RFID and Building a Secure Supply Chain
Summary

Security since 9/11
- Supply chain risk: a hot topic
- High cost of failure begs for solutions
- A daunting challenge
- The old way won’t work anymore
- Key programs
  - Customs/trade partnerships (C-TPAT)
  - Container Security Initiative (CSI)
  - Trade data programs
  - Smart & secure tradelanes (SST)
- The key: leveraging information

The promise of RFID
- The original mandates
- The Wal-Mart experience to date
- Other RFID implementations
- Smart seals
- Sensors and the “Smart Container”
- Past the tipping point

What to do
- Part of a total security process
- 10-point plan for carriers
- 10-point plan for shippers
- Actions for vendors and service providers
- Resources and links
The Key Question

Security Concerns

• Explosive device
• Biological contamination
• Counterfeiting
• Nuclear weapon
• Dirty bomb

RFID Benefits

• Compliance
• Inventory accuracy
• Shipment tracking
• Traceability
• Sensory information

How Can RFID Make My Supply Chain More Secure?
Related Questions

- Military “halo effect” implies connection between RFID and security
  - Operation Desert Storm
  - DOD mandate

- MIT: “RFID and Cargo Security”

- A.T. Kearney: “RFID can improve…security in the global supply chain.”

- Hau Lee: “RFID could be a major technology that improves supply chain security.”
Agenda

• The Security Situation Since 9/11
• The Promise of RFID
• What to Do
The Security Situation Since 9/11
Supply Chain Risk: A Hot Topic

Supply Chain Risk
(ISM Conference 2004)

Supply Network Design
(MIT)

Supply risk
(Supply Chain Planet)

Holistic Risk Management
(Purchasing Magazine)

Risk Management
(Inside Supply Management)

The Breaking Point
(Journal of Commerce)

Risk Control
(APICS Performance Advantage)

Supply Risk
(Supply Chain Management Review)

Balanced Scorecard
(Harvard Business Review)

Supply Continuity Planning
(Inside Supply Management)

Supply Management Risk
(International Journal of Supply Management)

6/30/2008
High Cost of Failure Begs for Solutions

- 50-day backup
- $60 billion

### Delays and Costs Resulting from a Port Shutdown

<table>
<thead>
<tr>
<th>Delay (Days)</th>
<th>GDP Impact</th>
<th>Trade Lost</th>
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</thead>
<tbody>
<tr>
<td>5</td>
<td>&lt;$1 B</td>
<td>$117M</td>
</tr>
<tr>
<td>10</td>
<td>$5.9B</td>
<td>$1.4B</td>
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<tr>
<td>20</td>
<td>$28.8B</td>
<td>$7.1B</td>
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</tbody>
</table>

Source: Global Insight
A Daunting Challenge

- 108 million cargo containers moving worldwide
- 10 million maritime containers arrive at United States seaports annually (26,000 per day)
- 90 percent of manufactured goods move by container
- 95% of inbound cargo is waterborne
- 90% of waterborne trade is containerized
- 361 public ports

Source: CSI FactSheet, Hu, Khan, & Young
The Old Way Won’t Work Anymore

- 2% inspection, 7-day dwell
- 5% inspection could increase dwell time to 300 days if mis-managed

Source: Hu, Khan, & Young
Key Programs

- C-TPAT (Customs/Trade Partnership Against Terrorism)
- CSI (Container Security Initiative)
- ACD (24-Hour Advance Cargo Declaration)
- Other notable programs
  - SST (Smart and Secure Tradelanes)
  - OSC (Operation Safe Commerce)
Customs/Trade Partnership (C-TPAT)

- Goal: Top 1,000 importers
- 9,000+ applications
  - 5,000 importers
  - 2,200 carriers
  - 1,400 brokers
  - 400 foreign mfrs
- 5,300 certifications
- 3-4 million not certified

Source: Inbound Logistics
Container Security Initiative (CSI)

- 44 participating ports: 21 in Europe, 14 in Asia

“An x-ray image is still a judgment call.” Barry Brandman, Danbee Investigations
Trade Data Programs

- 24-hour rule
- ACE (automated commercial environment)
- ITDS (International Trade Data System)
## Smart & Secure Tradelanes (SST)

<table>
<thead>
<tr>
<th>Terminal Operators</th>
<th>Ports</th>
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<tbody>
<tr>
<td>Hutchison Port Holdings</td>
<td>Long Beach</td>
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<tr>
<td>PSA</td>
<td>Los Angeles</td>
</tr>
<tr>
<td>P &amp; O Ports</td>
<td>New Jersey</td>
</tr>
<tr>
<td>China Merchants Holdings International</td>
<td>Charleston</td>
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<td>Stevedoring Services of America (SSA)</td>
<td>Savannah</td>
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<td>Felixstowe</td>
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<tr>
<td>Antwerp</td>
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<tr>
<td>Seattle-Tacoma</td>
<td></td>
</tr>
</tbody>
</table>
The Key: Leveraging Information

Treatment of Incoming Containers

Percent of Inbound Containers

Before | Now | Future

- Identified, Not Screened or Inspected
- ID and Screened, Not Inspected
- Inspected
The Promise of RFID
The Original (2003) Mandates

- Albertson’s
- Best Buy
- Coca-Cola
- Department of Defense
- Gillette
- Target
- Wal-Mart
The Wal-Mart Experience to Date

- 12 DCs
- Top 200 suppliers
- 23,753 tagged pallets
- 663,912 tagged cases
- 5 million tag reads
  - > 90% for cases on carts
  - 95% on conveyors in DCs
  - 66% on cases in pallets
- RFID data available to suppliers within 30 minutes via extranet

Some top Wal-Mart suppliers
- Gillette/P&G
- HP
- Johnson & Johnson
- Kimberly-Clark
- Kraft Foods
- Nestle
- Purina
- Unilever
Other RFID Implementations

- Tesco
- Marks & Spencer
- TNT Logistics
- Port of Long Beach
- Las Vegas airport
- Hong Kong airport
- Purdue Pharmaceutical
- MasterCard
- Shanghai Masters Cup
- UPS
- Passports
- Drivers licenses
- Hospitals
- Danish bus terminal
- Automobiles
- Cellphones

“...distinction should be made between passive and active systems, active with finite battery and active with rechargeable battery, and read and read-write tags” (David Collins, a2b Tracking)
Smart Seals

- Manual seals and locks
  - Indicative seals
  - Barrier seals
- Electronic seals
  - Study currently underway

Source: Brooks Seals, FHWA
Sensors and the “Smart Container”

- Temperature
- Light
- Humidity
- Pressure
- Vibration
- Sound
- Acceleration

- Existence
- Draw
- Motion
- Air exchange
- Explosives
- Location
- Radioactivity

Credit for this list to Adam Schlesinger, MIT
Past the Tipping Point

- New mandaters
- Compliance assumed a “cost of doing business”

“Companies will be forced to adopt it in order to be part of the global supply chain”
— Peter Green, BellHawk Labs

“We still need active tag and sensor standards”
— Ed Schuster, MIT Data Center
What to Do
Part of a Total Security Process

- Articulate objectives
  - Prevention vs. recovery
  - Theft vs. counterfeiting vs. explosive device
- Document processes & best practices
- Implement technologies
  - Container scanning
  - Data improvement and filtering
  - Data security
  - RFID
10-Point Plan for Carriers

1. Screen customers
2. Ensure container security
   • Inspection
   • Seals
   • Storage
3. Install physical access controls
   • Boarding & disembarking
   • Employees
   • Visitors
4. Monitor personnel
   • Verification
   • Background checks
   • Termination procedures
   • Procedures
   • Passenger and crew
   • Bill of lading
   • Stowage plan
   • Conduct security training

Reference: C-TPAT Sea Criteria
10-Point Plan for Carriers (continued)

5. Install active RFID solutions with sensors
6. Gather and monitor RFID data in real-time
7. Upgrade physical security
   • Fencing
   • Gates & parking
   • Buildings & locks
   • Lighting
   • Alarm systems
8. Protect data
   • Password protection
   • Accountability
9. Conduct security assessment
10. Address areas of weakness

Reference: C-TPAT Sea Criteria
10-Point Plan for Shippers

**Security**
1. Generate awareness
   - Executive leadership
   - Communication
2. Document a data protection plan
3. Plan for redundant or alternative supply chain flows
4. Develop contingency plans

**RFID**
5. Establish specific improvement objectives
6. Invest in education
7. Anticipate evolution of standards
8. Integrate with ERP
9. Align security and privacy policies
10. Link to security program
Actions for Vendors & Service Providers

1. Provide solutions that improve data security
2. Develop the data architecture to handle immense quantities of data
3. Help assess the costs, benefits, and optimal timing of RFID implementation
4. Avoid misleading associations between supply chain security and passive RFID used for track & trace
Resources and Links

- Government programs
  - C-TPAT (cbp.gov)
  - CSI (cbp.gov)

- Tag and reader suppliers
  - Alien (alientechnology.com)
  - Avery (averydennison.com)
  - Brooks (ejbrooks.com)
  - Intermec (intermec.com)
  - Savi (www.savi.com)

- Consultants & solutions
  - Boston Logistics Group (bostonlogistics.com)
  - IBM (ibm.com)
  - Oat Systems (oatsystems.com)
  - SAP (sap.com)

- Standards bodies
  - AIM-UK (aimuk.org)
  - EPCGlobal (epcglobalinc.org)

- rfidjournal.com
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