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Putting RFID to Work

May 2, 2006



Item Level Tagging

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Enormous Promise

- AutoID Center at MIT – “The Internet of Things”
- Recent KSA study sponsored by the Apparel & Footwear industries
- Three Primary Categories of Benefit Associated with Item Level Tagging (ILT)
 - Retail Sales
 - Manufacturing and Distribution Management
 - Collaborative Planning and Execution

Retail Sales

- Sales Floor Out-of-Stocks
- Automated Receiving
- Replenishment from Fitting Rooms
- Shoplifting
- Rapid Inventory Counting
- Accurate Perpetual Inventory Data
- Rapid Checkout at Point of Sale
- Quality of Sales Support

Manufacturing & Distribution

- Upstream Quality Control
- Product Flow and Carrier Performance Management
- Product Diversion
- Cost-Effective Performance and Quality Management
- Increased Flow-Through Distribution

Collaborative Planning and Execution

- Charge backs and Invoice Reconciliations
- Cross-Enterprise Visibility
- Collaborative Optimization

Reality of ILT – It's Beginning

- Mark Roberti's Recent Article "RFID Gets Itemized" – Good Overview of Where the ILT Stands Today
- Survey of Retailers – 40+% Believe in ILT in the Next 12 to 24 Months
- Some Early ILT Work in the Areas of Apparel, Footwear, Jewelry & Electronics
- CPG's Struggling to Find the ROI – Tag and Infrastructure Cost

ILT Opportunity Profile

- Criteria For Ideal ILT Opportunity
 - High Value Goods
 - Closed Loop Supply Chain
 - Manageable Infrastructure Requirements
 - Relatively High Volume
 - Improved Visibility Creates Significant Benefits
- Possible Early Adopters – Apparel, Designer Goods, Electronics, Entertainment
- Early Applications – Hidden Out-of-Stocks, Time Sensitive Execution, Authentication

ILT vs. Supply Chain

- ILT is Different From Supply Chain Tagging in Some Important Ways
- Key Differences:
 - Tags at Rest vs. Tags in Motion
 - Read Range
 - Tag Density
 - Importance of Privacy and Security
 - Volume of Data

Challenges Ahead

- Certain Key Challenges Need to be Overcome to Promote Widespread ILT
 - Frequency Debate
 - Infrastructure Costs and Requirements
 - Applied Tag Cost
 - System Integration and Data Synchronization
- Impressive Work Being Done in All These Areas to Help Ensure a Rewarding Future for ILT

Frequency Debate

- Many Possible Frequency Options for ILT
 - Low Frequency (LF) – 125 KHz
 - High Frequency (HF) – 13.56 MHz
 - Ultra High Frequency (UHF) – 915 MHz
- Supply Chain Pilots and Initial EPCglobal Standards Built Around UHF
- Conventional Thinking Assumed UHF Would NOT be Appropriate for ILT – Preference for HF
- Significant Support for HF Among the Pharma Industry

UHF vs. HF

- Assumption that HF was the Superior Frequency for ILT – “Near Field” Capability
- UHF Selected for Supply Chain – “Far Field” Capability
- UHF Also has a “Near Field” Capability
- Recent Demonstrations Prove that UHF Can Support ILT Requirements

UHF Myths

- Impinj Whitepaper Addresses UHF Myths
 - UHF Gen 2 Tags Are Too Big for ILT
 - HF is the Worldwide Frequency for ILT
 - UHF Gen 2 Won't Work on Liquids
 - UHF Gen 2 Won't Work on Metals
 - UHF Gen 2 Won't Work on Items in Close Proximity
 - UHF Gen 2 has Too Great a Range for ILT
 - UHF Gen 2 is More Susceptible to Interference

Infrastructure Costs

- Cost of Infrastructure is a Significant Issue
 - Fixed Reader Portals
 - Shelf Antennas
 - Handhelds and Mobile Read Points
 - Infrastructure Management Appliances
 - Middleware Servers
- Infrastructure Needs to be Optimized for Specific Applications – Generic Solutions are Almost Always Inefficient

Infrastructure Requirements

- Reliable Technology That's Easy to Deploy
- Number of Antennas Driven by a Single Reader Needs to Increase Significantly
- Standards Provide a Great Foundation but Interoperability Needs to Improve
- Mobile Infrastructure will be an Important Bridge Concept
- Infrastructure Management is Crucial to Driving and Sustaining Network Performance

Think Applied Tag Cost

- Original Premise – Tag Costs Drop as Volumes Build and Finally Reach 5 Cents
- 5 Cent Tags Support the Economic Feasibility of ILT
- Issue – it Costs Between 15 and 25 Cents to Manually Apply Tags
- Widespread ILT Requires Automated Label Application in the Manufacturing Process – Source Tagging Model

Source Tagging Model

- Electronic Article Surveillance (EAS) Provides a Good Reference Model
- Over 4.5 Billion Security Tags Every year
- Thousands of Manufacturers and Hundreds of Retailers Participate in the Program
- EAS and RFID Look the Same but do Very Different Things – Lock vs. Bar Code
- Most of the Source Tagging Lessons Learned Apply

Drivers of Source Tagging Adoption

- Retailer Lead Initiative – Requires High Levels of Collaboration
- Category Focused – Evolved Category by Category
 - DIY
 - Electronics
 - Automotive
 - Specialty Apparel
 - Health & Beauty
 - Over-the-Counter
 - Sporting Goods

Drivers of Source Tagging

- Criteria for Tagging
 - High Dollar
 - High Margin
 - High Loss
 - High Risk
- Three Levels of Source Tagging
 - Level 1 – On Package
 - Level 2 – In Package
 - Level 3 – In Product

Source Tagging Technical Requirements

- Tag Quality / Defect Rejection
- Certified Tag Placement
- Ability to Apply Tags at High Speed
 - 300 Parts per Minute Standard
 - Up to 650 Parts per Minute
- Tag Fulfillment Services
 - Unique Form Factors
 - Support Multiple Applicators / Application Techniques
- Program Verification and Audit

RFID Source Tagging Challenges

- Tag Programming
- More Sophisticated Rejection Criteria
- Inlay Durability and Protection
- Leveraging / Adapting Existing Source Tagging Processes

System Integration / Data Synchronization

- Recent VDC Report Identifies the Challenges Associated with ILT Deployments
 - Conversion Code Written for Existing Databases to Support EPC Information
 - Enormous Volumes of Data Associated with ILT will Potentially Impact Entire IT Infrastructure
 - Common / Standard Data Formats and Data Sharing Schemes Must be Developed
 - Extensive Cultural and Training Impacts Associated with Using New Systems

Summary

- Item Level Tagging Offers Enormous Promise – Some Day
- ILT Getting Traction in a Few Key Areas
- Widespread ILT Requires the Resolution of Several Key Issues
- Growth of ILT will Likely be Category by Category, Application by Application
- Significant Industry Resources Being Applied to Turn ILT into a Reality