

Auto-ID Center

Vision, Technology, Applications

Massachusetts Institute of Technology
Cambridge University



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Overview

- About the Center
- Vision
- Technology
- Characteristics
- Strategic Applications
- Tactical Applications
- Operational Applications
- Current Status



About The Center

- Global, industry funded research program
Massachusetts Institute of Technology (1999)
Cambridge University (2000)
Labs planned for Asia (2001) & South America (2002)
- Mission
Change the world by merging bits and atoms



About The Center

- End User Sponsors include
 - Procter & Gamble, Gillette, Uniform Code Council (UCC), EAN International, CHEP, International Paper, Philip Morris Group, Johnson & Johnson, Wal-Mart, Yuen Foong Yu, United States Postal Service, Westvaco, Unilever, Kimberly-Clark, Tesco, Dai-Nippon Printing, Coca-Cola
- Vendor Sponsors include
 - NCR, Savi Technologies, Sun Microsystems, Flint Ink, Markem, Invensys, Sensormatic, Cash's, Rafsec, Flexchip, Alien Technology, Philips Semiconductor, SAP, Checkpoint, ThingMagic, Accenture, Globe Ranger, Ember Corporation, AC Nielsen, Avery Dennison
- Trade Bodies include
 - AIM Global, GCI, GMA, FMI, NACS, NACDS, AIM, POPAI, IMRA, ARTS, UTSA

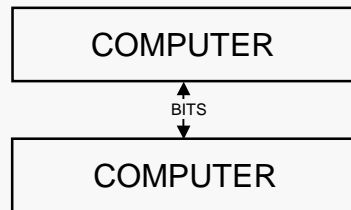


Vision

- A world where...
 - ...bits and atoms are merged
 - ...physical objects communicate in real time all the time
 - ...the Internet extends into everyday products
 - ...everything is connected



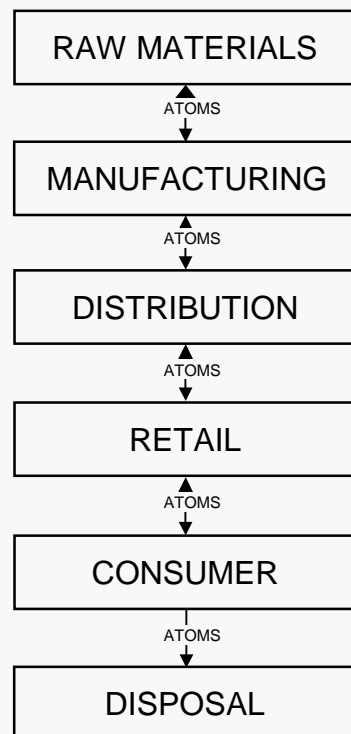
Vision: networks of bits and atoms



The Internet is a network of bits



Vision: networks of bits and atoms

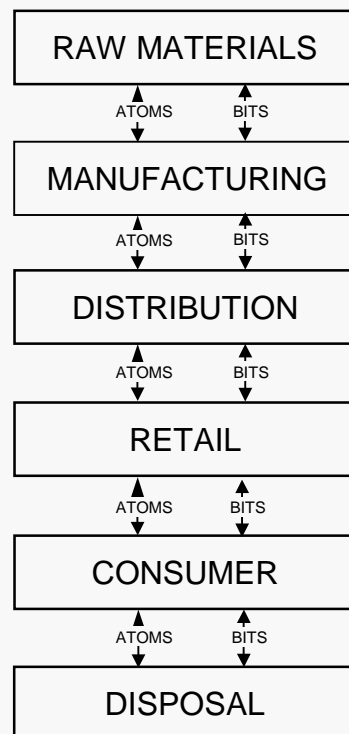


The supply chain is a network of atoms



Vision: networks of bits and atoms

We aim to Synchronize
the Flow of Bits and
Atoms

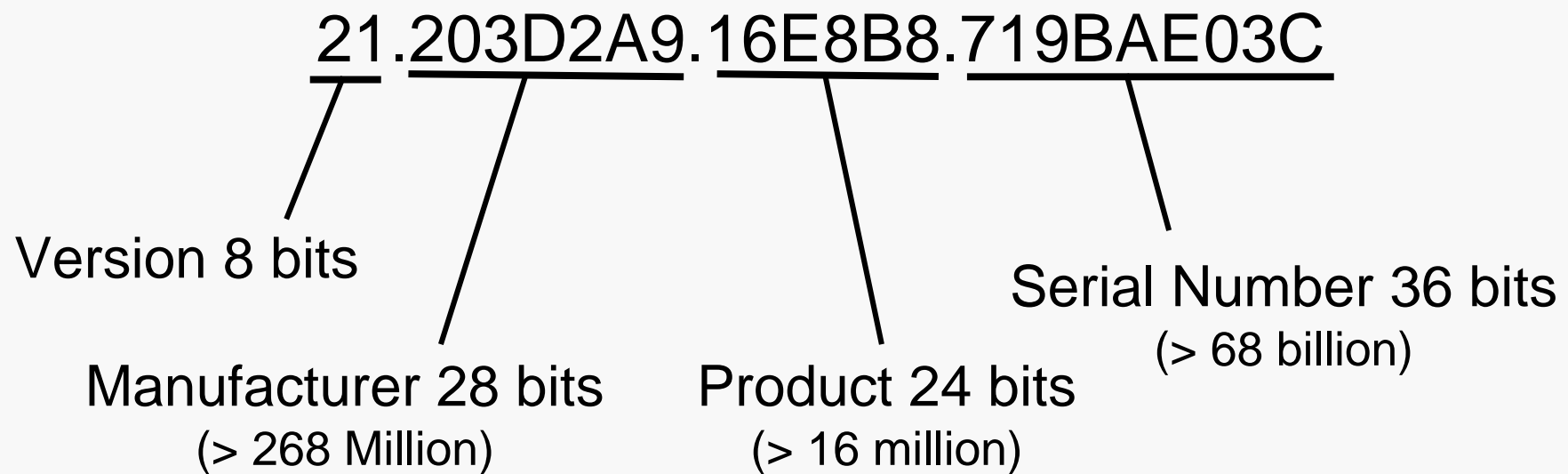


Technology



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Technology – ePC



Technology - ONS

- Redirection Service

acts as telephone book

based upon Domain Name Service (DNS)

hierarchical

distributed

scalable



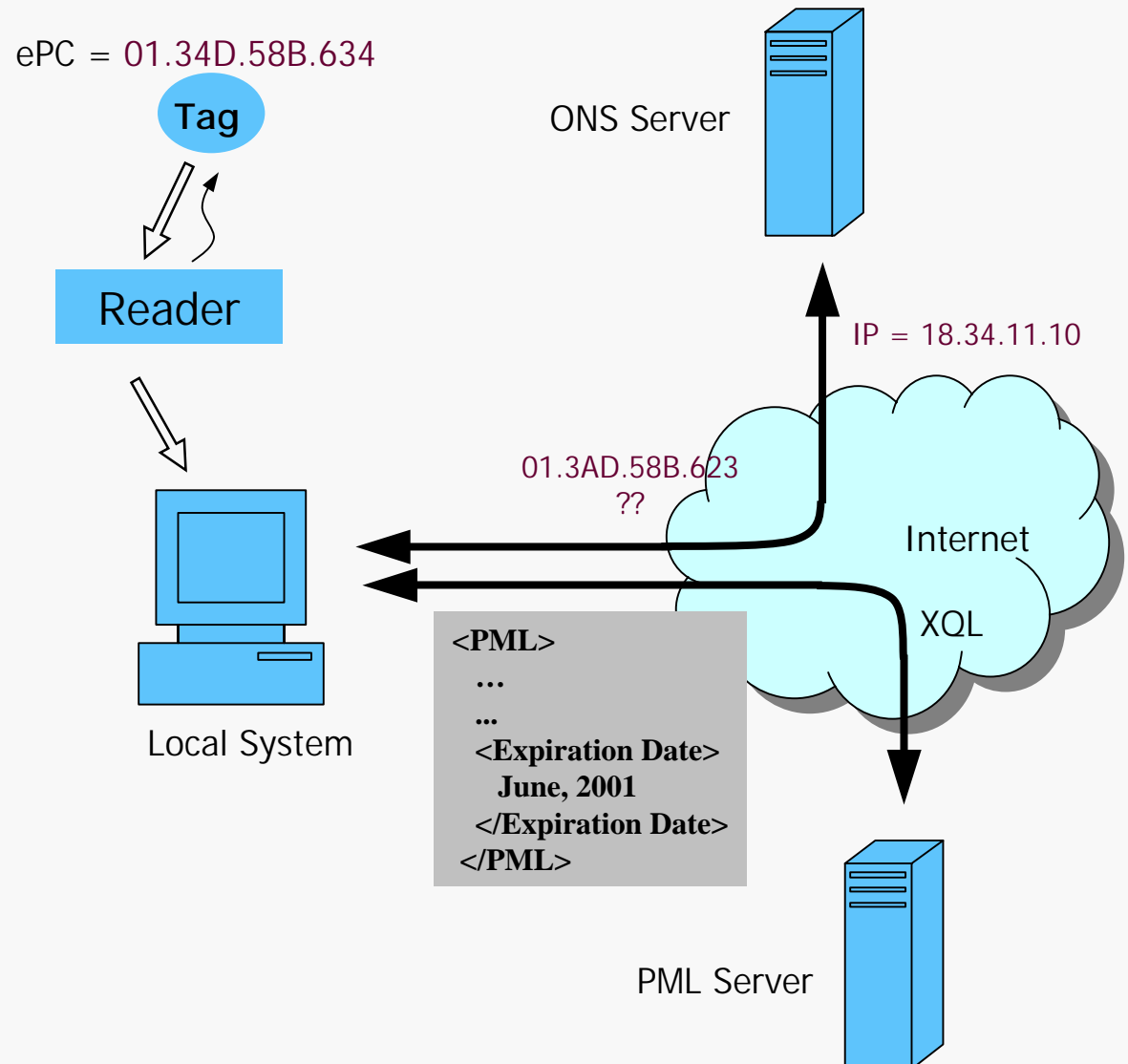
Technology - PML

- Language for describing physical objects
 - classification and categorization
 - hierarchy
 - relations
 - sensor telemetry



Technology – the System

- **Unique identification**
ePC
- **Automatic data capture**
Tags & Readers
- **Real-time identification**
ONS & PML



Characteristics

- Real Time Visibility
- Trace-ability
 - Finished Goods
 - Process
- Enhanced Accuracy
 - Finished Goods
 - Process
- Higher Productivity
- Unique Identification
- Bi-directional Information Flows



Strategic Applications

- Extended Product
- Management of Complex Networks
 - Globalization
 - Leveraging Scale
 - Distributed Manufacturing
 - Third Party Service Providers
- Reaction to Market Changes
 - Pattern
 - Pace
 - Place



Tactical Applications

- CPFR/VMI/ECR/S&OP Support
- Diversion Management
- Activity Based Costing Support
- Product Life Cycle Management
- Product Replenishment Support
- Promotions Management
- ISO 9000
- E-Procurement



Operational Applications

- Logistics
 - Automated Inventory Counting
 - Efficient Proof of Delivery
 - Management of Warehouse Complexity
 - Pipeline Inventory Visibility
- Product
 - Counterfeit Control
 - Recall Control
 - Re-cycling Management

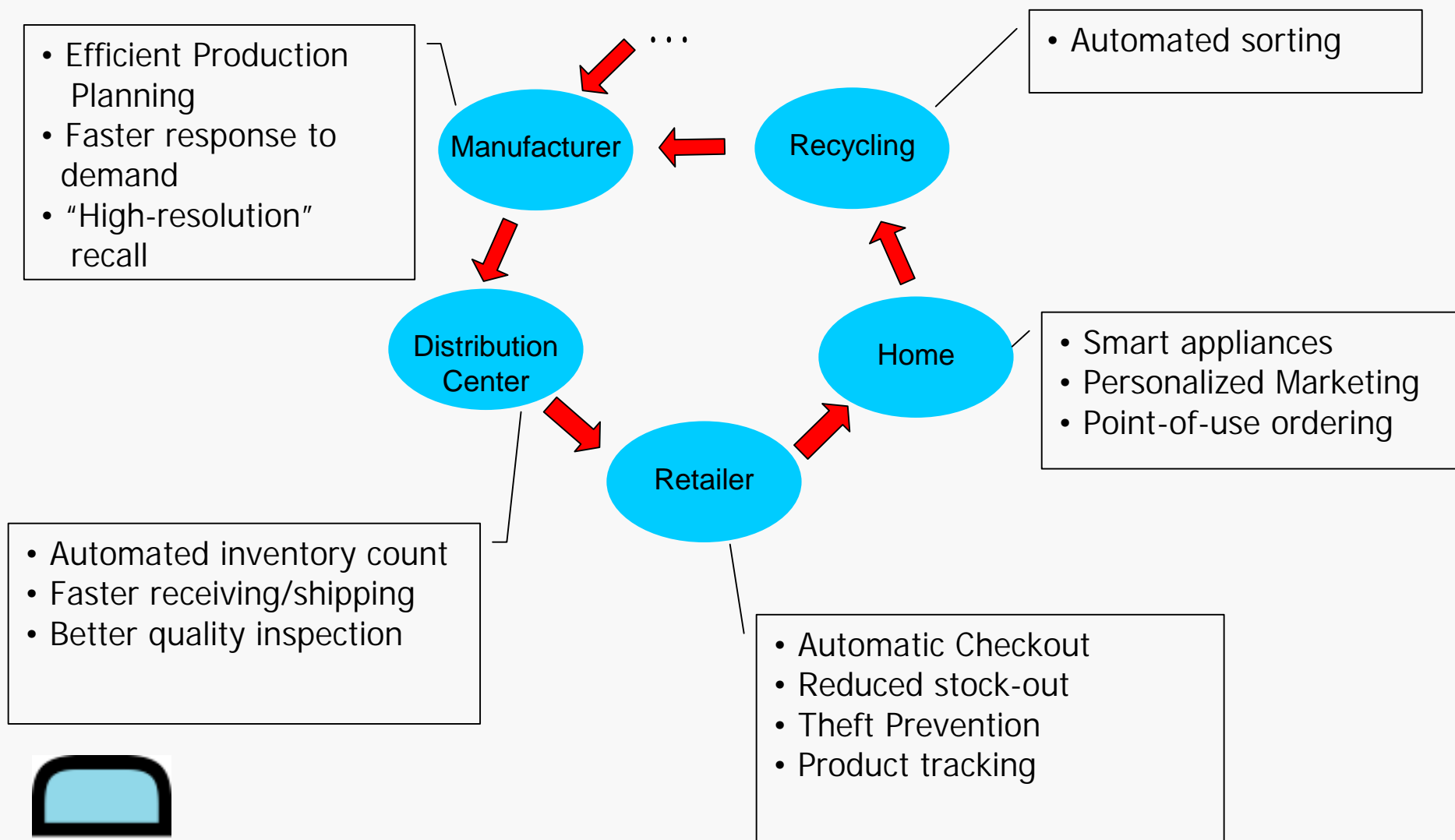


Operational Applications

- Retail Stores
 - Reduced Out-of-Stocks
 - Theft Control/Prediction
 - Automatic Check-out
 - Back Room Management



Supply Chain Applications



The Field Test



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Field Test

- aka.. the “Town Test”
- Provides a real world environment to work through issues
- And understand the impact throughout the entire supply chain (Plant – DC – Shelf – Register – Home)



Field Test Objectives

1. Demonstrate the power & potential of the ePC
2. Test MIT Auto-ID Center infrastructure & open standards
3. Develop business case
4. Create excitement that will lead to development of low cost chips, readers, smart shelves, and other smart applications for stores, distribution centers, and consumer's homes.



Field Test Status

- Field test team has been meeting for 6 months
- 3 sub-teams established (end users, technology vendors, & public relations)
- Town selected: Tulsa, OK
- Retailer: Sam's Club
- First Product: Bounty Towels (15 Roll) on CHEP
- Three phased implementation plan



Field Test Implementation

Phase I: Pallet Level – October, 2001

- Sam's Club - Tulsa, OK
- Bounty Towels – 15 Roll
- Gillette, Unilever, Kraft to follow
- Savi & intermec tags & readers

Phase II: Case Level – February, 2002

- Bentonville Test Lab
- IP, Phillips, & Checkpoint – forklift & portal solution
- Expand to Walmart
- J&J & Kimberly Clark added

Phase III: Item Level – June, 2002

- Install low cost tags & readers - MIT
- Other retailers & suppliers - TBD



Phase I First Shipment – 10/1/01 (Pallet test – Bounty 15 Roll)



450 “Smart Chip” tagged CHEP Pallets

Application of Test Brand Code Label – Cape Girardeau Plant



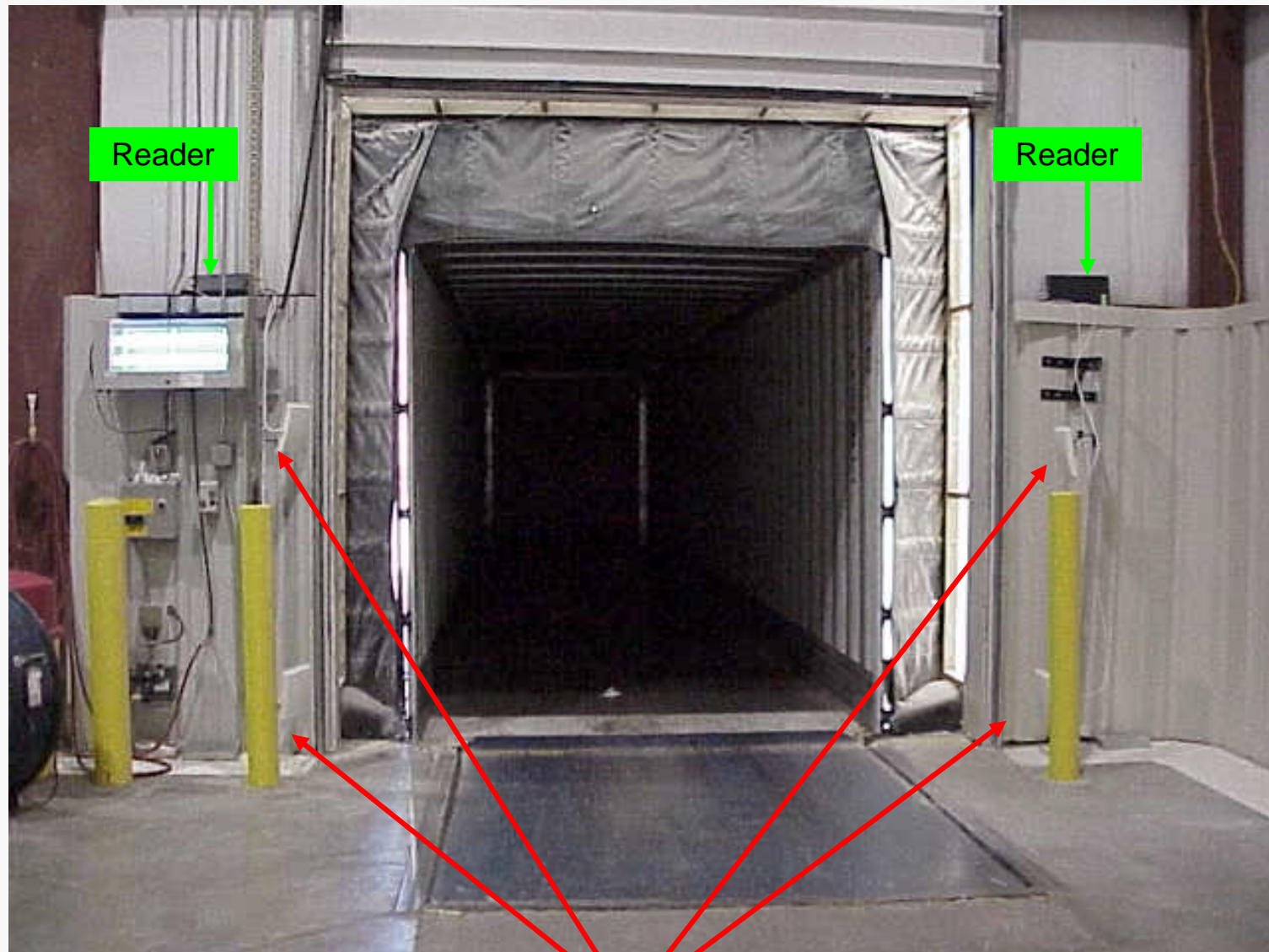
Bulk Storage in Outbound Warehouse



Wired 1 Outbound Dock Door – 2 Antennae per side



Wired 1 Outbound Dock Door – 2 Antennae per side



Antennae

[illegible]

System Monitor for Cape Girardeau

Phone
Connection
to Internet

Beep...

Savi Site Server
connected to dock door

MIT Savant Server
connected to Internet

First Shipment: Bounty is picked and loaded 2 wide x 2 high



1st Shipment out of P&G and into Sam's Club was a success!



The “beep” heard around MIT offices?



Arrival of 1st Shipment into Sam's Club in Tulsa, OK



Field Test Next Steps

1. Expand Phase I pallet test
 - Add Unilever & Gillette brands
 - Add Sam's DC
2. Finalize Phase II case level plan
 - International Paper & Philips case level proposals
 - Add Walmart DC & store
3. Develop Phase III unit level plan
 - MIT deliverable – low cost tags & readers
 - Shelf solution – TBD
 - Check-out solution – TBD

