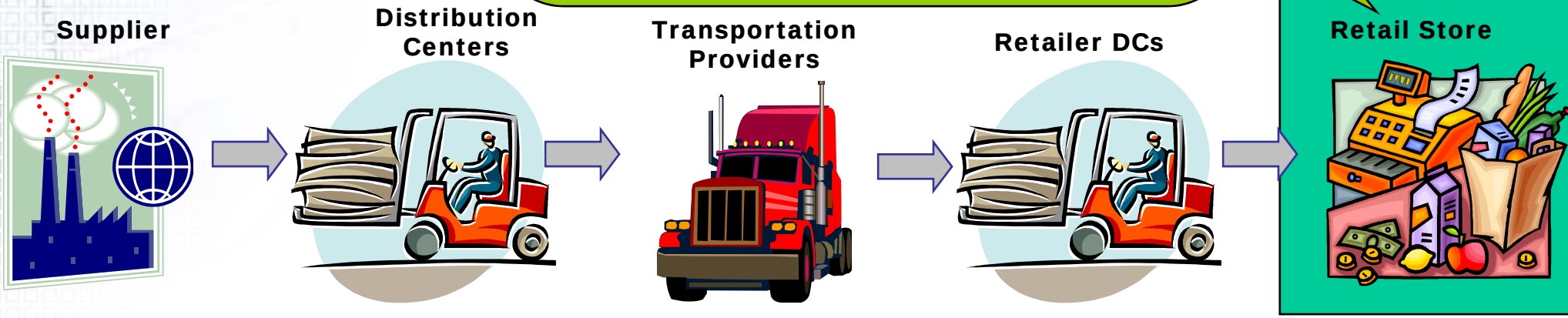
- The ultimate goal
- Not possible without proper technology deployment and proper data use
- Some real benefits, some expected benefits, some not-yet-imagined benefits …
- The key is VISIBILITY

Where to Find Business Value



Where to Find Business Value

- Out of stocks reduction
- Promotions execution
- Product rotation
- Reduction of manual orders
- Recall management
- Reduce shrinkage
- Visibility: where is my stuff?



Business Value

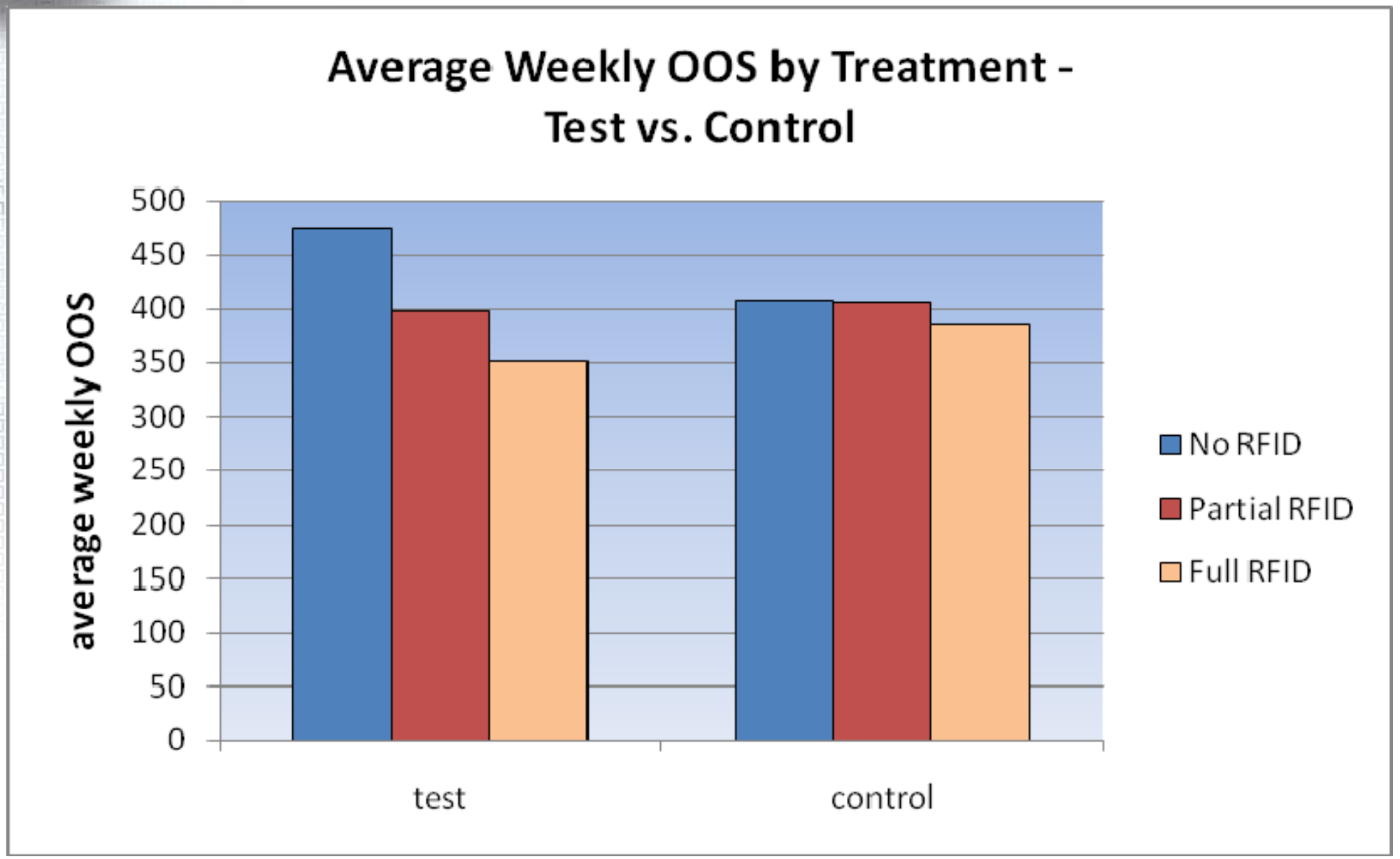
- Does RFID reduce out of stocks?

- But first, HOW can it reduce out of stocks?

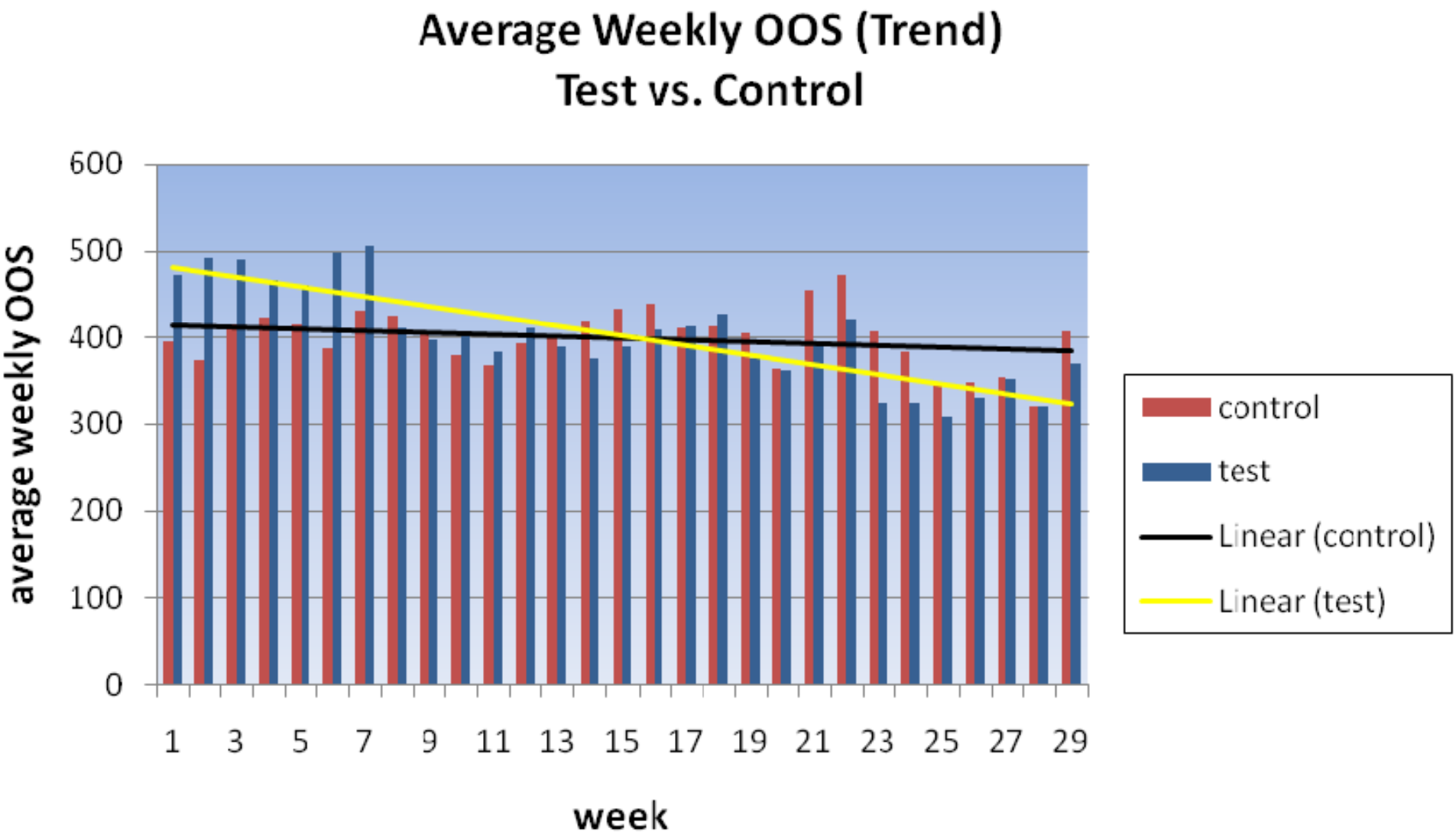
Basic Premise

- National and worldwide average out of stock (OOS) of approximately 8%
- Roughly 25% of OOS attributed to store replenishment processes (in the store, not on the shelf)
- Consumer responses to OOS:
  - Do not purchase: 9% (Retailer, Supplier)
  - Substitute different brand: 26% (Supplier)
  - Substitute same brand: 19%
  - Buy item at another store: 31% (Retailer)
  - Delay purchase: 15%
- Potential sales loss to retailers: ~3.2% (40%x8%)
- Potential sales loss for suppliers: ~2.8% (35%x8%)

OOS Study - Results



OOS Study - Results



OOS Reduction – by Velocity

For products selling X units per day …		RFID reduced OOS by …
< .1	----------	no improvement
.1 - .2	----------	32%
.2 - .3	----------	32%
.3 - .5	----------	20%
.5 – 1	----------	36%
1 – 3	----------	29%
3 – 7	----------	32%
7 – 15	----------	62%
> 15	----------	inconclusive
.1 – 15	**==========**	**30%**

More than 90% of the tagged items were within this range

OOS - Summary

- 26% improvement in test stores; Metro reported an 11% in stock improvement for test sites
- ~30% reduction in out of stocks for products selling ≥ .1 and ≤ 15 units per day (statistically significant)
- Translated into $ for suppliers? For retailers?
- With 8% national average, then potential improvement of 2.4% instock position for products in the .1-15 sales range.
  - For retailers: potential uplift of ~1%
  - For suppliers: ~.8%
- All of this by using RFID data at the store …

Business Value

- Promotions improvement

Promotions

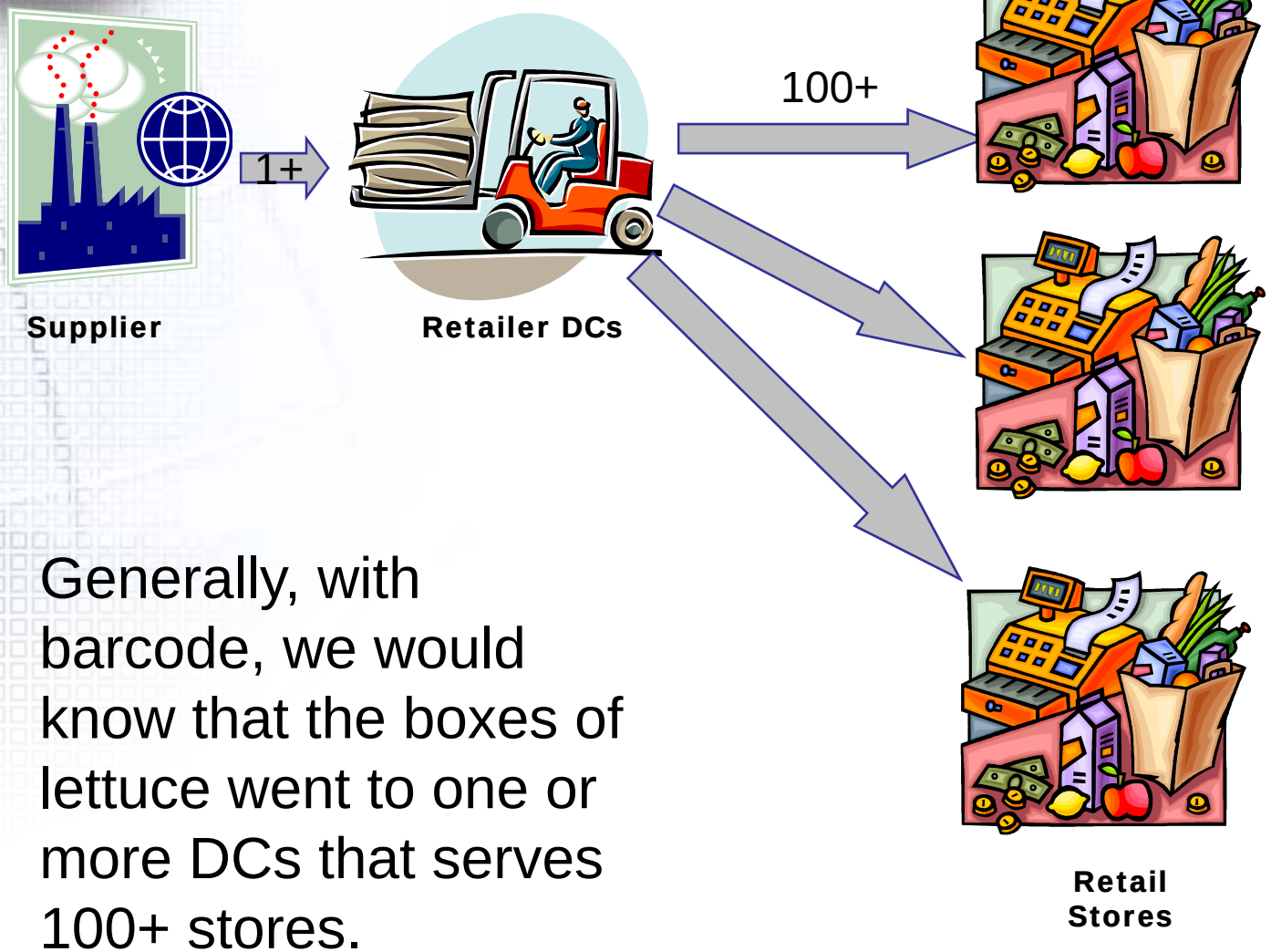
Location	EPC	Date/time	Reader
DC 123	0023800.241813.**500000024**	10-04-06 23:15	inbound
DC 123	0023800.241813.500000025	10-04-06 23:22	inbound
DC 123	0023800.241813.**500000024**	10-08-06 7:15	outbound
DC 123	0023800.241813.500000025	10-09-06 8:23	outbound
ST 987	0023800.241813.**500000024**	10-08-06 20:31	inbound
ST 567	0023800.241813.500000025	10-09-06 19:10	inbound
ST 987	0023800.241813.**500000024**	10-09-06 20:54	sales floor
ST 567	0023800.241813.500000025	10-12-06 5:17	sales floor

If the product needed to be on the floor by 10/10/06 for the promotion, store 567 just missed an important window of opportunity – for themselves and for the supplier …

Business Value

- Product rotation
- Reduction of manual orders
- Recall management
- Reduce shrinkage
- Visibility
  - What is happening in the store?
  - Can RFID be used to improve inventory accuracy? On average 65% of inventory counts are inaccurate by an average of almost 35%
    - Causes: theft, incorrect deliveries, misplaced items, unsaleables (damaged)

Recall Management



Generally, with barcode, we would know that the boxes of lettuce went to one or more DCs that serves 100+ stores.

With RFID, we would know which DC received the product and which stores received the cases in question.

Business Value

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- Reduction of manual orders
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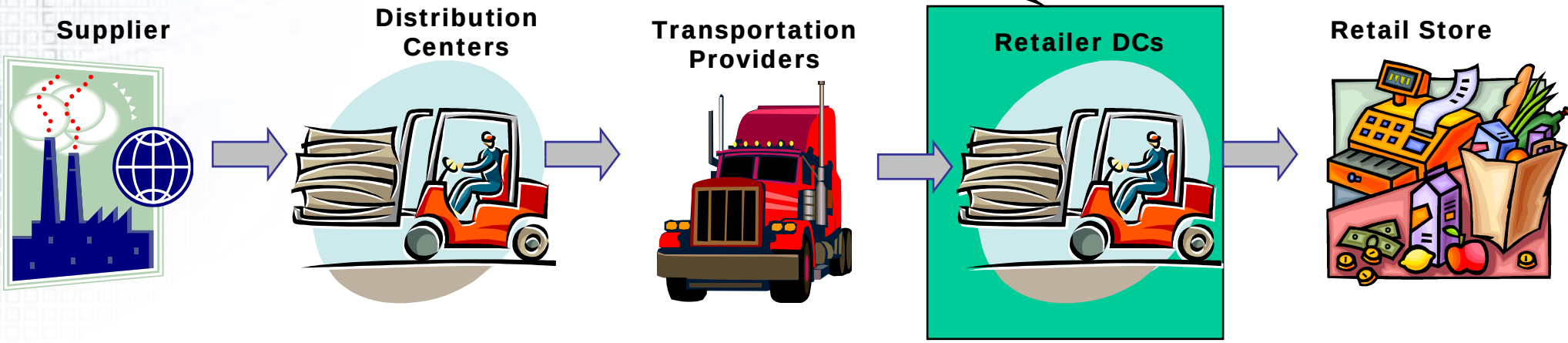
Where to Find Business Value

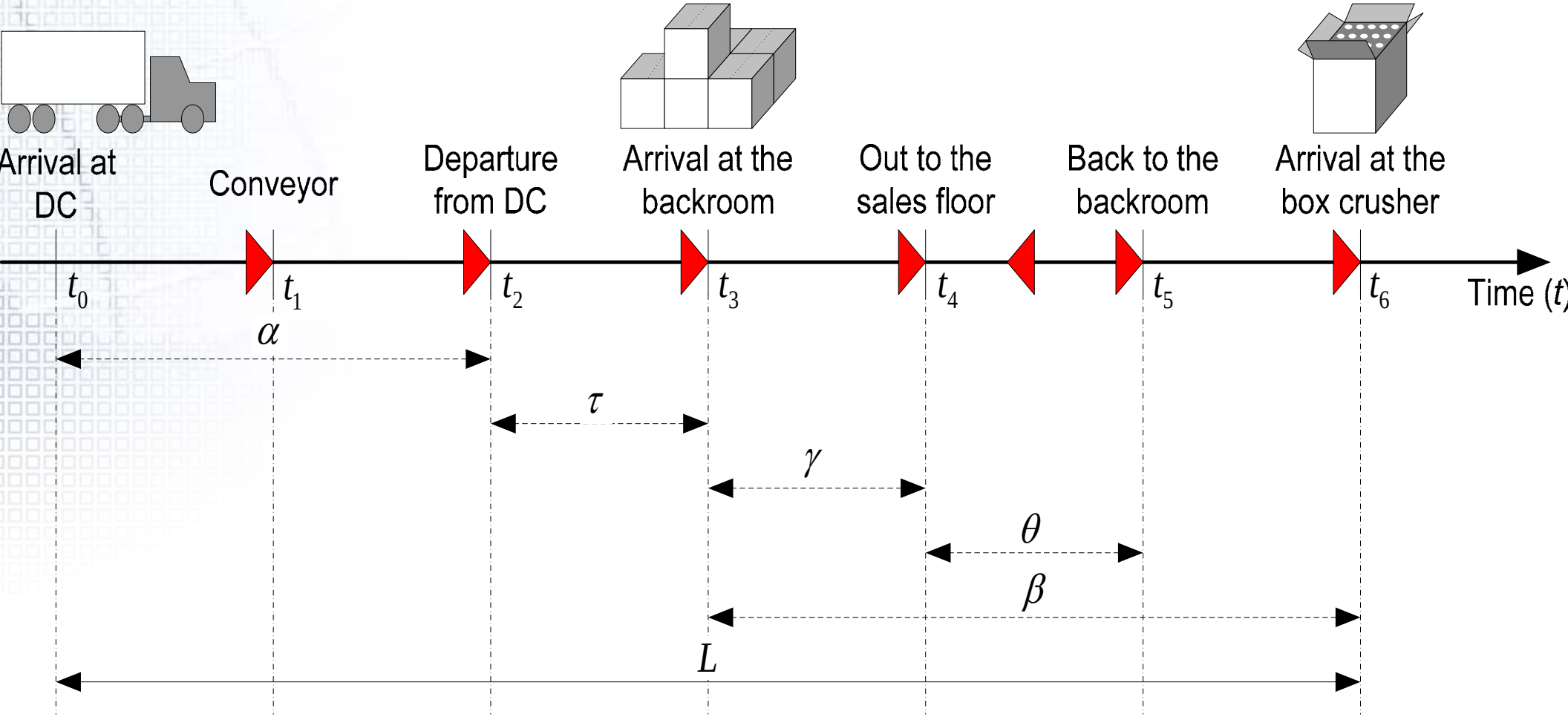
- Electronic proof of delivery
- Product rotation
- Recall management
- Shrinkage
- DC receiving
- Visibility: Where's my stuff?



Business Value

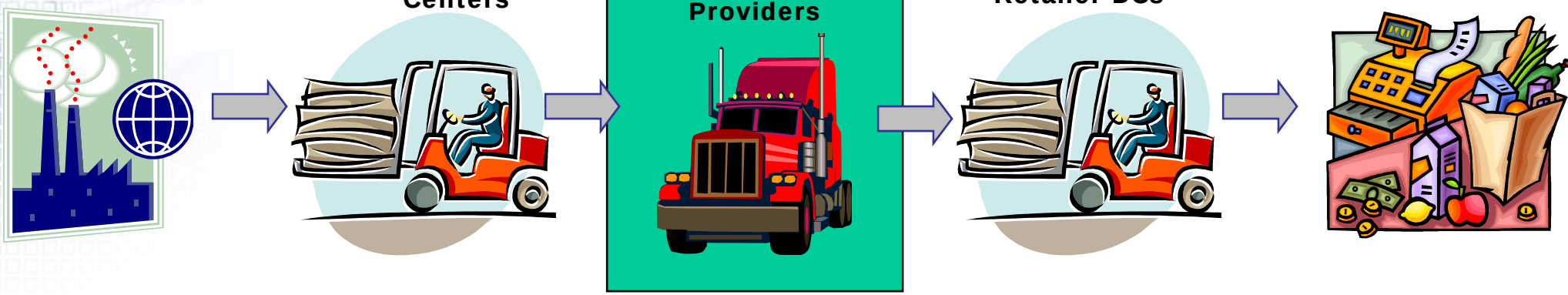
- Electronic proof of delivery
- Product rotation
- Recall management
- Shrinkage
- DC receiving
- Visibility
  - Where is my stuff?
  - How long has my stuff been sitting at ____?
    - Example: where are the candles?
      - Short term implications
      - Long term implications

Insights – Forecasting, Replenishment



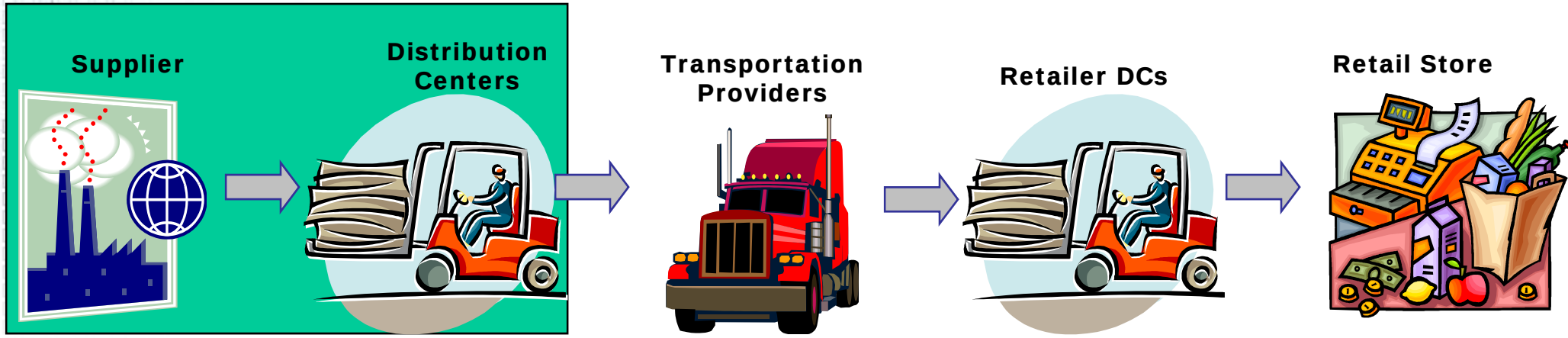
Where to Find Business Value

•Shipping/Receiving Accuracy/Efficiency
•Maintenance
•Asset utilization
•Yard management
•Food quality / damage



Where to Find Business Value

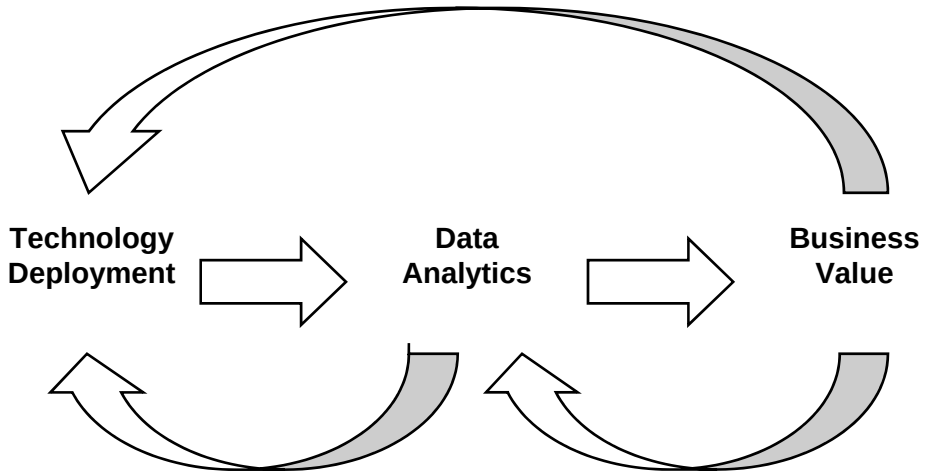
- Targeted use of merchandisers
- Recalls / lot control
- Appropriate movement of goods
- Improved shipping accuracy
- Reusable containers
- Asset management
- Food quality



Getting Started

- Technology: deploy the proper technology
- Data: what can it tell you?
- Business value: what are your pain points?

- Single use case vs holistic use cases



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International Journal of RF Technologies: Research and Applications

In cooperation with GRFLA

Now accepting submissions

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