RFID @ Sun: Expertise & Experiences

Vivek Khandelwal
RFID Business Unit
Sun Microsystems, Inc.
Agenda

• Industry Overview
• Sun's RFID Expertise
  > Products, Services & Solutions
• Sun's RFID Experiences
  > Pilots & Projects (Internal & External)
• Questions
Industry Overview
What's Driving RFID Today?

Cheap Tags + Standards + Network = **New Applications**

**Cheaper & Better RFID Tags**

**Industry Standards & Mandates**

**Numbering Schemes (EPC)**

**Cheap Network Connectivity**

**The Internet**
RFID in the Industries

Healthcare
Lost/Stolen equipment accounts for up to $4000/bed/year in US Hospitals.

Pharmaceuticals
2% to 7% of drugs in the US and 80% in some Third World countries are counterfeit.

Transportation & Logistics
RFID can help significantly reduce Cargo theft, loss, and damage in the transportation and logistics industry.

Supply Chain, Mfg. & Retail
P&G believes that RFID can reduce their inventory by 1/2. 8-12% of items in stores are out of stock at any one time.

Airline Industry
1.5 Billion Bags carried each year. Each lost bag costs the airlines $100.

Asset Tracking
RFID can help more accurate and real-time tracking of almost any asset resulting in better asset utilization.

P&G believes that RFID can reduce their inventory by 1/2. 8-12% of items in stores are out of stock at any one time.

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Applying RFID to Manufacturing

Better Visibility of critical assets
- Loss, Theft prevention
- Lower Inventory Levels
- Coordination with trading partners

Better WIP Tracking
- Better Asset Utilization
- Improved Labor Efficiencies
- Safety and Regulatory compliance
- Reduced Errors

Product Integrity and Safety
- Service Management
- Improved Customer Satisfaction

Source: Gartner Dataquest (November 2004)
Sun RFID Products, Services & Solutions
Customers have many Questions...

- **RF Basics**: Tags, Readers, RF physics, Regulations?
- **Standards**: What Technologies should I use?
- **Scalability**: How do I start small and then go big?
- **Reliability**: Will it work in an enterprise setting?
- **Manageability**: How do I manage the infrastructure?
- **Security**: What are my security considerations?
- **Business**: What will this cost? How long to ROI?
- **Partners**: Who should my trusted partners be?
Global RFID Test Centers

Dallas Test Center
- 17,000 Sq. Ft Warehouse
- Dock Doors for Receiving/Shipping
- High Speed Conveyor System
- Pallet Conveyor and Forklift
- Multi Reader and Tag testing
- Fully Operational

Benefits to Customers
- Off premise testing, lower risk
- Real-world simulations
- “One stop” technology shop
- Other locations planned worldwide
Sun Java System RFID Software

**SJS RFID Event Manager**
- Purpose: Event Data Collector
- Supports EPC Gen 2, ISO, other tags (Active/Passive) and sensors
- Self-healing, fault tolerant, automatic
- Central Monitoring console, Remotely Administrable (JMX, SNMP)
- Java based (API for extension)

**SJS RFID Information Server**
- Purpose: Store and Retrieve Item Information and Track & Trace
- J2EE based Java Enterprise System
- RDBMS (Oracle)
- Extensible schema
- Client Interfaces: XML/Http, JMS, RMI (Java Client Library provided)
Sun RFID Architecture

Sun Java System RFID Software
- Information Server
- RFID Event Manager

Enterprise Edge
- Readers
- Tagged Items

Enterprise Back-End
- ERP, WMS, Legacy Apps

Enterprise Service Bus (SOA)
- JES
- Portal
- Web/App Server
- Identity Server

Databases
- EPC IS / ONS
- Pedigree Database
- Federated Identity

Trading Partner Services
- Web Services
- HTTP / XML / JMS

Internet

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RFID-based Industry Solutions

Tags  Readers  Middleware  Integration  Applications

Sun RFID Event Manager

Sun Java Enterprise System

Sun RFID Information Server

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Sun & Customer RFID Projects
Goodyear Tires
CPG/Wal-Mart Mandate
Pilot Profile

• **Company:**
  > World's largest tire company

• **Objective:**
  > Tag testing on tires; seek optimal tag placement
  > Determine effects of material (rubber, metal)
  > Prepare for Wal-Mart mandate and tire tread act but also leverage for ROI

• **Scope:**
  > Single tire tagging and testing
  > Various orientations
  > At Sun's RFID Test Center in Dallas, Texas USA
## Tire Orientation

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<tbody>
<tr>
<td>Container</td>
<td>Rolling through a threshold</td>
<td>Rolling through a threshold</td>
<td>Pallet (arranged) through a threshold</td>
<td>Pallet (arranged) through a threshold</td>
<td>Pallet (arranged)</td>
<td>Stacked on horizontal racks</td>
<td>Stacked stowed on floor</td>
</tr>
<tr>
<td>Overhead mounted reader</td>
<td>Dock door reader - sides</td>
<td>Dock door reader - header</td>
<td>Dock door reader - sides</td>
<td>Dock door reader - header</td>
<td>Handheld reader</td>
<td>Handheld reader</td>
<td>Handheld reader</td>
</tr>
<tr>
<td>500 feet per minute</td>
<td>500 feet per minute</td>
<td>500 feet per minute</td>
<td>500 feet per minute</td>
<td>500 feet per minute</td>
<td>Static</td>
<td>Static</td>
<td>Static</td>
</tr>
</tbody>
</table>
Summary

• Solution included:
  > Sun RFID Technology
  > Sun Professional Client Services
  > Reader/Tag Partner (multiple)
  > Sun RFID Test Center (Dallas)

• Key Takeaways
  > Testing of different technologies and conditions is critical to getting best results
  > Not enough to perform “ad-hoc, informal” testing in-house - need experienced partner
Sun Shared Labs Project
Inventory Management/Tracking
Pilot Profile

• Company:
  > Sun Microsystems, Inc.

• Objective:
  > Reduce Inventory Assessment Cost, Effort & Time
  > Reduce Inaccurate Inventory Data
  > Control and Notifications on Inventory Movement

• Scope:
  > IT Equipment – small to large servers, desktops, high density racks
  > Passive RFID Tag Technology, Fixed and Mobile RFID Readers
  > At Sun's Shared Labs facility in Newark, CA
Sun Shared Lab Facility

Server Racks

Workspace

RFID Portal

Walkway
Sun Shared Lab Facility

Scan Rack Mounted Servers

Scanned Data Synced With Database
Summary

• Solution included:
  > Passive RFID Tags (with insulation to avoid metal contact)
  > Fixed and Mobile (Handheld) RFID Reader
  > Vizional Asset Tracking Application
  > Sun RFID Technology

• Key Takeaways
  > Passive RFID Tags Difficult to Use in Metallic Environment
  > Placement of RFID Tags on IT Equipment is Challenging. Better Approach – Integrate RFID Tags in the Design
  > Training of Staff is Required
Sun Manufacturing Pilot
Inventory Management/Tracking
Pilot Profile

• Company:
  > Sun Microsystems, Inc.

• Objective:
  > Improve Material Transfer Accuracy in manufacturing
  > Determine the ability to tag metal computer parts
  > Integrate data with back-end systems

• Scope:
  > Implement with single Tag Type in a pilot fashion
  > Data integration limited to one back-end system
  > At Sun's Manufacturing facility in Newark, CA
Sun Pilot - Project “Sun Beam”
Transaction Gate Screen

Section A

Section B

Section C

Section D

Section E

Section F
Summary

• Solution included:
  > Extensive tag testing of metal parts in production environment
  > Sun RFID Technology
  > Sun Professional Client Services
  > Integration to Oracle Back-End

• Key Takeaways
  > 100% read rates were achieved with metal parts
  > Material transfer accuracy improved by 7%
  > Learned lessons re. training operators
  > NPV analysis indicated a positive ROI possible in a year
The Gillette Company
Product Authentication/Shipments Reconciliation
Pilot Profile

• Company:
  > Gillette

• Objectives:
  > Mitigate Out-of-Stocks through product authentication
  > Integrate RFID into the entire Gillette Value Chain

• Scope:
  > Demonstrate real-time product authentication between retailer and supplier
Business Driver for Pilot

Key Drivers of Out-of-Stock

- Forecast Errors
- Late Deliveries
- Diverted Deliveries
- Mis-deliveries
- Inventory Miscounts
- Under Forecast
- Incomplete Deliveries
- Shrinkage
- Quality Issues
- Mismatched Data
- Misplaced Inventory
- Inspection of Inventory
- Long Picking Time
- Inventory Not Available
- Inaccurate Picking

Product Authentication can help by answering:

- What is the item?
- Who produced it?
- When was it shipped?
- Where did it come from?
- Where is it supposed to be?
Pilot Deployment Architecture

Identity Infrastructure
Internet

Root ONS

Demo Station

Readers
Tags
Trading Partners

Extranet Infrastructure

EPC Information Service

Warehouse Management System
Data Warehouse
Other Enterprise Applications

Integration Layer

EPC Middleware

Readers
Tags

EPC Middleware

Readers
Tags

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Gillette Packing Center
Summary

• Complete Solution included
  > Sun RFID Technology
  > Customized applications
  > WMS and Middleware Partners

• Key Takeaways
  > Seamless data integration throughout the company challenging, but key to success
  > Standards based RFID middleware and enterprise middleware essential

• Demonstrated Gillette Product Authentication Solution Live at EPC Global!
Questions?

Vivek Khandelwal
vivek.khandelwal@sun.com