IBM Software Group

2004 WDI / WBIC Customer Conference

Global Business Transformation

Radio Frequency Identification (RFID)

David Lee

Kraft Foods

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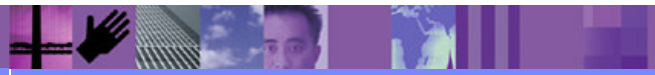
Dateline: June, 2003

Wal*Mart to Top 100 Suppliers:

"Tag 100% Cases & Pallets"



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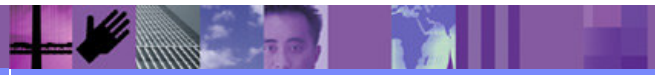
Agenda

- RFID 101
- The Business Case
- Challenges
- EPC Roadmap



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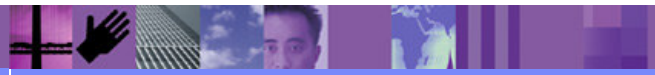
Top Eight Things to Track

8. Golf Balls
7. Boss
6. Staff
5. Beverages
4. Money
3 Credit Cards
2. Children on a Friday night
1. Wife on a Friday night



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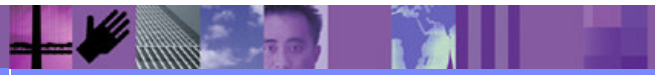
RFID 101



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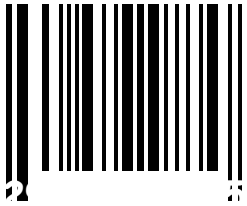
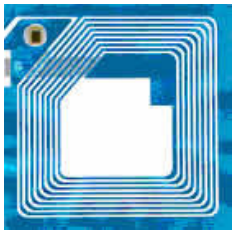
EPC / RFID and Bar Codes



Inexpensive
Installed infrastructure
Data capture signal – it 'beeps when it reads'



Passive data capture (no human intervention)
No optical line-of-sight required (convenience)
Ability to read multiple tags simultaneously (efficiency)
Serialization of product code enables
- Track and trace – specific case identification for precise recall capabilities
- Authentication – identify counterfeit

Future tags may have ability to update content
- Multiple write capability – update data along the supply chain, providing a history
- Enhanced functionality – environmental information
- Exchange data more real-time information

Bar codes and RFID tags will co-exist for a long time!

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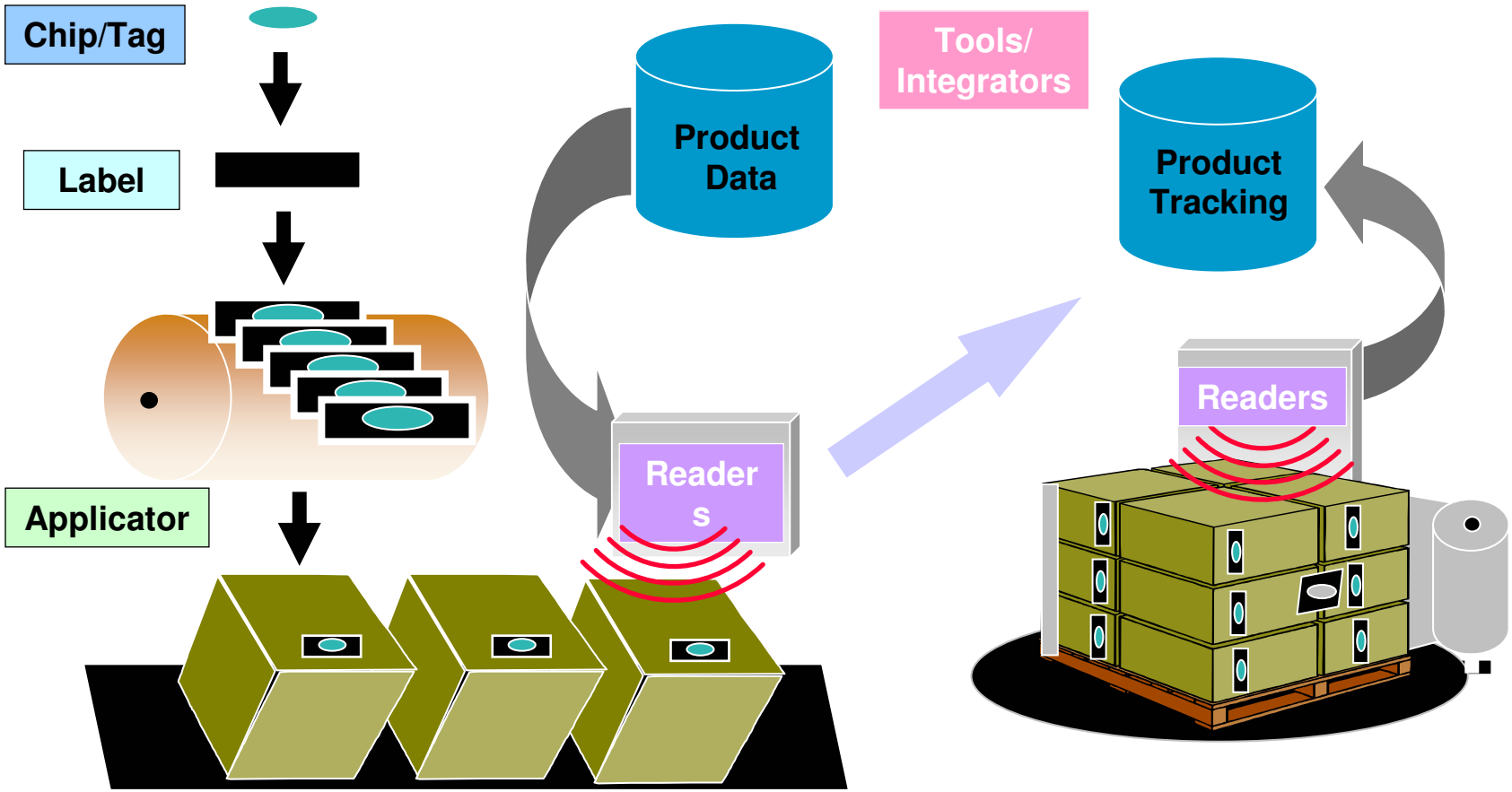
Technology Deployment (Generic)



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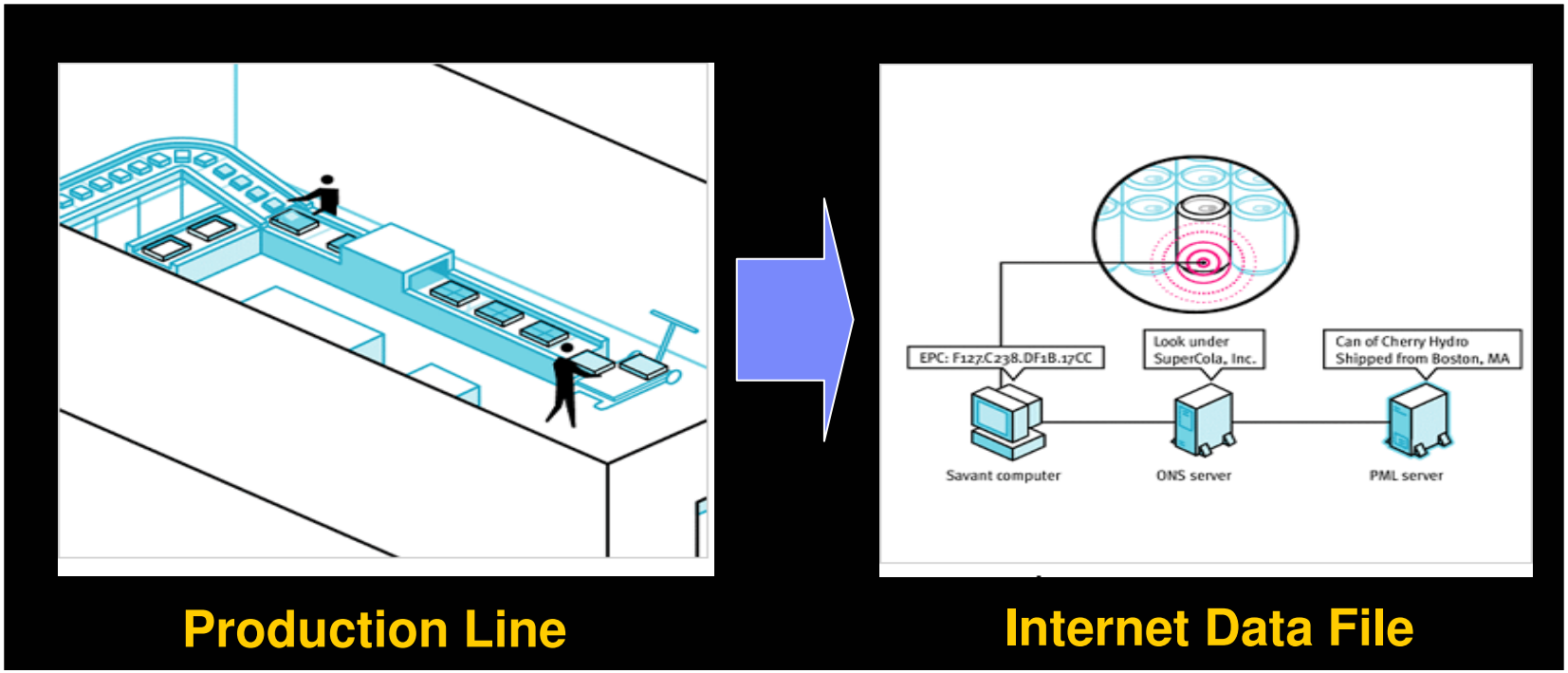
EPC Vision:

1. Information from the tag is posted to internet servers at the plant production line.



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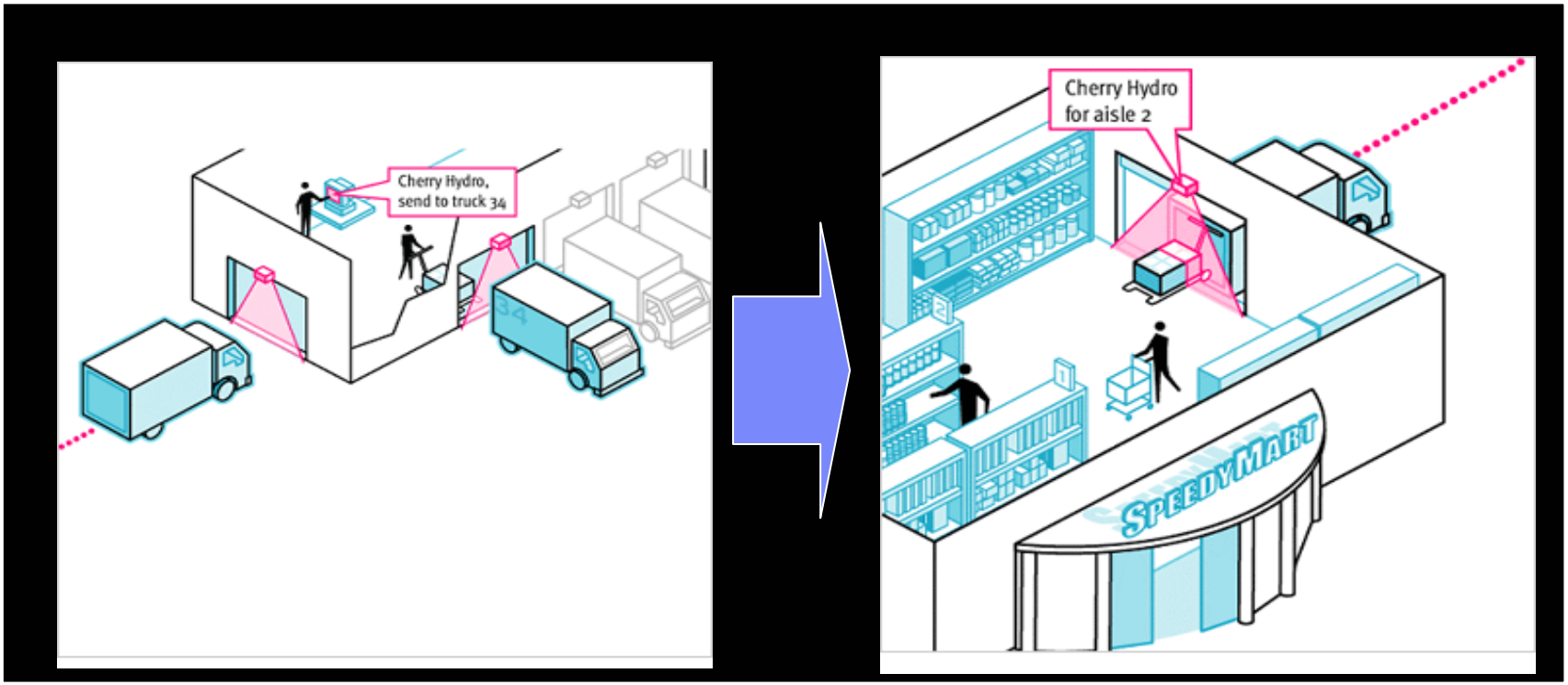
EPC Vision:

2. "Readers and Transmitters" are used to update location of product in the supply network.



Customer Warehouse **Store Dock**

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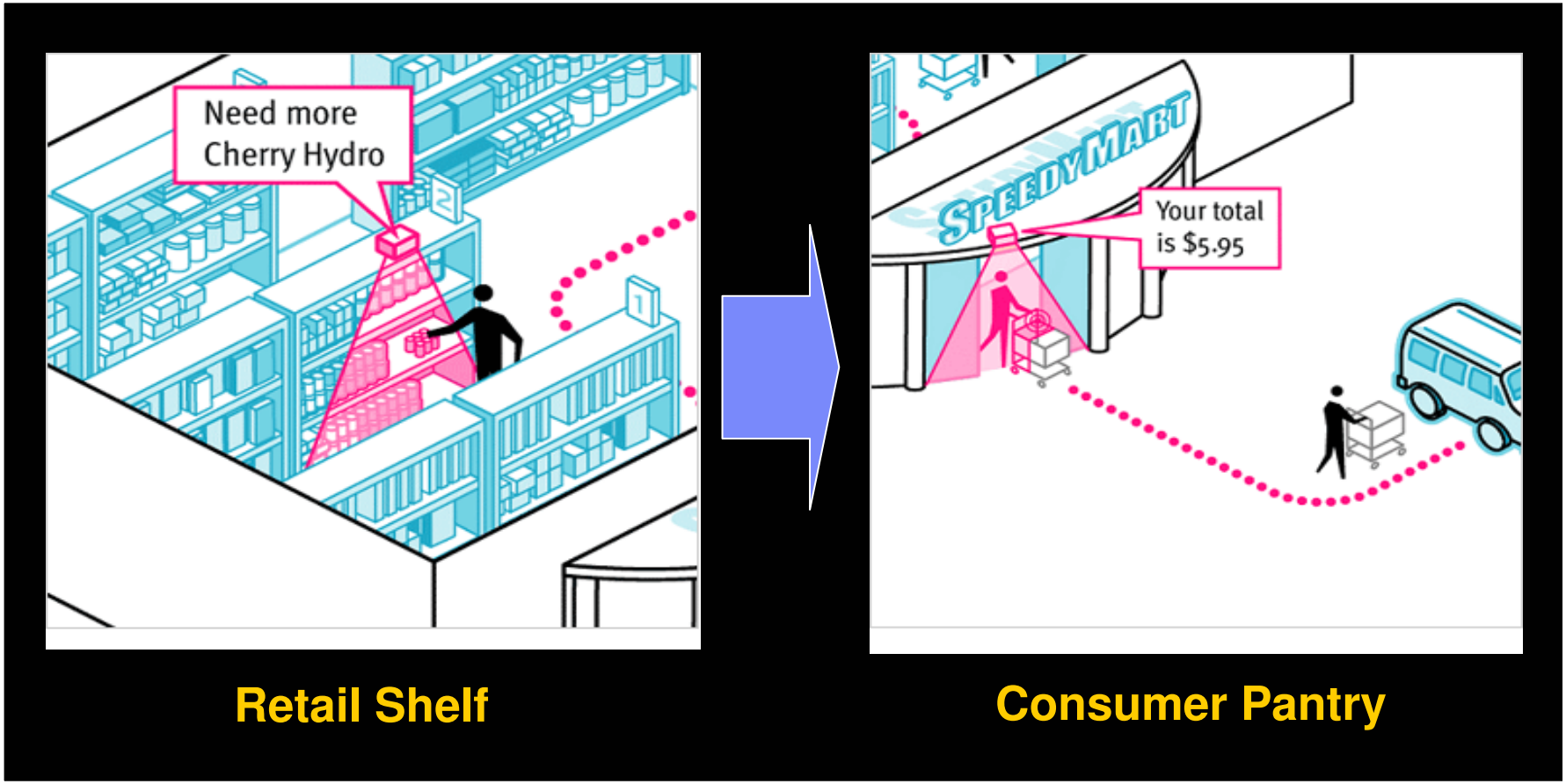
EPC Vision:

3. At the point of purchase retail inventory is updated and manufacturers receive notice for replenishment.



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Comparing/Contrasting UHF & HF Tags

UHF (915MHz or 868MHz)	HF (13.56MHz)
Smaller	Bigger
Cheaper	More expensive
Faster (5-10ms read time)	Slower (50-100ms read time)
Restricted in some countries	Globally available
Less penetration of metals	Better penetration of metals
Shorter read range	Longer read range
Freq hopping to minimize interference	No frequency hopping
Plastic electronics are not fast enough for UHF tags	Plastic electronics are fast enough for HF tags

Take away:

- UHF tags will be used for pallets & cases
- Plastic electronic HF tags will be used for items

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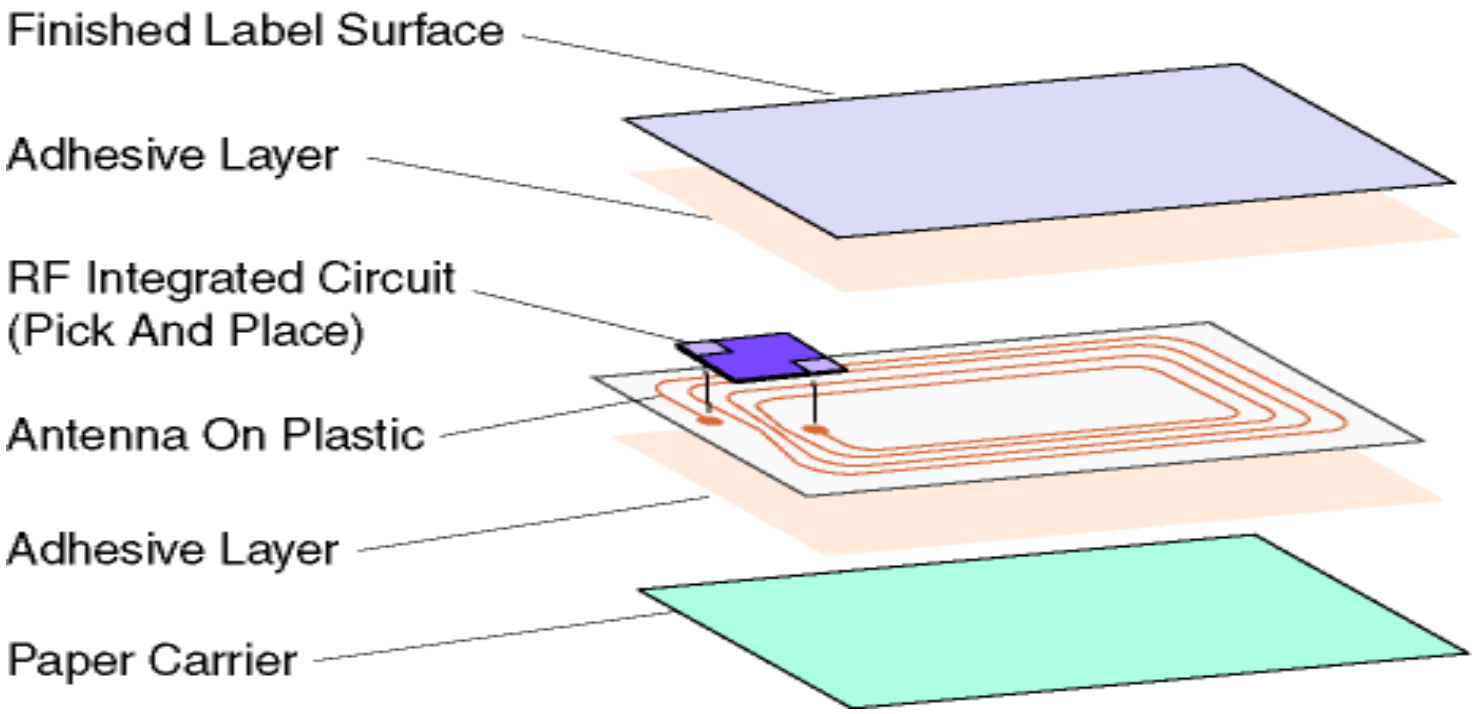
Layers Of An RFID Tag



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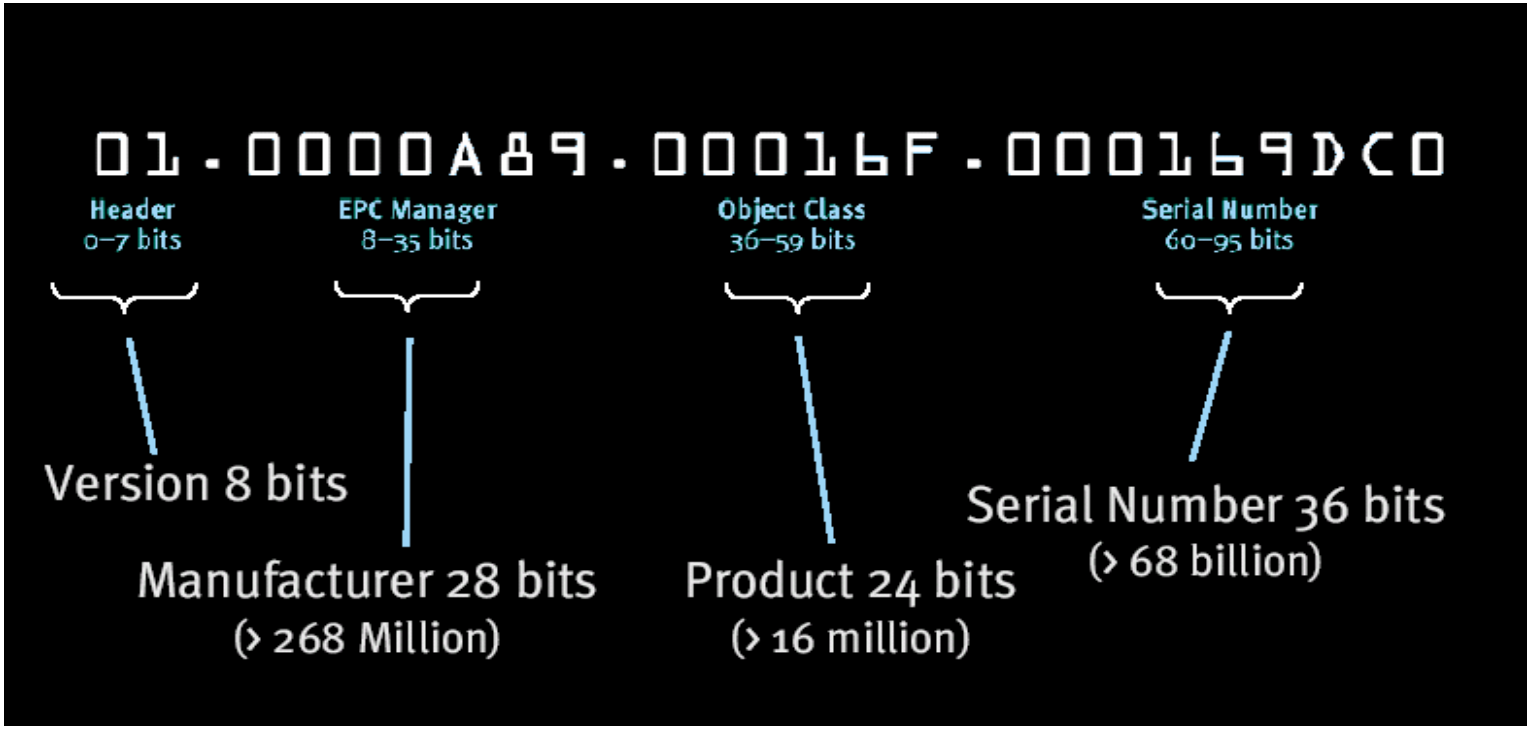
EPC: 96-Bit Version



- Provides a *unique identifier* (or license plate) for every distribution object
- Designed to be scaleable and extensible
- Serves as a *key* to a back-end database
- More powerful than a UPC, but can still track objects at the SKU-level

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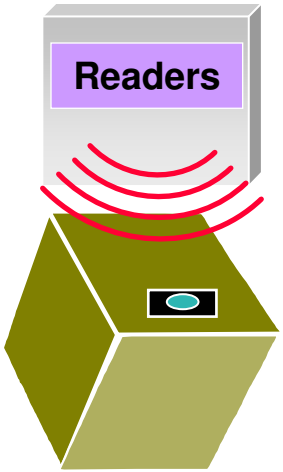
How Does RFID Work?



- RFID readers emit EM waves
- EM waves wirelessly power up nearby tags
- EM waves also carry encoded reader commands
- Tags in close proximity respond to reader commands
- Readers can read multiple tags at once
  - This property is called anti-collision
  - Typical spec→ 200 tag reads per second
- Readers filter tag data dumping relevant info to a back-end network for storage & data processing

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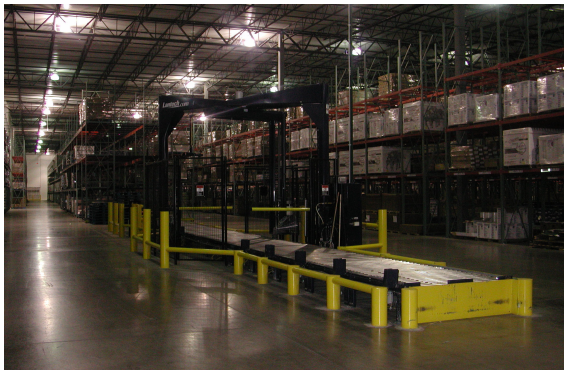
Customized Reader Solutions Are Required

1. Case conveyors



2. Palletizers

3. Smart forklifts

4. Pick-bays

5. Doorways

6. Handhelds

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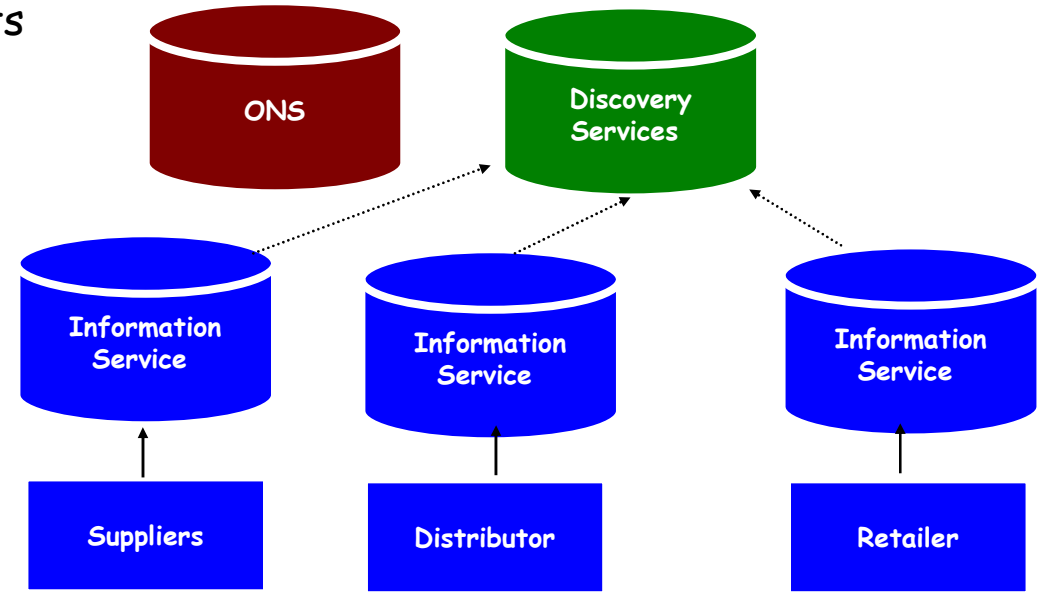
EPC Network

- The EPC network is the key to making RFID successful
  - EPC network allows us to take RFID outside the four walls and create value for the entire supply chain
  - Leverage the existing Internet infrastructure to create a low cost standards-based set of services
  - Three main components



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EPC Middleware

- The Auto-ID Center developed a software technology called Savant to deal with the management and movement of the enormous volumes of EPC data
- A Savant differs from most enterprise middleware in that it uses a distributed architecture and is organized in a hierarchy that manages the flow of data.
- Savants will run in stores, distribution centers, factories and other locations, gathering, storing and managing data, and interacting with other Savants in other locations.
- Savants will also be capable of monitoring data, correcting errors in data coming from readers and making decisions on where data needs to be sent

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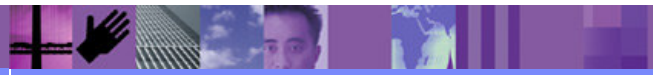
Business Case…

- The strategy is not about RFID …
- Make sure product is where it's suppose to be for the least cost!
  How are you going to …
  Improve trace ability
  Product availability
  Merchandizing
- We are moving from a push environment to a pull environment – demand driven supply chain
- Two ways to make money .. This is about the second way
- Simple compliance is going to be a negative proposition, companies need to look at the big picture – how are they going to change their business with technology



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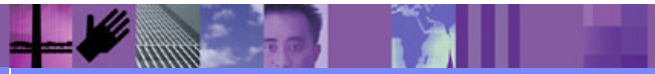
The business case for Retailers is compelling

- Increased productivity within the store
- Improved inventory accuracy with capture of ALL inventory movements – backroom to selling floor – total **automated replenishment**
- Lower inventory levels from improved inventory visibility
- Improved customer service through reduced out of stocks by maintaining selling floor perpetual inventory (3-4% lost due to lost sales)
- Lower shrinkage could result in 1-7% savings
- Increased sales from improved in stock positions



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Wal*Mart has taken the reins

- June, 2003 – "The shot heard 'round the RFID world"
  - Top 100 Suppliers to tag pallets and cases by January 2005
  - All Suppliers to tag pallets and cases by December 2006
- Creating 100 laboratories around the world
  - Setting the bar at 100% participation
  - Looking to solve for the issues
- Supplier Collaboration Board (early adopters, including Kraft)
  - Phase I (2004) - start up of three DC's, 150 stores
  - Phase II (2005) – expansion yet to be defined

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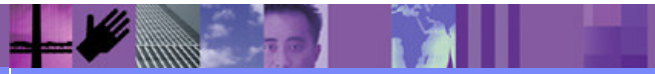
…and other Retailers will not be far behind

- U.S. Department of Defense
  - The DOD has run a number of pilots over the past few months, and that these produced no surprises and justified the military's view that RFID was worth the investment.

- Metro Group – beyond the Future Store
  - At the Metro Innovation Center installation, prepackaged meat items, each bearing a smart label, can be presented to the RFID reader in the kiosk. The kiosk's screen can then display a detailed account of that item's history in the supply chain, such as the animal's date of birth and the farm where it was raised, as well as perhaps the kinds of food it was fed, the date and place of its slaughter, and the name of the wholesale butcher.



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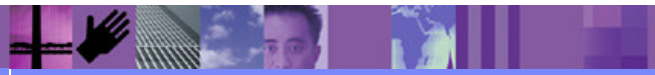
…and other Retailers will not be far behind

- Target – a measured pace we like
  - Regional deployment in Spring, 2005 (possibly TX)
  - Spring 2007 – "Accept RFID from all vendors as a supplement to the current barcode markings"
- Albertson's – another 'Top 100' proclamation
  - April 2005 pilot (possibly TX)
- Tesco
  - Category rollout, food lower priority



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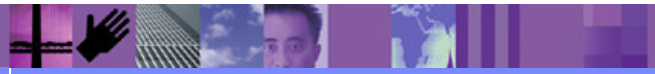
Suppliers' business cases differ greatly

- High value products (electronics, pharmaceuticals) have a stronger case
  - Tag costs represent a smaller percent of gross margin
  - Subject to greater levels of counterfeit, shrink
- High risk products, highly regulated products (pharmaceuticals) require tighter control of the supply chain
- Business case focused on:
  - Improved in-stock position at retail
  - Reduced unsaleables through improved inventory control
  - Reduced product diversion through trace ability of individual cases
  - Reduced inventory levels from improved inventory visibility
  - Marginal productivity gains



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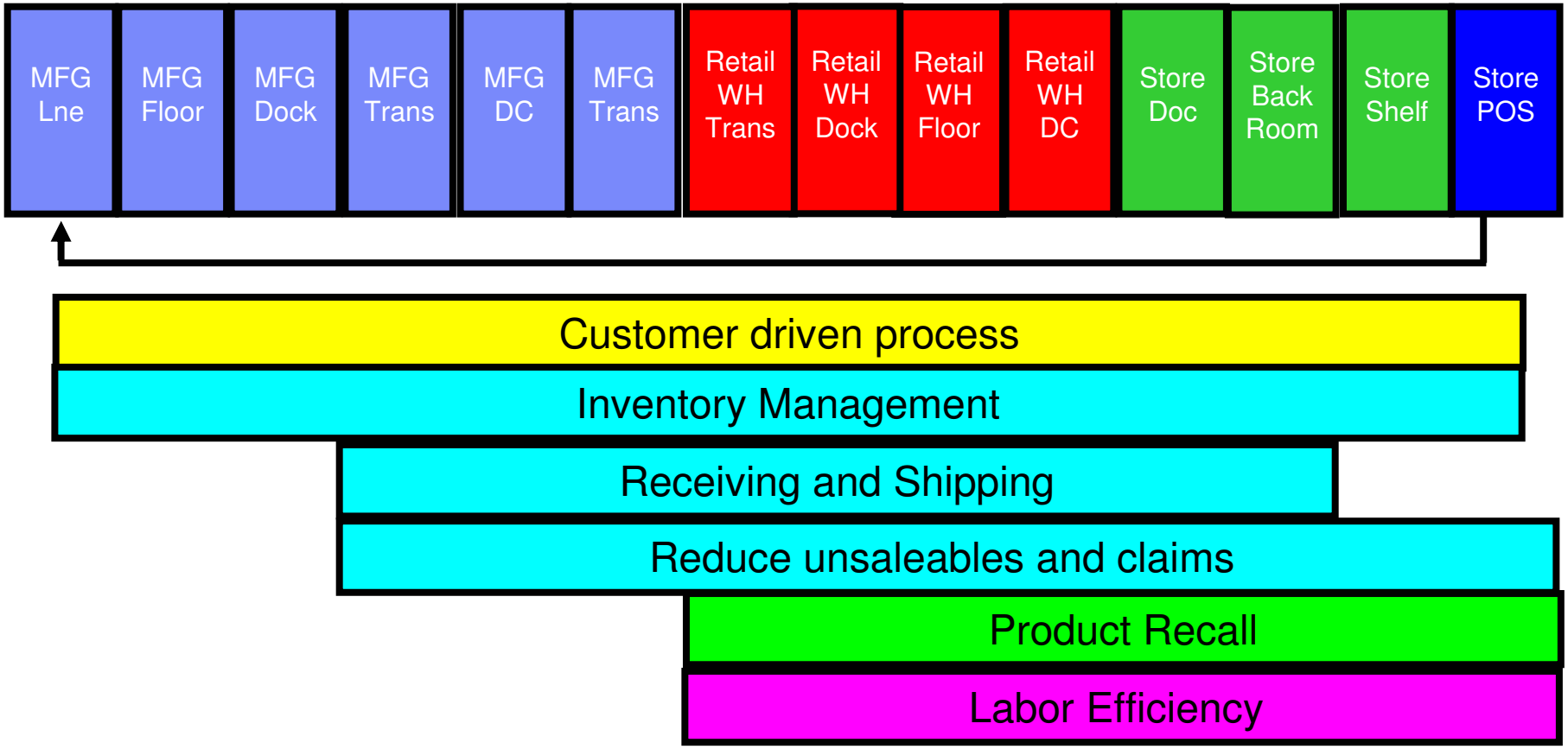
Supplier to Retail Process



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Challenges

Technology

- Technology standards have not been established for tags, data or applications but great progress is being made Tracking products as they cross physical boundaries between trading partners

Privacy

- Public policy (privacy, workplace safety) issues are unresolved and could impact consumer acceptance

Business Case

- Pricing curve dynamics for tags and readers are unpredictable Technology does not currently perform sufficiently well to support elements of business case (i.e. case receiving)

Standards

- Single Universe standard for tag and interface

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Just when you think you have it solved ….

- **Managing resource commitment to customer pilots**
  - Growing retailer interest, SKU expansion, location expansion
  - Complex distribution flow of cases into customer locations (DPS, 3rd party sourcing)
- **Solving for unfriendly products and packaging**
  - Liquids absorb RF, metals/foils reflect, humidity impacts
- **Evaluating technology commitments**
  - Purchasing scale, strategic partnership opportunities
- **Pacing financial investments with no visibility of a benefit stream**
  - Significant infrastructure investment ($10's of MM))

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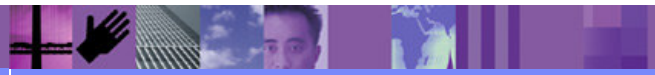
EPC Team: Objectives

- Through pilot work, develop a comprehensive assessment of opportunities to leverage RFID technology for supply chain optimization
- Engage with Wal-Mart, through pilots, and comply with tag "mandate" as appropriate
- Develop EPC recommendation



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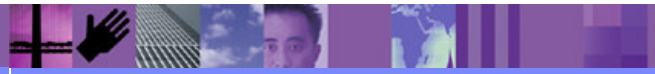
EPC Roadmap

- Learn
  - Read, read and read
  - Participate in meetings … learn from others
  - Meet with key vendors
  - Understand cost
- Experiment
  - Develop EPC vision
  - Conduct business case
  - Understand partnership requirements
- Evaluate
  - Set up pilot environment
  - Identify lessons learned and react
- Recommendation



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Collaborative Learning Approach with Wal*Mart

- **Establishing significant level of engagement**
  - CEO sponsorship, Operating Committee engagement
  - Cross functional involvement, WW scope, dedicated resources
  - Wal*Mart Supplier Collaboration Board – one of eight early adopters

- **Committing to "collaborative learning" – productive, prudent advancement**
  - Pilot learnings – technology shortfalls, process evolution, scalability, integration
  - Commitment to significant spending

    To sustain level, need read reliability, improved inventory accuracy

    To expand, need visibility of benefit streams – in stock improvements, inventory visibility

    Incremental internal efficiencies can extend our efforts

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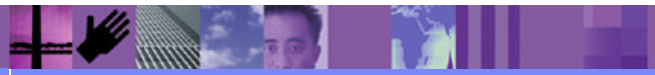
Tech Team: Four Key Deliverables

1. **Evaluate and Select Vendors for initial pilot work**
   - Tags – Labels - Applicators
   - Readers
   - Software – Hardware - Tools
   - Vendor Criteria/Assessment
   - Vendor Offering Due Diligence
   - Purchase Strategy/Negotiations

2. **Maximize learnings and educate**
   - Technology solutions
   - Assist with SKU selection – leveraging known RFID factors
   - Opportunities, costs, efforts, constraints, risks and obstacles
   - Scale-up calibration exercise



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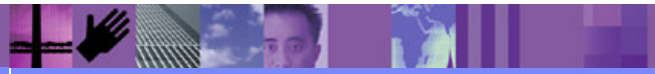
Tech Team: Four Key Deliverables

3. **Begin Data Architecture Work**
   - Design near-term data architecture
   - Envision longer-term data architecture

4. **Develop strategy for Objective is to test:**
   - Product
   - Packaging
   - Environment
   - Process Change
   - Strategy needs to address:
     - How many labs are needed
     - Where to best locate
     - Expected Costs
     - Estimated Effort/Timing



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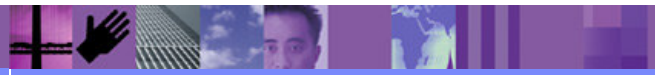
Key Principles

- Lead with well defined business processes
- Determine business rules that govern data collection and storage
- Leverage existing architectures and framework for data integration
- Make sure data interpretation and analytics provide information people can act on



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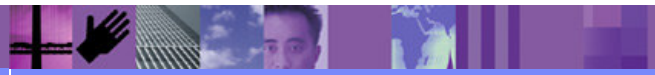
Next Steps

- Manage customer engagements productively, collaboratively and prudently
- Continue industry engagement for standards, dialogue
- Install minimal infrastructure to support research, learning and pilot engagements
- Expand and deepen business case assessment
  - Broaden assessment to include upstream activities
    - Manufacturing
    - Procurement
  - Identify opportunities to redesign business processes rather than overlay the technology onto existing processes



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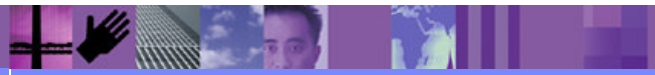
Next Steps for Others

- Understand the potential and limitations of evolving EPC/RFID technology
- Develop high level business cases to establish near term priorities
- Participate in industry forums to establish industry standards that reflect the interests
- Establish "slap and ship" capabilities for near term pilot support
- Provide input to OB budgetary plans



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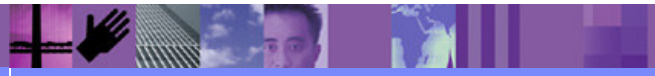
Summary

- EPC/RFID has the potential to be a transformational technology that change our expectations of supply chain performance
- Institutionalizing this opportunity requires the integration of business process change and technological development
- Steady progress will be required to validate the business proposition as we align the costs and benefits with our customers
- To make EPC/RFID a reality, we need to develop open, inclusively defined technology, data and application standards



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