



SAP RFID Technology

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What is RFID?

SAP RFID Solution Strategy

SAP RFID Solution

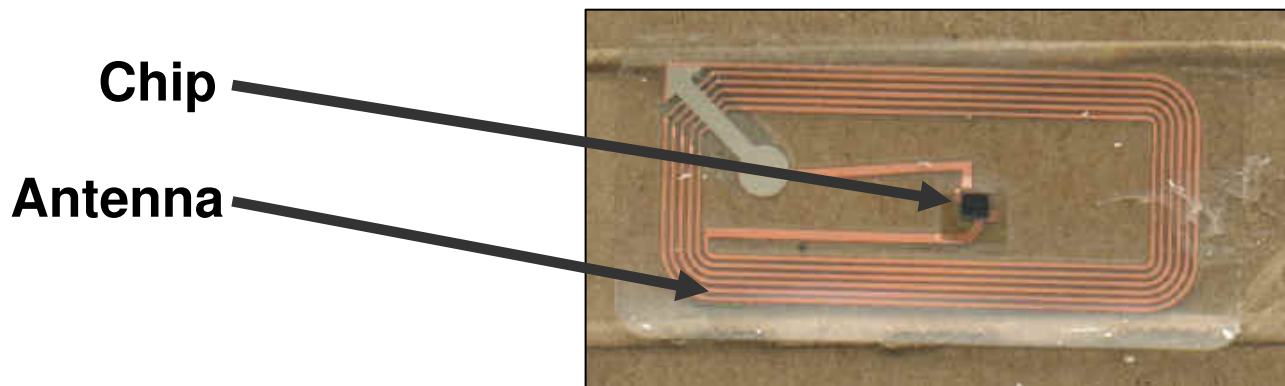
RFID Enabled Business Processes

Customer Use Cases

Summary

Radio Frequency Identification (RFID)

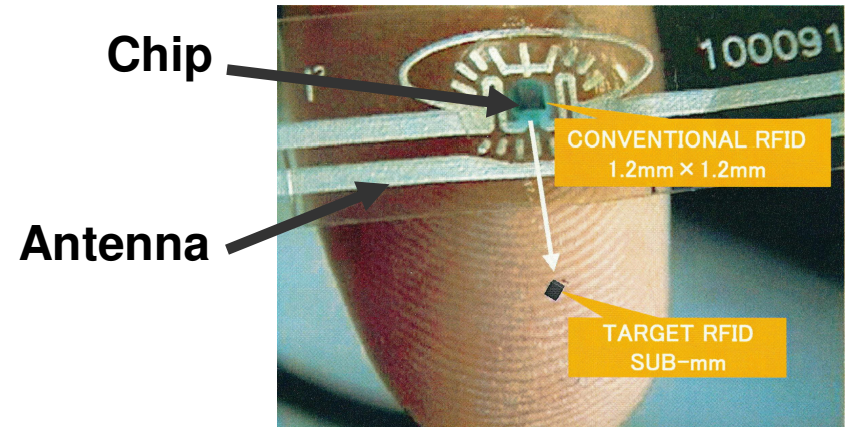
- RFID is a technology that has existed for decades. At a simple level, it is a technology that involves tags that emit radio signals and devices called readers that pick up the signal.
- RFID tags consist of a chip for holding data and an antenna for communicating the data through radio waves



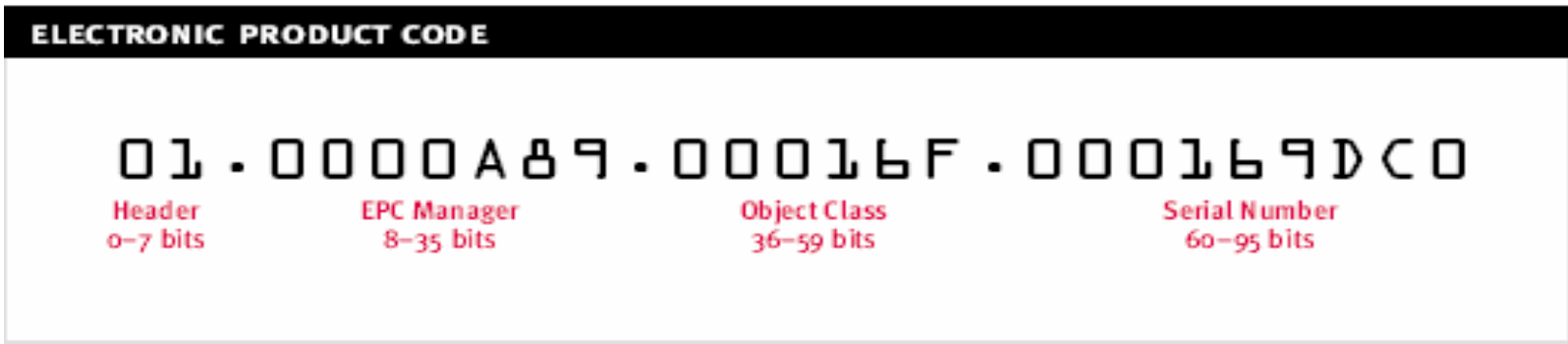
- The reach of RFID signals depends on the kind of chip, on the frequency – but is usually several centimeters to meters.

Key Components of RFID

- Tag
- Printer
- Reader
- Content



Electronic Product Code (EPC)



EPC was conceived as a means to identify all physical objects.

It should provide for industry coding standards, (e.g.: EAN-UCC, SGTIN-96, SSCC-64)

Code should be extensible, allowing future expansion in both size and design.

Auto-ID standards are based on a minimum on information on the tag (only EPC) to reduce the tag costs and allow mass usage on low cost products. Additional data is stored on central servers (EPCIS)

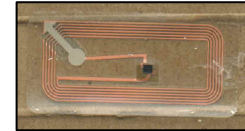
Bar Code vs. RFID

Bar Code



- Optical technology
- Read only
- Not reusable
- Up to 249 characters
- Attended reading
- Product level identification
- Line-of-sight required
- More mature technology, widely adopted

RFID



- Radio frequency technology
- Read only, and/or read and write
- Can be reused
- Up to 512 bit of data
- Unattended reading, typically
- Individual object/item level identification
- No line-of-sight required
- Emerging technology, pilot projects

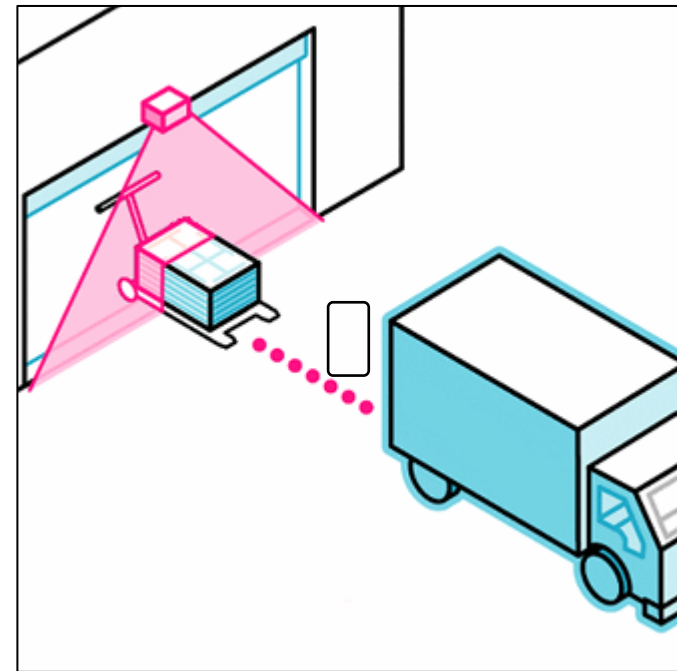
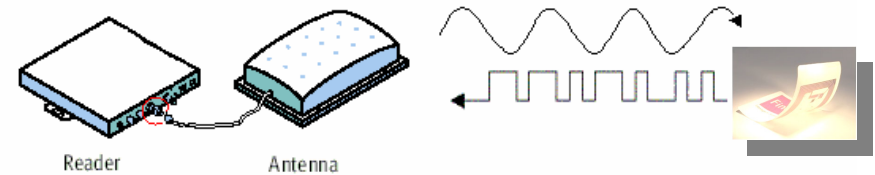
RFID Can Help

RFID Advantages

- No line-of-sight required
- Bulk-reading capability
- Unique Identification
- Repeated Read/Write Capability
- Accurate and Real-time data
- More data points

Usage Examples

- Industrial automation
- Building access control
- Skiing arenas
- Anti-Theft-Devices
- Toll Collection





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SAP Experience in RFID

1998
Research
Begins

1999
Join MIT
Auto-ID

2001
All
Development
Begins

2002 / 2003
Early Pilots
and RFID
Middleware

2004+
RFID-Enabled
Business
Processes
Delivered

SAP corporate research begins work with RFID.

SAP is the founding member of MIT Auto-ID Center (now called EPC Global).

The first demonstration took place at SAPHIRE in Philadelphia.

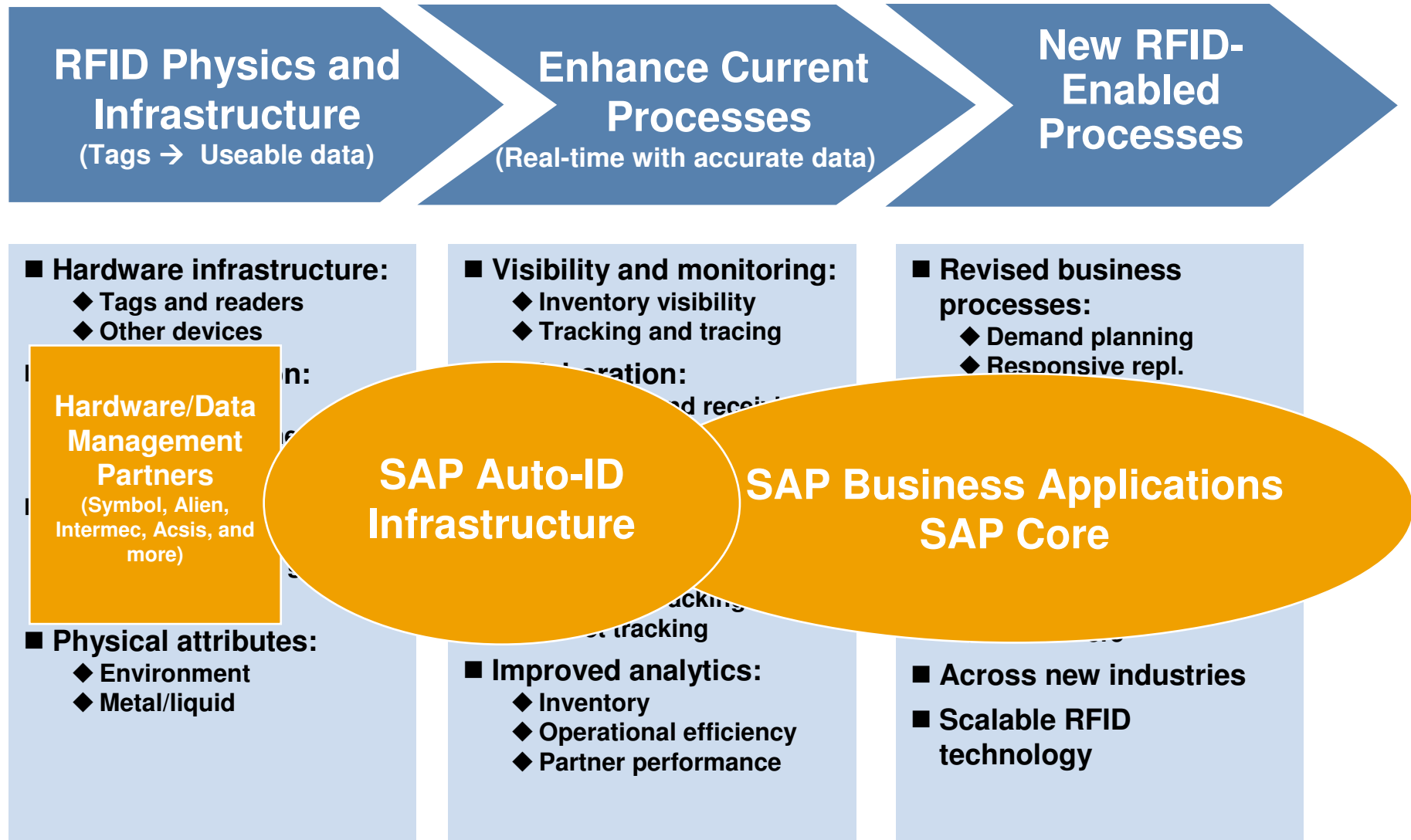
SAP Auto-ID Infrastructure development begins.

- SAP participated in Procter & Gamble and metro pilots (shelf/future store).
- Fraport RFID asset management pilot enabled SAP Mobile Infrastructure.
- SAP created SAP RFID customer council and America's SAP user's group executive exchange.
- Global SAP Auto-ID Infrastructure customer survey was taken by more than 400 respondents.
- SAP received the *Wall Street Journal* Award for Metro Superstore Project.

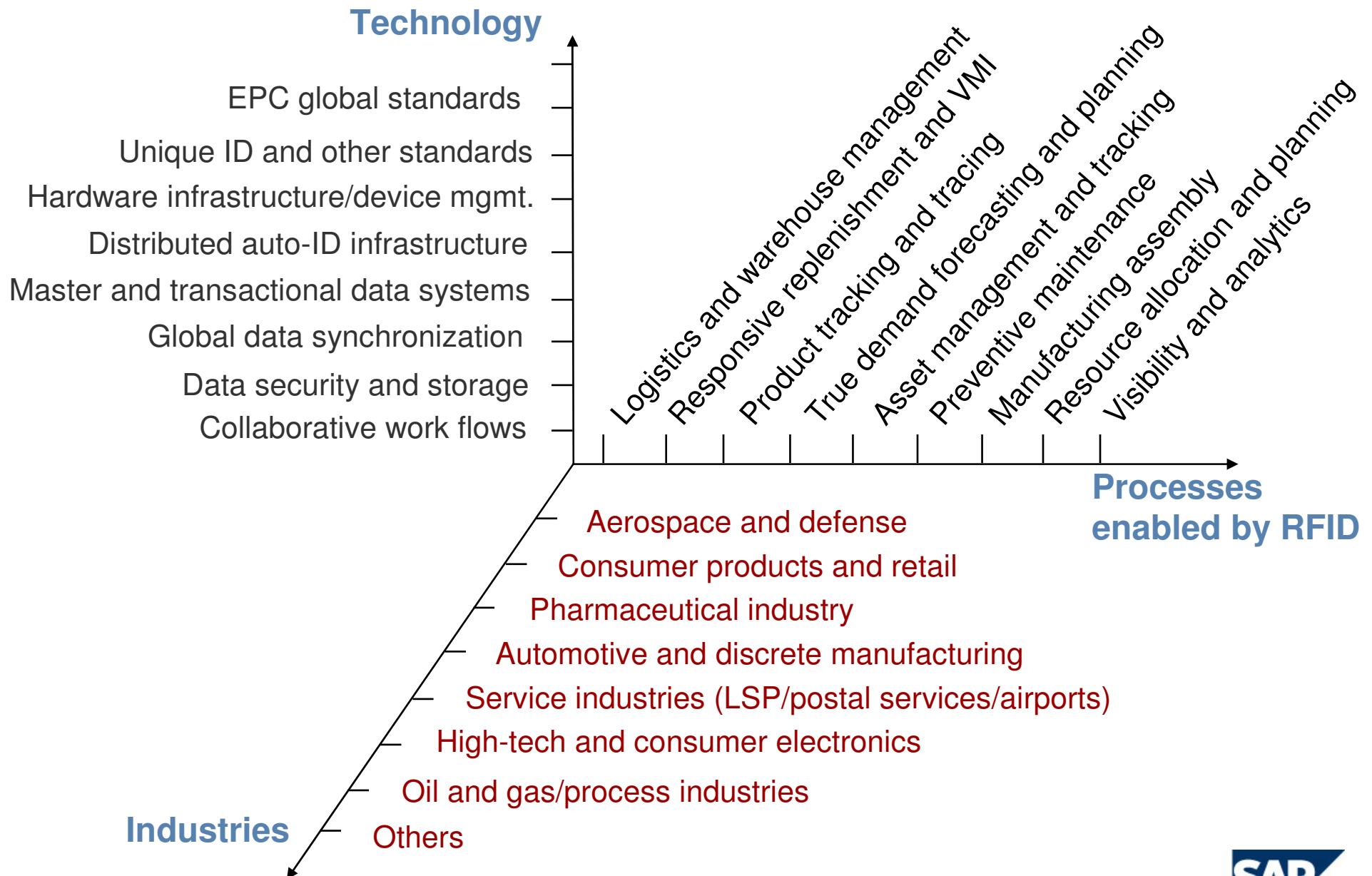
- RFID technology package for logistics and enterprise asset management is delivered.
- SAP Auto-ID Infrastructure 2.0 and 2.1 are released.
- RFID enabled mySAP ERP and mySAP Supply Chain Management.
- 19 customers signed for the SAP RFID technology.
- Purdue goes live (item level tagging).
- SC Johnson goes live.
- Pacific Cycle goes live.
- The first set of SAP customers ship RFID tagged goods to Wal-Mart.
- Analysts and customers rank SAP at the top of the field.



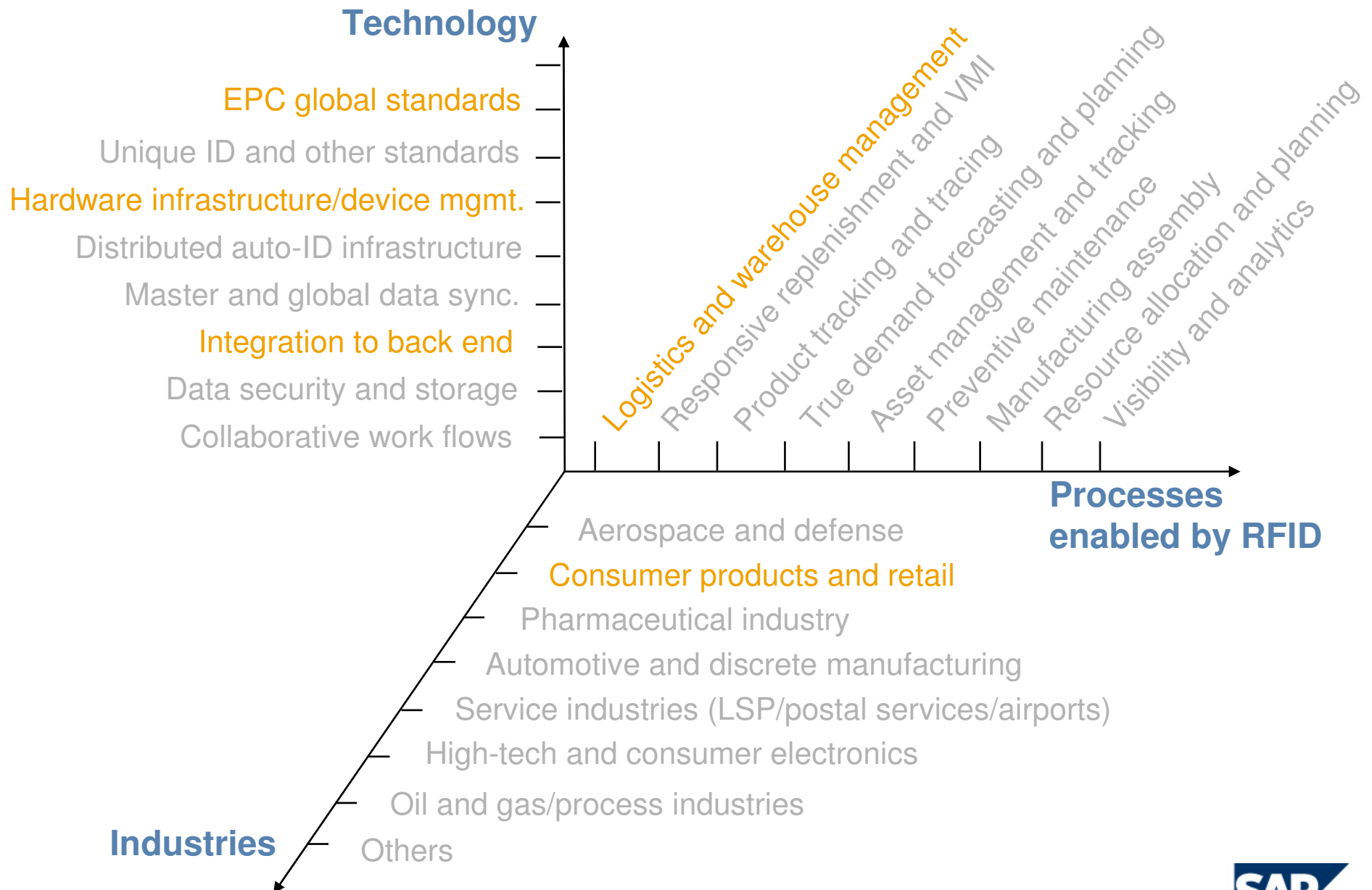
First Principle: Phased RFID Adoption



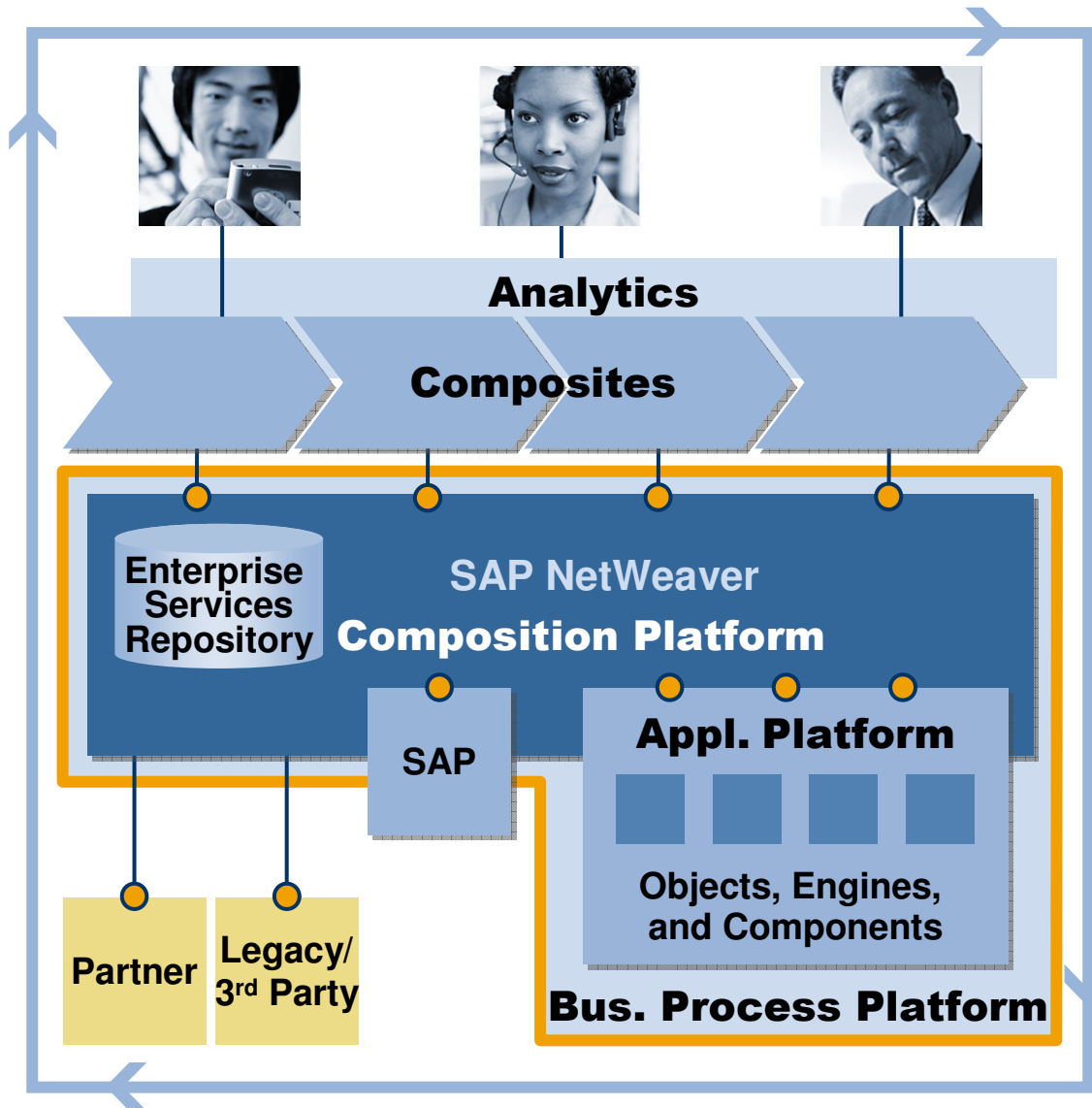
Second Principle: Widespread RFID Proliferation



Many Potential Combinations Are Possible



ESA Enabled RFID Solution



Composites / Pre-Configured Business Processes

- Scalable/Flexible Core Technology
- SAP NetWeaver Components
 - ✓ Auto-ID infrastructure
 - ✓ Exchange Infrastructure

Business Process Components

- Process Specific Capabilities
- Standards Management (EPC, UID, etc.)
- Shipping, Receiving, Picking, etc.

Technology

- Scalable/Flexible Core Technology
- SAP NetWeaver Components
 - ✓ Auto-ID infrastructure
 - ✓ Exchange Infrastructure
 - ✓ Business Activity Monitoring / Event Management
 - ✓ Master Data Management
 - ✓ etc.



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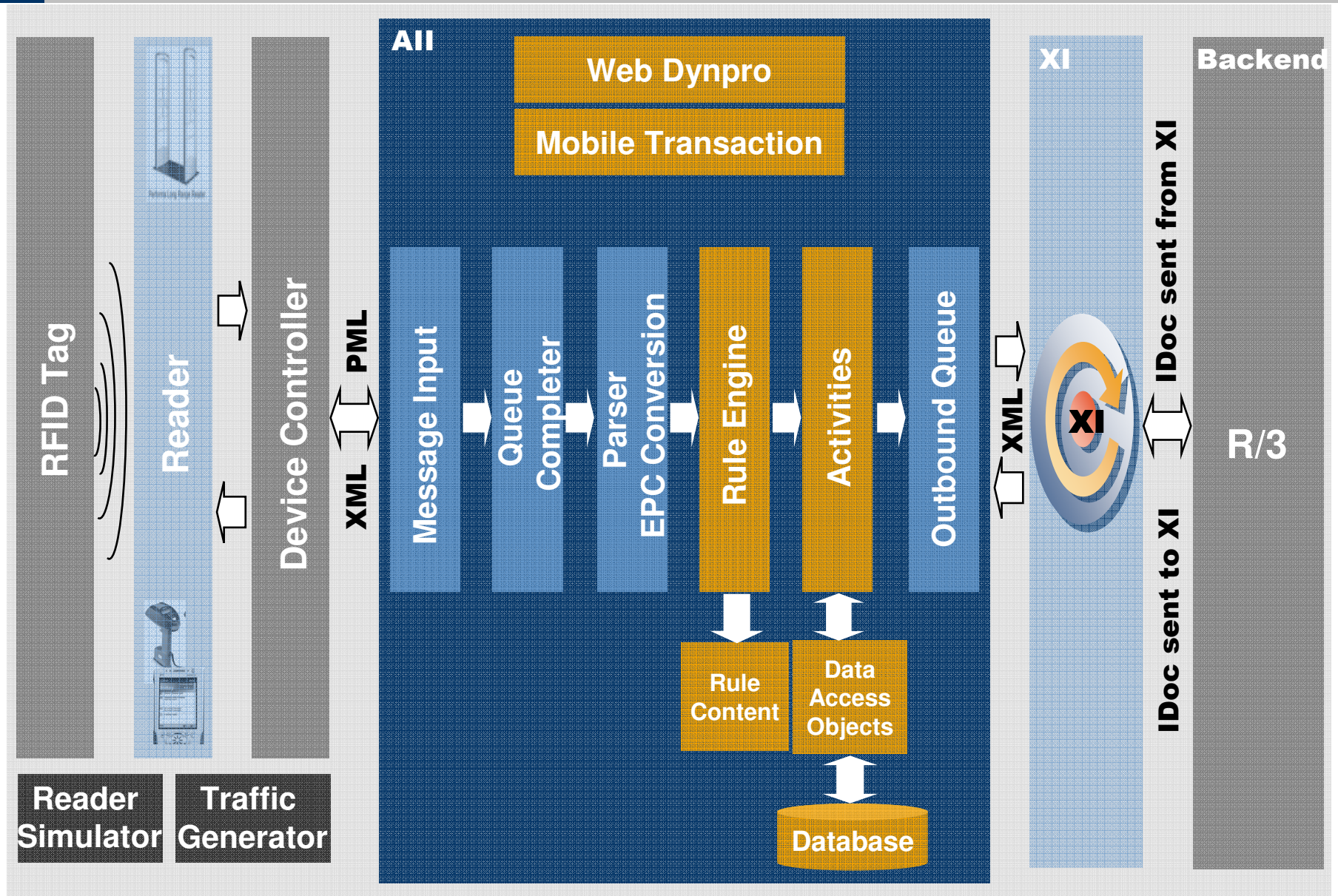
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RFID Enabled Business Processes

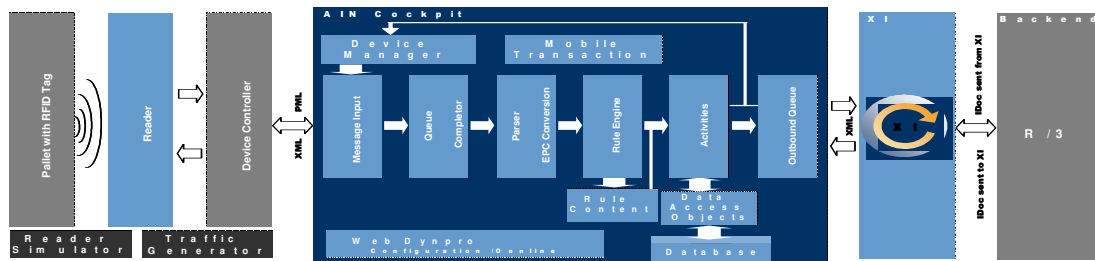
Customer Use Cases

Summary

SAP RFID Solution Architecture



SAP RFID Solution Component – All 2.1

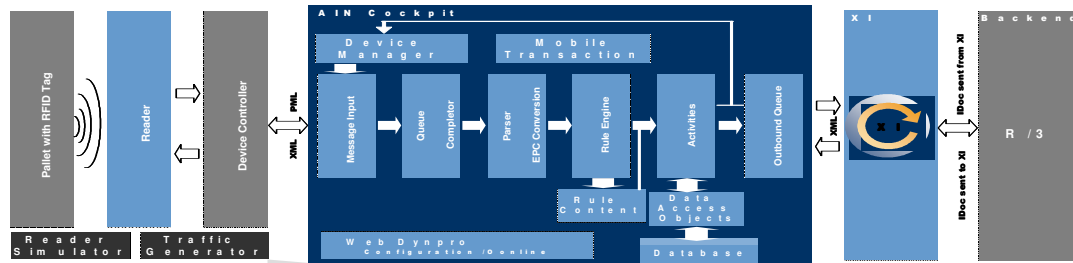


■ Mapping: Translates XML to appropriate ABAP context

■ Rule Processor & Activities

- ◆ A rule is assigned to a business process
- ◆ Rules: Moving, printing, packing
- ◆ Activities are attached to Rules
- ◆ Rule: Activity -> 1:n
- ◆ One activity can be used by many rules
- ◆ Contain application logic
 - Read data to DB
 - Write Data to DB
 - Update to BW
 - Write EPC to tag or label

SAP RFID Solution Component – Device Controller



■ 2 Interfaces, Java Based Application

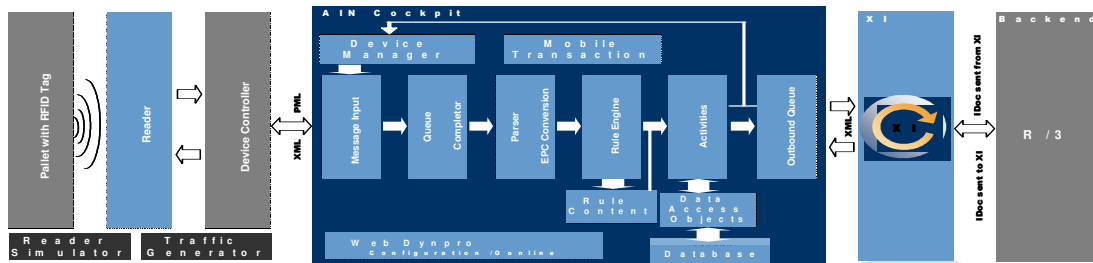
- ◆ Interface 1: LLI (Low Level Interface) / Connection to Reader Station
- ◆ Interface 2: XML based PML (Physical Markup Language) Core / Connection to All

■ Connection: Serial Connection

■ Functionality

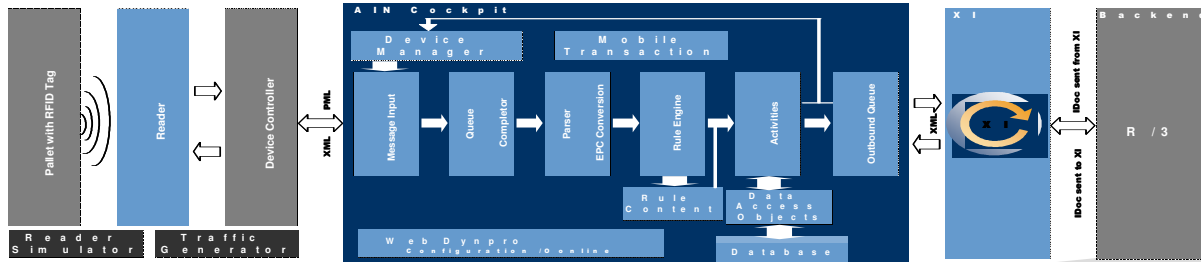
- ◆ Format EPC reads in XML / PML format and send to All / receive from All
- ◆ Forward read / write commands to the readers
- ◆ Notification registration (when tag comes in range / out of range of reader)
- ◆ Consolidation of duplicated reads (e.g. 2 readers at one gate)

SAP RFID Solution Component – SAP XI



- Leveraging SAP XI capabilities, offering a robust and secure information exchange mechanism in an heterogeneous landscape
- Supporting two alternative connection paths
 1. XI connection to SAP and non-SAP systems
 2. XML over HTTP based on project specific implementation

SAP RFID Solution Component – Backend Systems



SAP R/3

- ASN

SAP Event Management

- Track & Trace
- Chain Visibility
- Proof of Delivery

SAP BI

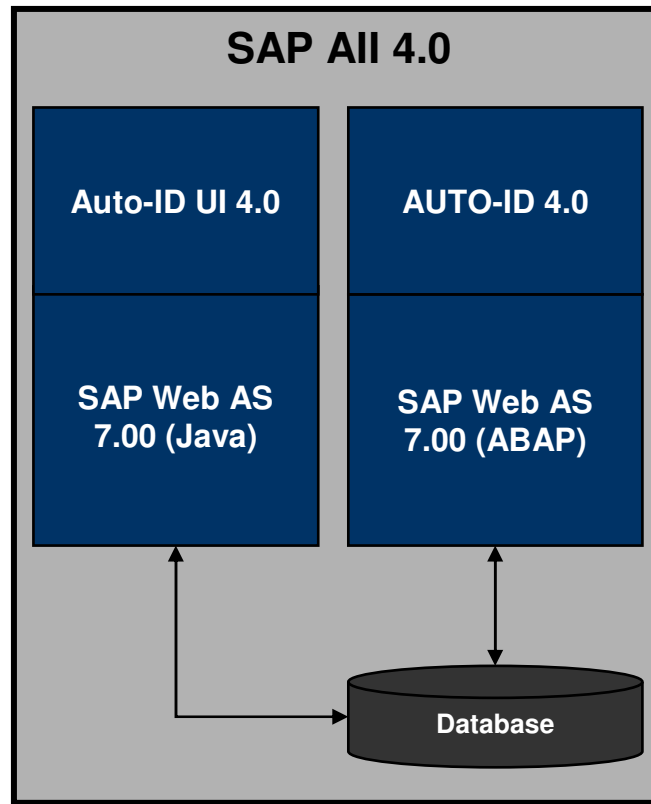
- Store Level Visibility
- Back Room to Sales Floor
- RFID Consolidated Reporting

Basic Facts on SAP All 4.0

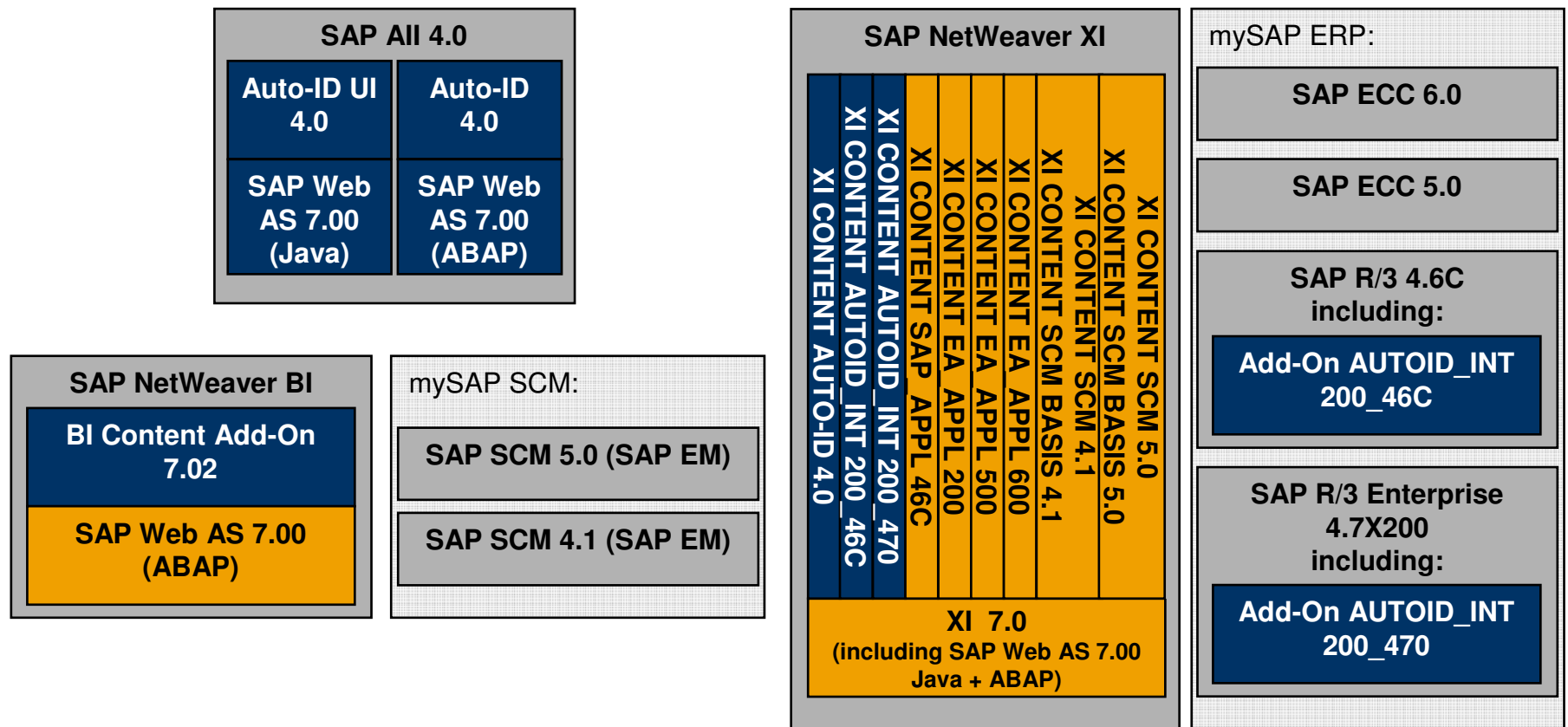
- **SAP All 4.0 is based on SAP NetWeaver 2004s;**
 - **Can operate as standalone**
 - **Optional integration with**
 - ◆ **SAP SCM – SAP Event Management**
 - ◆ **SAP NetWeaver BI,**
 - ◆ **mySAP ERP solution (via SAP NetWeaver XI)**
- **Stand-alone RFID enabled Processes:**
 - **RFID-Enabled Slap and Ship Outbound Processing,**
 - **RFID-Enabled RTI (Returnable Transport Items) Processing;**
- **Integrated RFID enabled Processes possible with SAP All 4.0:**
 - **RFID enabled Outbound Processing**
 - ◆ **Optional: SAP BI and SAP Event Management Integration**
 - **RFID enabled Inbound Processing**
 - **Integrated RFID enabled Outbound & Inbound Processing**
 - ◆ **Optional: SAP BI and SAP Event Management Integration**




■ Software Component Structure of Standalone SAP All 4.0

- SAP All 4.0 is based on SAP NetWeaver 2004s;



Products and Software Components Relevant for SAP AII 4.0 Processes



-  **Components included in the PPMS for SAP AII 4.0** (The PPMS forms the foundation for developing and delivering the software products and Business Content, as well as for informing customers – quick link PPMS);
-  **Further relevant components or group of components;**
-  **SAP Netweaver parts + Products from the Solutions mySAP SCM and mySAP ERP;**



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RFID Enabled Business Processes

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Summary

Standalone RFID Enabled Outbound Processing

RFID enabled Outbound Processing with Standalone SAP Auto-ID Infrastructure

RFID Tag
Commissioning

Assign
Document

RFID
Packing

Move

Assign
Document

Load with
RFID



Target Customer

- Customers seeking to pilot RFID technologies
- Customers seeking simple RFID Solutions not integrated with backend systems
- CPG Customer seeking a low investment Wal*Mart compliant RFID solution

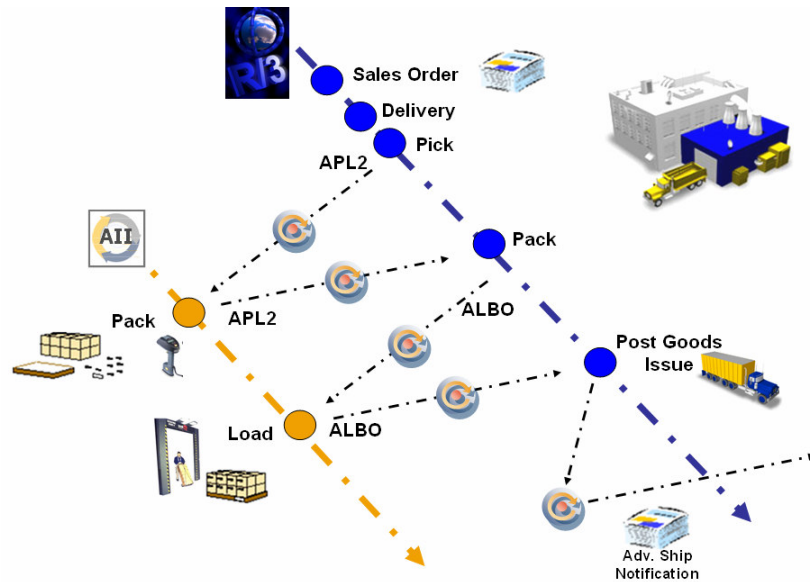
Installation Option

- Standalone AII 4.0 supporting manual outbound processing - Slap & Ship

Solution Offerings

- A. Standalone AII 4.0 with direct Device integration
- B. Standalone AII 4.0 with integration to Device Management (delivered by SAP's partners)

RFID Enabled Outbound Processing (integrated)



Target Customer

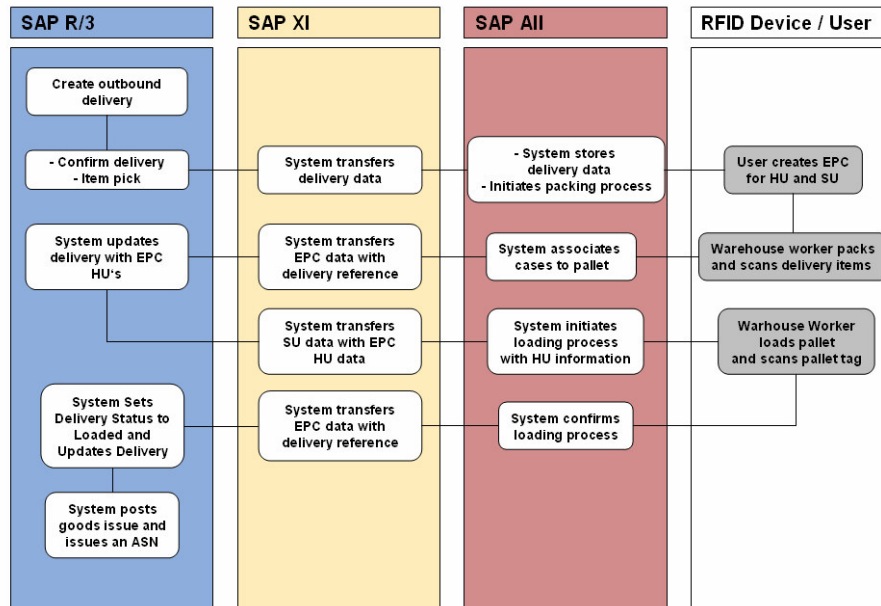
- Customers seeking to enable & integrate standard business processes with RFID
- Customers seeking to roll-out RFID Technology beyond piloting

Installation Option

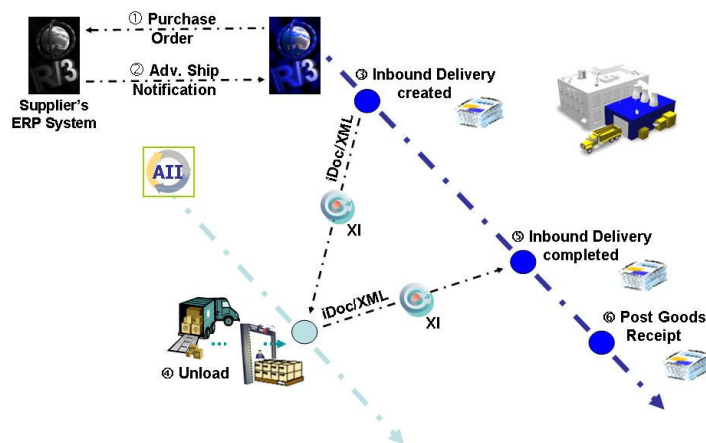
- All 4.0 integrated with Enterprise backend system
- RFID enabled integrated Outbound Processing & Inbound Processing
- Seeking to successively RFID enable Standard Business Processes

Solution Offerings

- All 4.0 integrated with Enterprise backend with Device Management



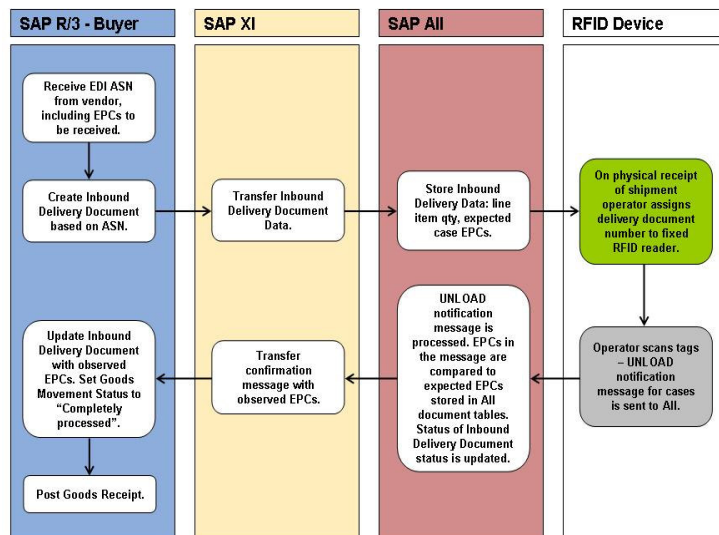
RFID Enabled Inbound Processing



Inbound processing provides an end-to-end RFID enabled Inbound Delivery solution. From receipt of the Purchase Order through the Advanced Shipment Notification, receipt of the Inbound Delivery, Unloading and Unpacking, and automatic Goods Receipt.

SAP's RFID technology

- Automatically established expected Inbound receipt from the Advanced Shipment Notification.
- Supports RFID tagged product receipt
- Compares actual receipt against expected receipt
- Increases automation of the Delivery process.
- Provides complete end-to-end process visibility
- Integrates with RFID enabled inbound processing
- Automatically identifies Deliveries requiring RFID tagging
- Supports upstream tagging requirements
- RFID enabled outbound processing is enabled in R/3 4.6C (AII 2.1 and higher), 4.7 EES 2.0 (AII 2.1 and higher), ERP 2004 (starting AII 4.0), ERP 2005 (starting AII 4.0)

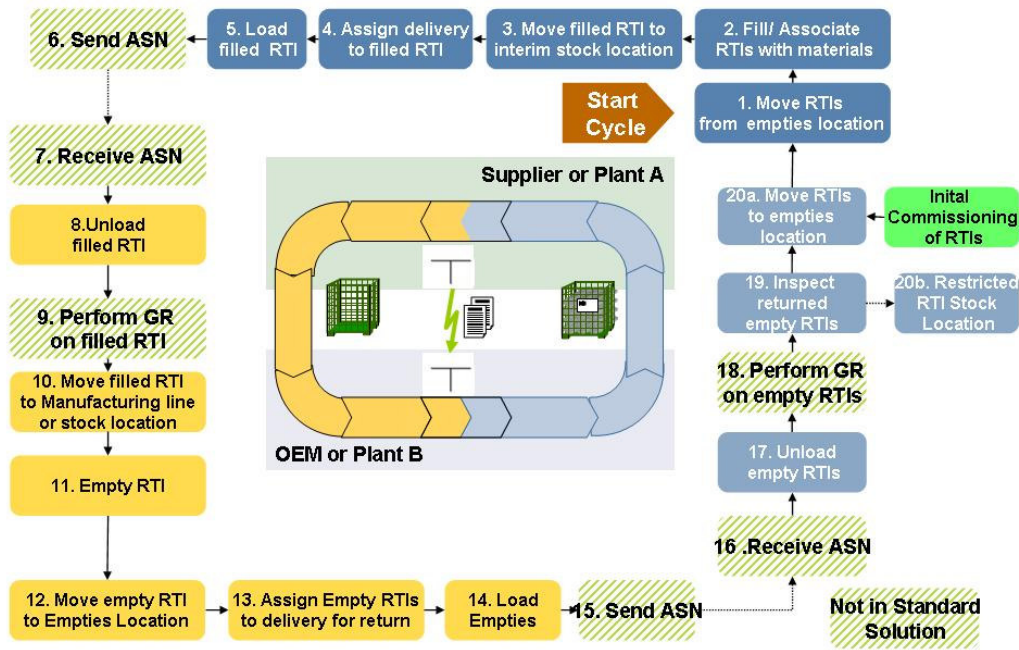


RFID Enabled Returnable Transport Items Visibility

Provides visibility across a closed loop returnable transport item (RTI) process covering the outbound, inbound and return process

Provides visibility throughout the complete returnable transport item process, based on deliveries and their handling units

- Track & Trace RTIs
- Monitor RTIs
 - Current and historic locations
 - RTI Status (full, empty)
 - Process Status (Outbound, Inbound, Return)
- GRAI encoding supported
- Stand-alone All deployment only directly integrated with SAP Event Management



■ SAP EM and SAP AI: Complementing Elements

Domains of SAP AI

- Deals with the automatic handling of RFID data
- Local implementation and visibility of RFID-related data
- Pre-filtering and consolidation of high-volume RFID data
- Direct feedback to equipment and workforce

Domains of SAP EM

- Inter-company collection and exchange of visibility data
 - Monitoring of complete, distributed processes
 - Enables exception-based process monitoring and event handling
 - Combines non-RFID information with RFID objects
-
- Both components integrate with any back-end system
 - **SAP AI** is closer to the physical process, whereas **SAP EM** is closer to the exchange and monitoring of data between partners

Event Management



Event Management - Inbound Example based on Outbound Delivery Event Handler

HU Status

- Packed
- Loaded
- Good Issued
- Unloaded
- Goods Received

Delivery Status

- Not Started
- Picking Complete
- Goods Issued
- Goods Received
- Proof of Delivery

Shipment Status

- On Time
- Delayed

SAP Event Management: Event Handler Details - Microsoft Internet Explorer

Address: http://pwwf2612.wdf.sap.corp:50000/scem/q1p001/ehsearch?OBP10_PO_NO=&OBP10_SO_NO=&OBP10_DELIV_NO=&OBP20_IN_DIV_NO_DLV=0180003070&OBP20_STAT_

SAP Supply Chain Event Management

Search Fast Entry My List Add to My List Search Results Log Off

Customer/Sales Exec. - Outb./Inb. Deliv. Visib. Proc. Details

Detailed Information

Reference Purchase Order: 4500002805
 Sales Order Number: 1601
 Delivery Number: 80010891
 Inbound Delivery Number: 180003070
 Delivery Date: Aug 29, 2005
 Shipping Status: Goods Received
 Delivery Status: On Time
 Delivery Total Weight: 1980.000 KG
 Delivery Total Volume: 18.000 M3
 Number of Packages: 1

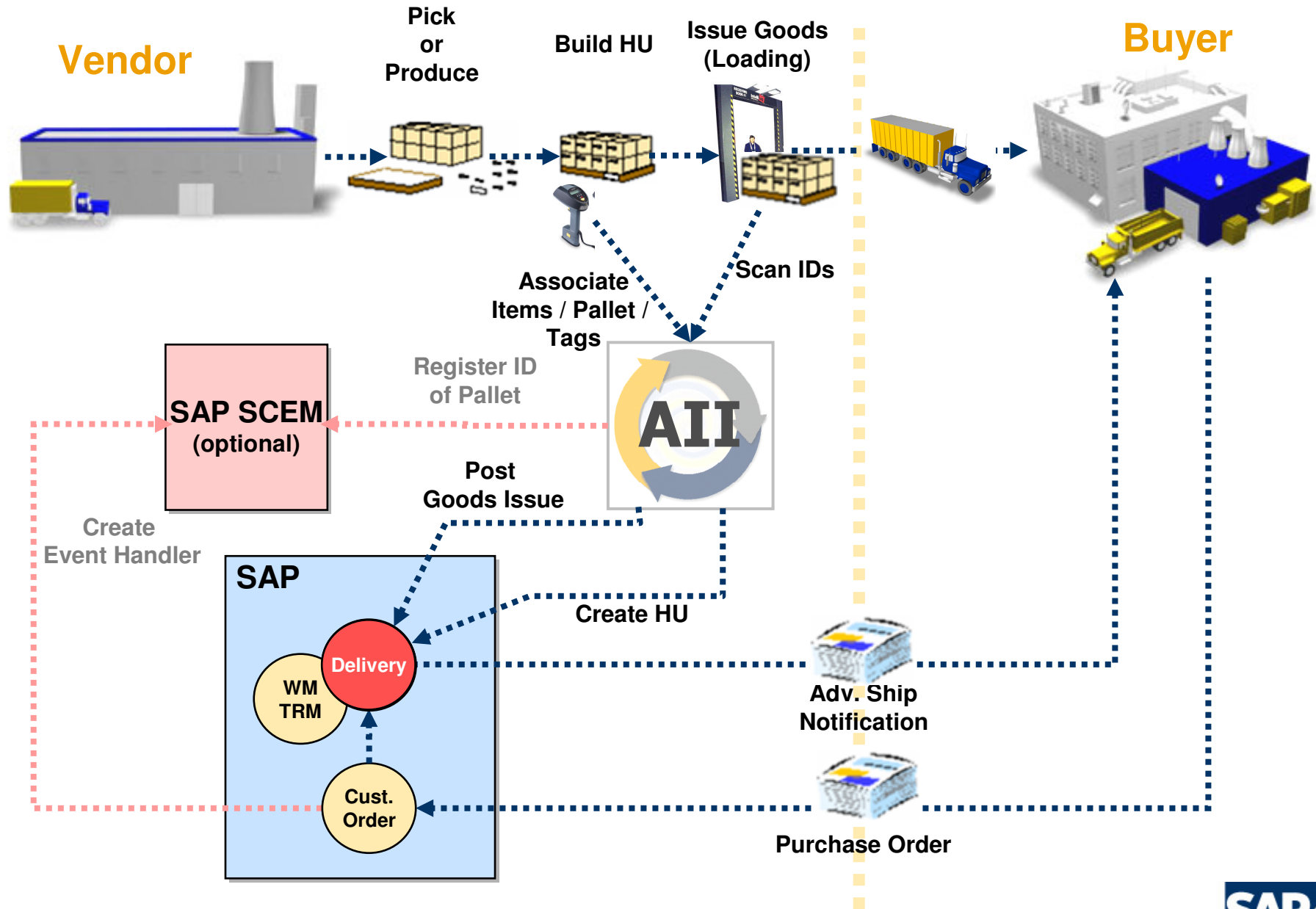
To display detailed event information, click an item. To sort the list, click a column header.
[Click here to refresh this page.](#)

Status	Event Description	Planned Date/Time	Actual Date/Time
+	Picking Complete	Aug 29, 2005 8:00 AM CET	Aug 27, 2005 1:00 AM CET
+	Goods Issue	Aug 29, 2005 6:00 PM CET	Aug 27, 2005 1:05 AM CET
+	Receive Advanced Shipping		Aug 27, 2005 1:05 AM CET
+	Goods Receipt	CET	Aug 27, 2005 1:19 AM CET
!	Proof of Delivery		

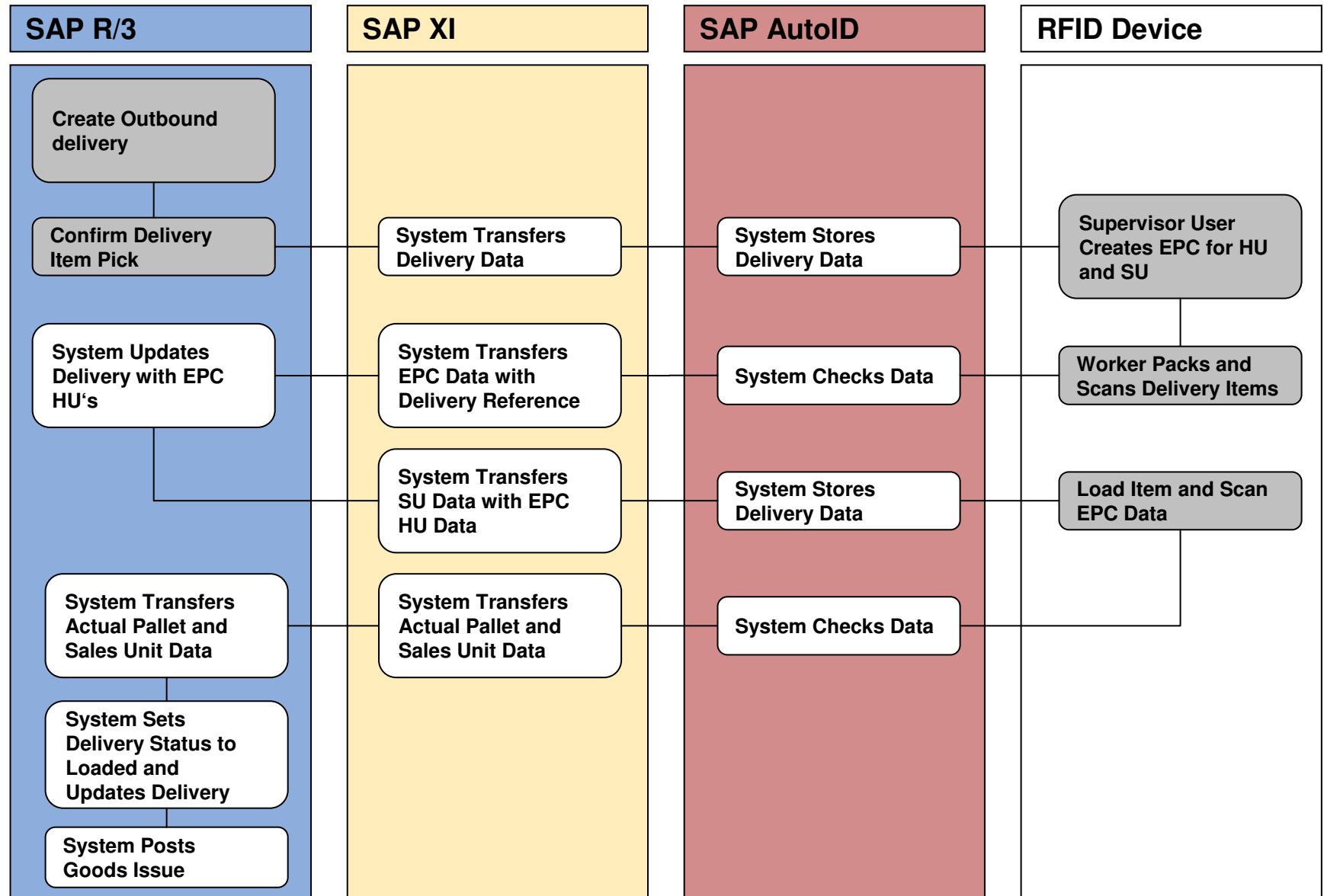
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SAP All triggers event handlers directly in Event Management without the need of XI for all events.

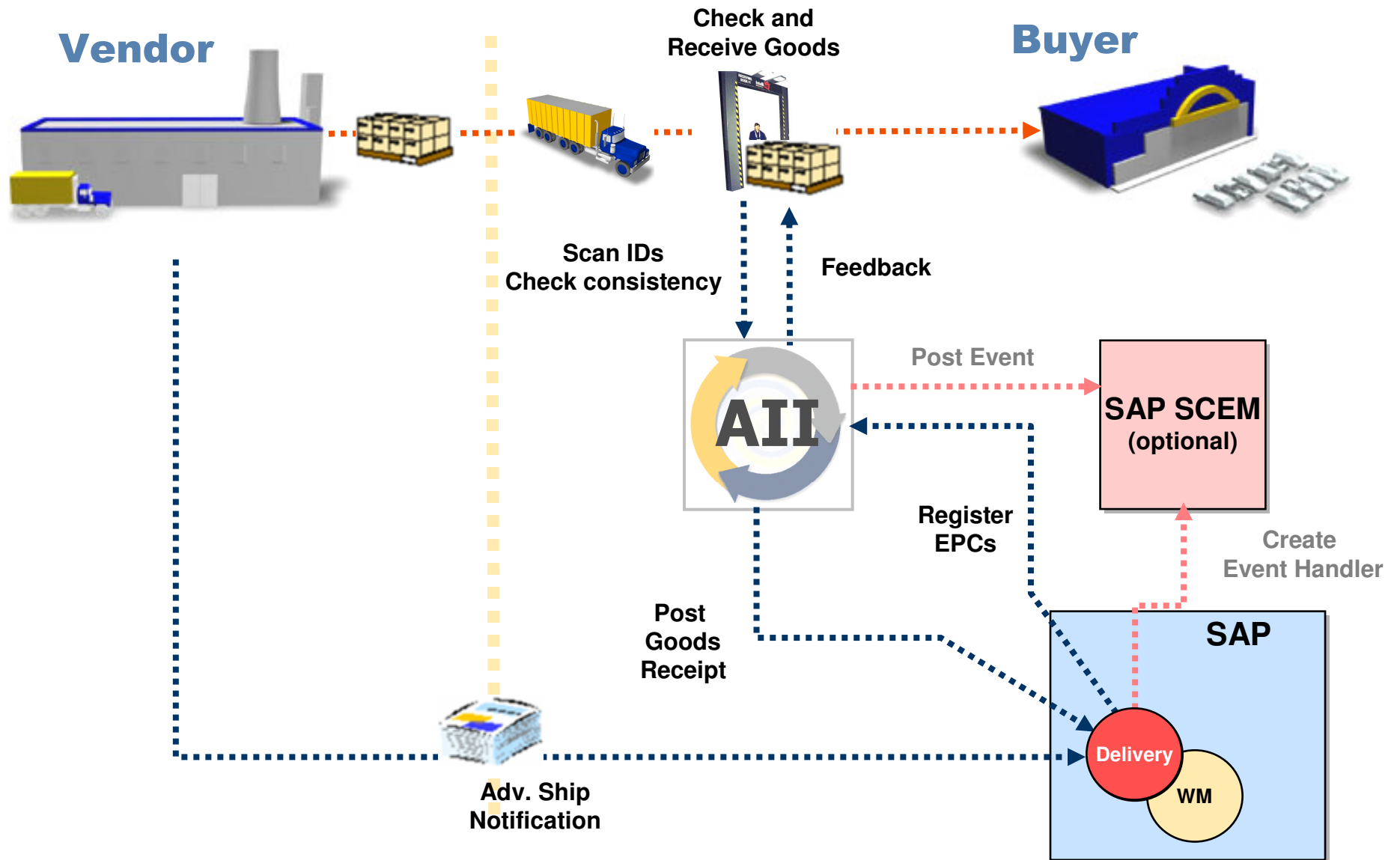
Outbound Process with RFID



Process Flow of Outbound Delivery



Inbound Process with RFID





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Customer Use Cases

Summary

Use Case 1 – Standalone Slap & Ship

Industry

- Food Manufacturing

Objectives

- Wal-Mart

Descriptions

- Enable an outbound process by tagging cases and pallets
- Store RFID data in All
- Future integration with R/3 with XI
- A pilot project

Benefits

- Explore the benefits of using RFID

Technical Details

- **All Version:** 2.1
- **Integration:** None
- **Tag Vendor:** Intermec
- **DC Vendor:** SAP DC
- **Device Vendor:** Intermec
- **Sites:** 1

Use Case 2 – Container Tracking

Industry

- Heavy Manufacturing

Objectives

- Tracking RFID tag equipped container movement

Usage Highlights

- Tracking containers between two locations
- Making container visible in Event Management
- Installing RFID tag at container level
- 15 gates with 2 readers each

Benefits

- Monitoring logistics flow from Event Management
- Creating new KPI's to track container flow

Technical Details

- **All Version:** 2.1
- **Integration:** EM
- **Tag Vendor:**
- **DC Vendor:**
- **Device Vendor:**
- **Sites:** 1

Use Case 3 – Warehouse Goods Processing

Industry

- Medical Equipment Distribution

Objectives

- Increasing efficiency in loan equipment handling, and inventory visibility

Process Highlights

- Each loaner-set contains implants and instruments. Hospitals return the loaner-set with or without implants after surgery. Invoice is generated based on returning content.
- Each item is tagged. Use RFID to detect content during loaner-set issuing and returning, instead of individual inspection by bar-code.
- Use RFID to locate a loaner-set within the warehouse.

Benefits

- Increase labor efficiency
- Improve product recall
- Raise competitive advantage
- Better customer service

Technical Details

- **All Version:** 2.1
- **Integration:** R3E in mass roll-out
- **Tag Vendor:**
- **DC Vendor:** Methec
- **Device Vendor:**
- **Sites:** 5 production, 15 DC

Use Case 4 – Integrated Slap & Ship

Industry

- Consumer Goods
Manufacturing

Objectives

- Meet Wal-Mart Requirements

Process Highlights

- During product packaging step, tags are placed on cases and pallets before moving to warehouse location.
- Tags are read in warehouse to confirm their placement
- Tag info is used to confirm pick action and goods issuing
- ASN is issued to the customers via EDI 856

Benefits

- Wal-Mart compliance
- Shipping & Inventory accuracy
- Better customer service

Technical Details

- **All Version:** 2.1
- **Integration:** R/3
- **Tag Vendor:**
- **DC Vendor:** CIBER/ACSIS
- **Device Vendor:** Alien
- **Sites:** 1 Plant, 2 warehouses

Use Case 5 – Inbound and Outbound Processes

Industry

- Defense

Objectives

- Meet US DoD Requirements

Process Highlights

- Inbound: Scanning inbound pallet to verify its content, issue goods receipt, store items as HU/SU or at a proper slot in warehouse.
- Outbound: During packaging, items are tagged and scanned to create HU. When ready to ship, tags are scanned again and goods issue is triggered.
- Tags will be generated if not exist.

Benefits

- DoD compliance
- Increase Inventory accuracy
- Flexible integration with a decentralized SCM system to replace legacy systems

Technical Details

- **All Version:** 2.1
- **Integration:** SCM via WebMethods
- **Tag Vendor:**
- **DC Vendor:**
- **Device Vendor:**
- **Sites:**

Use Case 6 – Integrated Slap & Ship

Industry

- Consumer Goods
Manufacturing

Objectives

- Meet retailer Requirements
- Resolve shipping/receiving discrepancy

Process Highlights

- Products are tagged, and cases and pallets are associated on each order.
- EPC's shipped and received are compared, any discrepancies are resolved.
- EPCs are monitored throughout the supply chain, especially when they enter store locations.

Benefits

- Wal-Mart and Target compliance
- Resolve shipping discrepancies
- Monitor entire supply chain

Technical Details

- **All Version:** 2.1
- **Integration:** R/3 and EM w/ XI
- **Tag Vendor:** Alien
- **DC Vendor:** Oat
- **Device Vendor:** Zebra/Alien
- **Sites:** 3



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Summary

- **RFID is an emerging technology to identify an item using radio frequency**
- **The usage of RFID is widening with an increasing Return on Investment (ROI)**
- **SAP is a key player in applying RFID to business applications, with many live customers around the world**
- **Make SAP RFID solution part of ESA family**

Questions?

Q&A

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