Implementing an RFID Data Infrastructure

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• Articulate the evolving field of RFID data management
• Examine the opportunities for RFID data usage that transcend simple “slap and ship” compliance
• Describe a scalable information infrastructure for managing RFID data
RFID Projects to Date

• Much attention has focused on RFID physical environment
  • Tag & Reader Standards
  • Data capture success rates

• Application-specific code to handle RFID data capture and integrate with existing application backbone

• Tangible Benefits Sought
  • To justify expansion from pilot to production
  • Data management has been secondary focus
• Common warehouse operations have been the focus
  • Inbound & Outbound
• Provides RFID-enabled version of standard transaction
• But RFID can evolve transaction entry bound processes
  • Extract new business value
  • User-driven processes become event-driven
• Examples
  • Product Genealogy
  • Real Time Promotion Optimization
  • Theft Detection & Prevention
RFID Solving Problems

• Overcomes constraints where traditional techniques have failed
• Example
  • Capturing and tracking raw material production
  • From source to manufacture
  • In harsh environments
  • With no IT infrastructure or support
Cambium-Forstbetriebe
User Story
Data Management Strategy

• Comprehensive Data Management Strategy
  • What data is relevant?
  • Where must the data be digested?
  • How does a tag read relate to other reads?
  • What context is required to provide understanding?
  • What reporting/sharing is required by each trading partner?
EPC-IS: A Proposed Data Management Standard

- New architecture proposed by EPCglobal
  - Standard definition occurring amongst its working groups
- Goal is standardize the functionality and roles of an EPC repository
  - Capture of low level events
  - Transformation
  - Application of business context
  - Data sharing with trading partners
RFID Event Management

• RFID events are being processed at the edge
  • Where the events occur

• Frequently morphing into existing transaction formats

• Upstream relay of events into enterprise
  • Must allow for reporting/monitoring
  • Must enable higher level events to be triggered from multiple edge-based event streams
RFID Event Information Architecture

- Subscribe or trigger based reporting
- Repository builds a history of events, actions, associations & derivations
- Intelligence to drive higher level updates
- RFID reads combine with other sensing feeds
7 Principles of RFID Data Management

1. Digest Data Close to the Source
2. Turn Simple Events into Meaningful Events
3. Buffer Event Streams
4. Cache Context
5. Federate Data Distribution in Real Time
6. Age RFID Data Gracefully
7. Automate Exception Handling
#1: Digest Data Close to the Source

Digest data at the “edge” of the enterprise
7 Principles of RFID Data Management

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#2: Turn Simple Events into Meaningful Events

<table>
<thead>
<tr>
<th>Simple Events</th>
<th>Complex Event Query</th>
<th>Meaningful Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>When a truck tag is read by reader 20...</td>
<td>...followed by pallet tag scanned at reader 7...</td>
<td>...followed by 50 case tag scans...</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Receipt of 50 Plasma TVs against ASN 123</td>
</tr>
</tbody>
</table>

...Meaningful information emerges
RFID CEP Example

**IF** ASN unloaded\_from\_truck **AND** location=destination

**FOLLOWED-BY**

INSPECT “damaged”

VALIDATE “agreed”

**ACTION ASN** bill\_customer

**FOLLOWED-BY**

TRUCK permission-to-leave

**ACTION stop\_truck**

**Complex Event Processing**

- Multiple streams of events
- Optimized for time & cause
- Identify patterns
- CEP results in actions
- Requires massively parallel event processing in real time
RFID deployments continue to improve and grow.

A vision for managing the new levels of data and means of data capture is critical to continued success and increased scalability.

Consider RFID as introducing event-based processes that can streamline existing transaction entry bound systems.