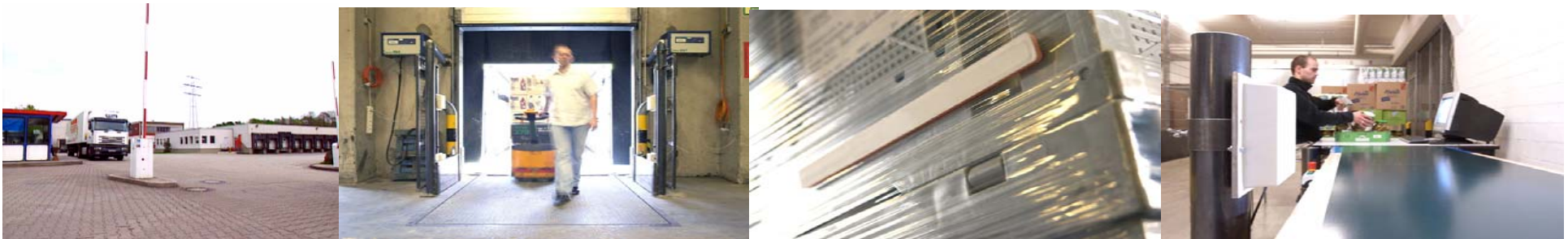




Radio Frequency Identification

Business Transformation with a Positive ROI



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Contents

- European RFID Market Overview & Trends
- Selected RFID Application Areas
- RFID in Automotive Industry
- IBM & RFID

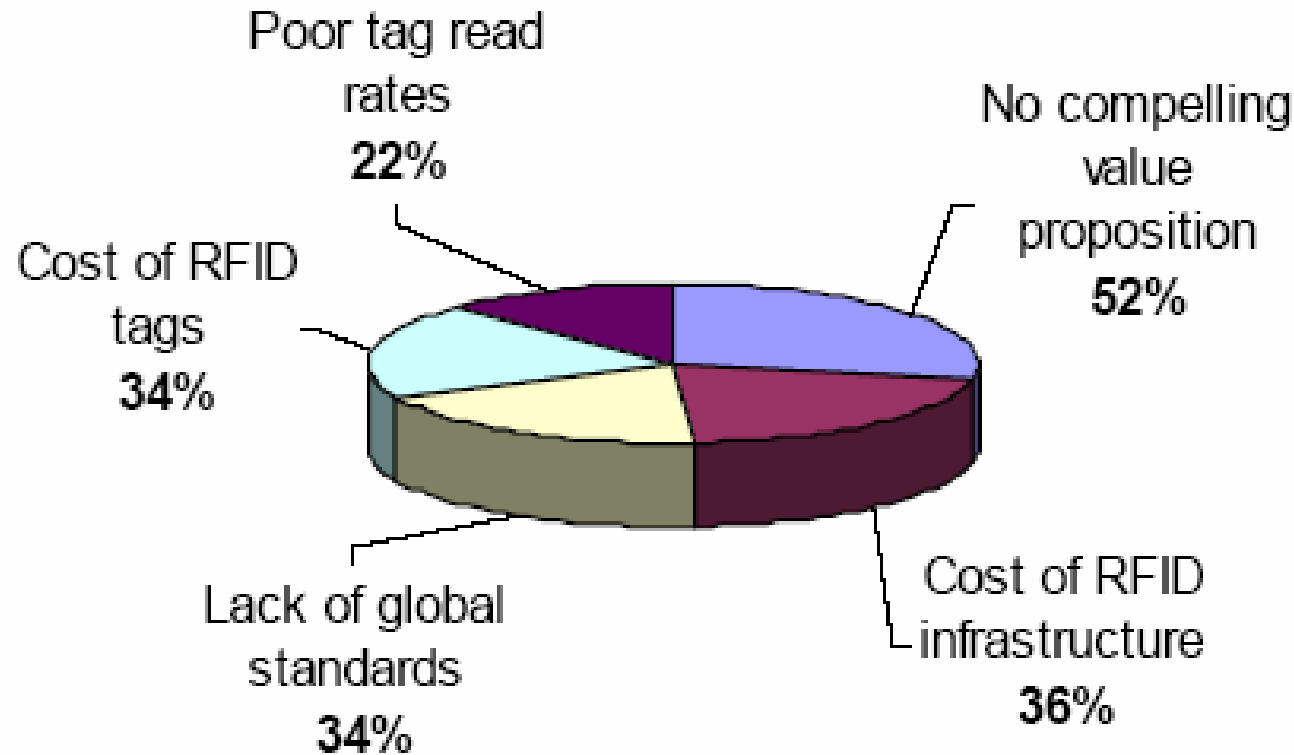


Today's RFID Market Realities ...

- RFID has been around for decades (ex. LF, HF, Active tag)
- Transitioning from "early-adopter" to "mainstream" phase (UHF) with pilots/PoCs resulting in "productified" solutions and transitions to roll-outs
- Mandates from governments and retailers has accelerated the market adoption faster than what would have occurred normally...
- ...and this has been compounded by positive government regulation and standards evolution (ISO, EPC)
- Adoption rates vary across industries, but Retail has led the way. Strong growth in key areas including Transport/Logistics, Healthcare, Pharma and Industrial
- SCM application area is largest, with AM, WIP & Traceability areas growing
- Convergence of RFID and Sensor technologies is a key emerging area

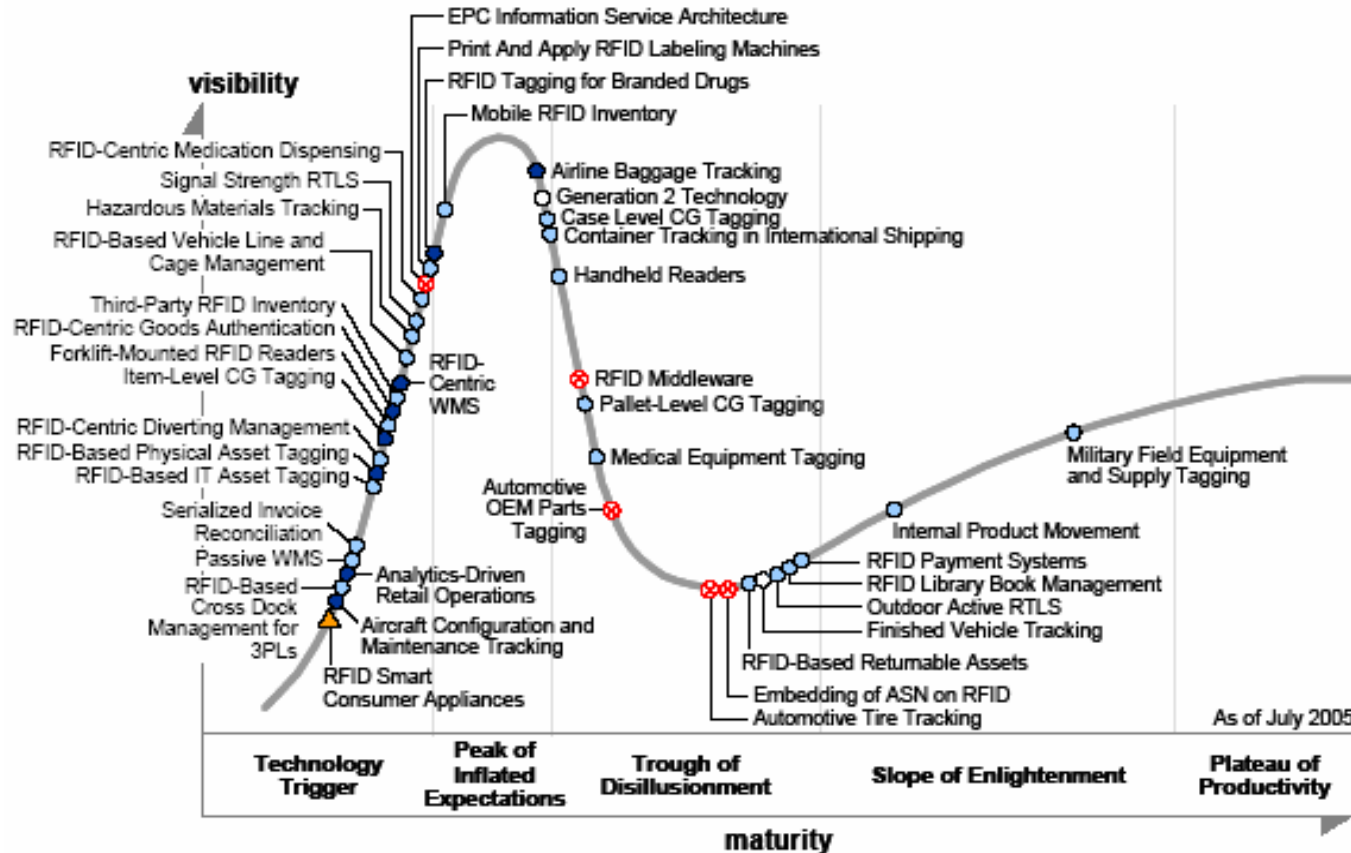
Perceived Obstacles to RFID Adoption: True or False?

Figure 2: Top Obstacles to RFID Adoption



Source: [AberdeenGroup](#), December 2005

Gartner emphasizes RFID as many different applications and technologies, many of which will not plateau for 2-5 years



Plateau will be reached in:









- less than 2 years
- ◐ 2 to 5 years
- ◑ 5 to 10 years
- ◒ more than 10 years
- ⊗ obsolete before plateau

Acronym key:

- | | |
|------------------------------------|--|
| 3PL third-party logistics | OEM original equipment manufacturer |
| ASN advance ship notice | RFID radio frequency identification |
| CG consumer goods | RTLS real-time locating system |
| EPC Electronic Product Code | WMS warehouse management system |

“The way RFID will affect business is dramatically different than most of the press accounts of the technology would have you believe. Although many people think about RFID as a single technology, it is a collection of many different technologies and applications ...it really isn’t proper to characterize RFID as a single dot on the Hype Cycle. RFID will not move in sync across applications of the technology or the industries where it can be deployed”, Gartner

IBM's RFID Application Area & Market Sector Focus

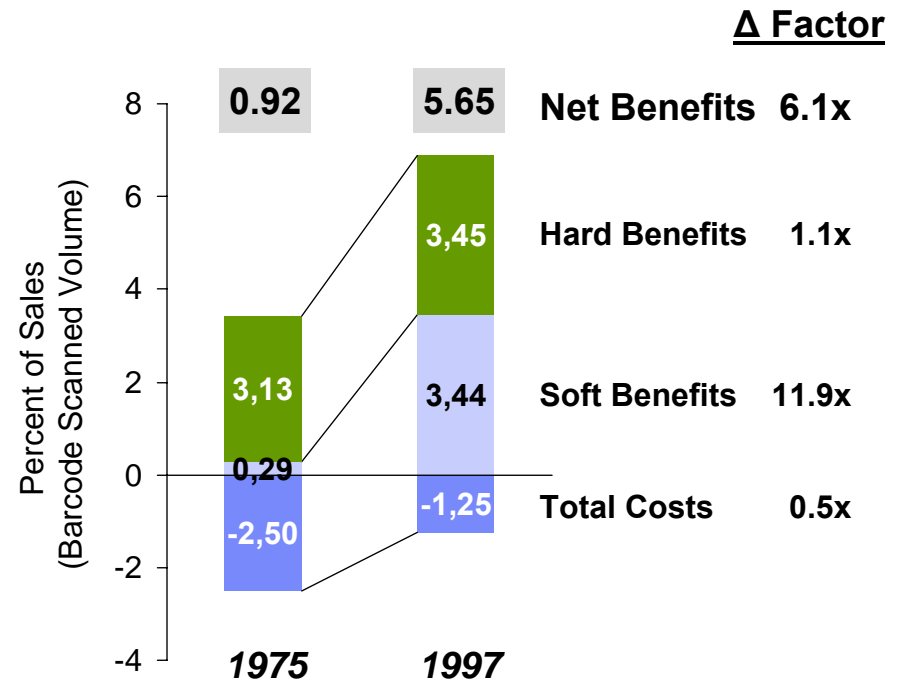
Solution Area		Description	Sectors	Clients
Supply Chain	Supply Chain Mgmt	 Shipment, inventory, and warehouse management	Distribution Industrial Public	METRO Group Nestlé Elizabeth Arden
	Tracking – Work In Process Mfg	 Locating and retrieving parts to manage production	Industrial	PHILIPS Major Auto Co. 
Tracking and Traceability	Tracking - Assets	 Tracking, monitoring, and identifying assets	Industrial Public Communications Financial Services	  
	Traceability	 Tracking products, verifying authenticity	Industrial Public Communications	Major Pharmaceutical Co. KUREHA

Past experience can help us better understand the long-term context for EPC RFID

Lessons Learned from the Barcode Experience

1. Standards are critical to drive widespread adoption
2. Collective industry action is key to achieve critical mass and speed realization of benefits
3. Full realization of benefits requires open information sharing and sustained change in business practices and processes
4. Forecasting benefits and costs is difficult

Estimated Barcode Scanning Benefits, 1975 vs. 1997 *U.S. Grocery Industry*



Source: "17 Billion Reasons to Say Thanks: The 25th Anniversary of the U.P.C. and Its Impact on the Grocery Industry", PricewaterhouseCoopers, 1999; IBM Institute for Business Value analysis

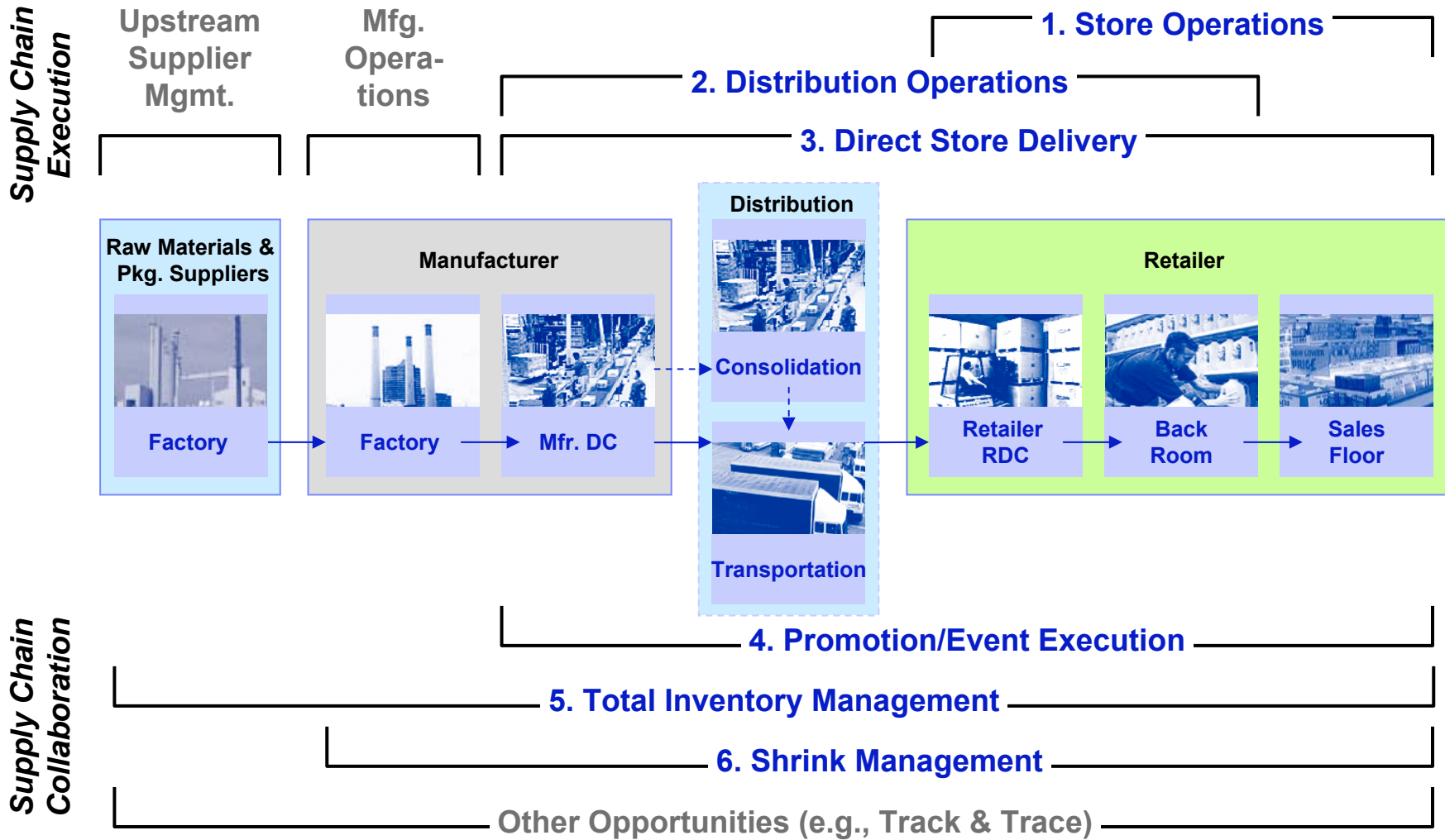
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RFID in Supply Chain Management

Key: Current EPC Focus
Future EPC Focus



Metro Group: RFID in the Supply Chain

Challenge

Drive continued growth for the business by streamlining the supply chain to benefit METRO's customers and enhance business results.

Solution

Metro hired IBM to provide middleware and installation services. IBM's RFID middleware is being used to exchange data between RFID readers and Metro's Merchandise management system as well to manage the RFID infrastructure. The solution includes:





- IBM WebSphere middleware (includes WebSphere RFID, WebSphere Business Integration, MQ, DB2, Tivoli)
- IGS Services
- IBM Servers

Benefits

- Process efficiency gains of up to 17%
- Theft/loss reduction of up to 18%
- Reduced OOS situations up to 14%
- Enhanced customer service
- Improved customer satisfaction



IBM, Philips, Intel and SAP in Project with DHL

 DHL	Products / Services	eShipping	Tools	Information	Press	Careers	About DHL
	Press Releases Good Morning					The Group	Investor Relations
Fast Track <input type="text" value="DHL Air Waybill"/> <input type="button" value="Go"/> More tracking options						Contact	Site Map Settings Help
Press Releases Media Materials Press Contacts	<p>Bonn 16. February 2006</p> <p>Deutsche Post World Net starts "DHL Innovation Initiative" with IBM, Intel, Philips and SAP</p> <p>Strategic partnership aims at developing innovative logistics solutions to increase efficiency of supply chains</p> <p>Under the leadership of Deutsche Post World Net, IBM, Intel, Philips and SAP have agreed on a strategic partnership called "DHL Innovation Initiative". The companies, which all have global presence, plan to advance the development and introduction of new technologies for the logistics industry. The initiative is aimed at making supply chains more efficient by uniting the flow of information and physical goods through increased automation, visibility and improved collaboration among trading partners. To achieve this, the partners have decided to pool their logistics, technology and IT expertise.</p> <p>In initial projects, industry-specific RFID applications will be tested in the supply chains of the partner companies and brought to market. Pilot projects have been started in the fashion, pharmaceutical and electronic industries in Europe, the United States and Asia First results are expected as early as mid-2006.</p> <p>"Steadily rising merchandise flows are posing new challenges for the supply chain, and these challenges can be mastered only by using innovative business models, innovative business processes and innovative technology", said Martin Jetter, Leader IBM Business Consulting Services Northeast Europe. "We want to make a joint effort to develop solutions that haven't yet entered our customers' minds," added John Allan, Board member at Deutsche Post World Net in charge of Logistics.</p> <p>"To ensure the success of this initiative, it is imperative that these new technologies are based on proven, integrated business solutions that support the industry's needs, while at the same time driving down the total cost of ownership," said Claus Heinrich, member of the Executive Board,</p>					<input type="text"/> <input type="button" value="Search"/>	
						Select your Location Global	
						Good to Know Corporate Citizenship Services A-Z Publications	
						Useful Tools Currency Converter Local Information	
						FAQ Questions and answers for a wide range of DHL-related topics <input type="button" value="more"/>	
							
						More About DHL Learn more about the world's leading express and logistics company <input type="button" value="more"/>	
							

Integrated Asset & Vehicle Tracking Systems from IBM & Microlise



SOLUTION DESCRIPTION

The IBM / Microlise RFID Trailer Portal product and solution portfolio utilises the latest UHF Tag and Reader technology, coupled with advanced Vehicle Tracking and on-board computing technology to provide total visibility of an operations delivery assets (and by association the goods being delivered throughout their supply chain.

The solution uses GPS Tracking coupled with an IBM MQTT messaging infrastructure and GPRS communications to track a vehicle and its goods on a route. This functionality is delivered using the Microlise In-Vehicle Computer (IVC) technology. UHF Tag and Tag Reading technology connected to the IVC delivers accurate, real-time and hands-free asset (such as Cages, Pallets & Totes) loading and unloading control & visibility. Items picked into the delivery assets can therefore be tracked by association.

In this way, enhanced real-time, hands-free, visibility of delivery and collections items from the moment they are loaded, whilst they are in transit and ultimately unloaded at point of delivery, can be provided without significant operational impact in terms

Manifest data is typically downloaded from an ERP system, such as SAP, into the Microlise Transport Management Centre which allows routes to be created and loads assigned and downloaded to vehicles covering those routes. Updates can also be made in real time once the vehicle is on the road.

The RFID Antennae & Reader technology reads the assets and associated order items onto the vehicle. Any errors or outstanding assets to be loaded, when compared to the downloaded manifest, are flagged to the driver in real-time via a simple rugged display & sounder system at the rear of the trailer.

The vehicle can then be tracked to its various drops where deliveries are to be made. Again, the RFID Antennae & Reader technology reads the assets and associated order items as they are unloaded from the vehicle - any errors, when compared to the downloaded manifest, are flagged to the driver in real-time via a simple rugged display & sounder system at the rear of the trailer.

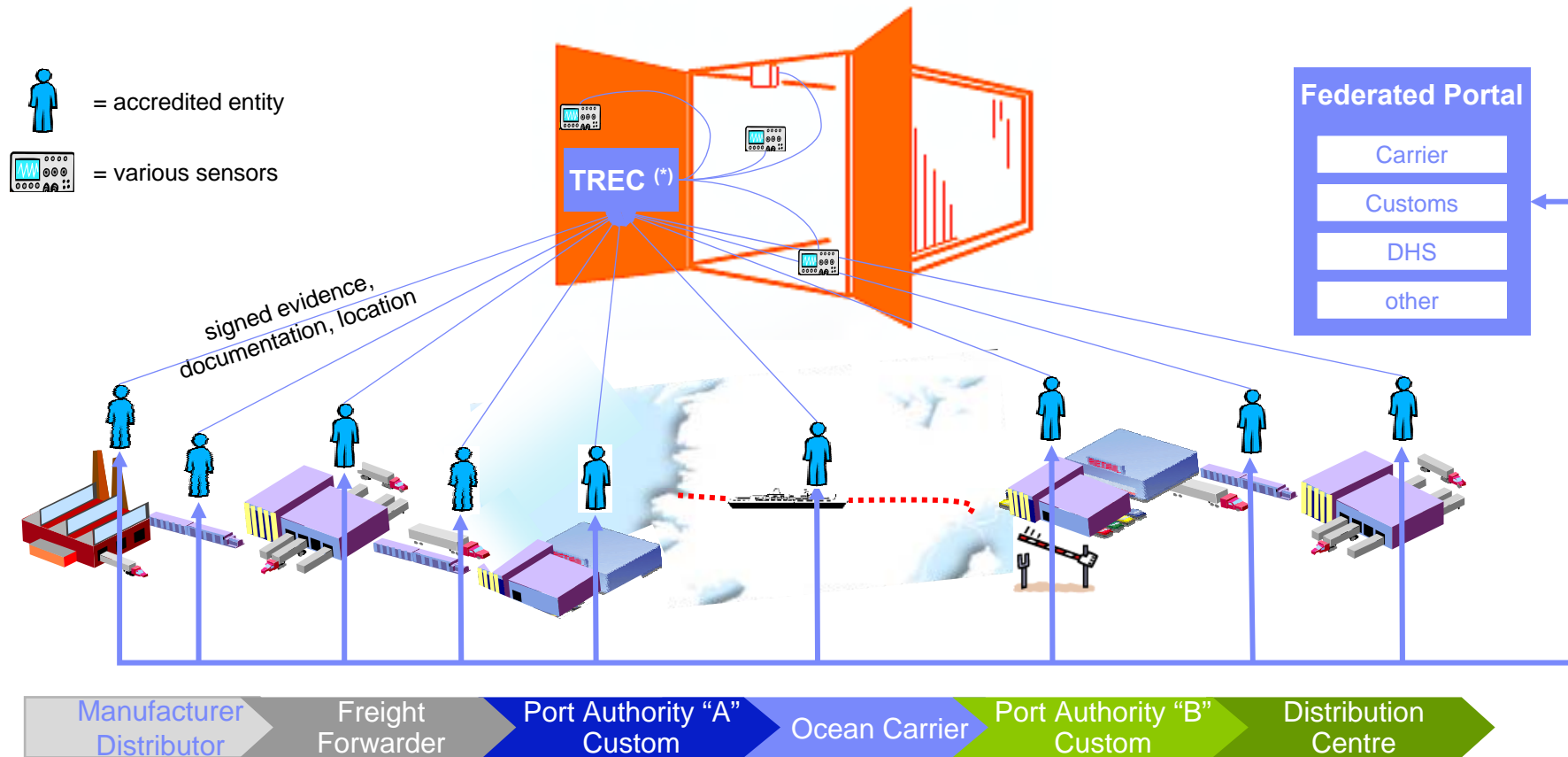
The real-time status of the delivery can be monitored in the Traffic Office using optional products such as the Microlise Transport Management Centre which displays vehicle locations on maps, can automatically pre-advise customers of pending arrivals, alert as to lateness, traffic problems or delivery problems.

The Proof of Delivery & Asset location and utilisation Information generated by the system is then sent back to the ERP host system as required, reducing data error and increasing the operational efficiency of the delivery system.

A Mobile Data Terminal can be used in conjunction with the system to provide the driver



The unique IBM Secure Trade Lane solution is based on the integration of different state of the art technologies into an end-to-end vision, implemented in a modular, non-proprietary and pragmatic way



(*) TREC= Tamper-Resistant Embedded Controller

Technology is the enabler for a Secure Trade Lane with the highest possible security and efficiency only be given through an end-to-end approach

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RFID in Asset Management

Asset management faces several challenges that can be addressed by RFID

Challenge/Pain Point

Asset Management

- Lack of visibility
- High labor expense
- Manual process errors
- Loss

Applicability

Business Attributes

- Traceability/Trackability
- Automated process
- Asset diversity
- Distributed

Process Characteristics

- Accuracy
- Timeliness
- Distributed

Sample RFID Enabled Solutions

- Asset registering
- Locating
- Tracking
- Automatic asset data collection
- Monitoring / Anti-theft alarm
- Inventory management

IBM Ireland: RFID for Mobile Asset Tracking

BUSINESS CHALLENGE

IBM Ireland provides employees with business-critical mobile computing hardware (laptops, for example). With vital information contained in these costly assets, it is critical for IBM to track and inventory this equipment. However, at its Dublin Technology Campus, IBM was relying on an eight-step, paper-based tracking system that required line-of-sight verification. These audits took up to three weeks to complete and only covered a small sample of the hardware. The process left IBM vulnerable to loss of expensive equipment and data.

SOLUTION

IBM Ireland can now minimize asset losses with an RFID solution that tracks all laptops across the entire campus. Portals located at entry and exit doors provide real-time asset traceability by registering the RFID-tagged laptops as they enter or leave each location. From a desktop computer, administrators can perform quick audits on all the RFID-enabled mobile assets in the system. An IBM eServer system supports the RFID portals and runs IBM WebSphere middleware that transmits RFID data to administrators.

BENEFITS:

- 100% of RFID-tagged assets **audited in minutes**, instead of a 1% sample audited in weeks
- Estimated **300% productivity increase** for asset administrators
- Eliminated significant asset loss—100% of mobile assets are now maintained
- **100% ROI expected by early 2007**



» On Demand Business defined

An enterprise whose business processes—integrated end-to-end across the company and with key partners, suppliers and customers—can respond with speed to any customer demand, market opportunity or external threat.

Leading Global Petroleum Company: RFID in Asset Tracking

Challenge

Avoid potential disasters and ensure highest safety level of all personnel in refinery environment based on high internal company standards and government regulation. Additionally, provide better visibility of assets to reduce lost/missing tools and gain better utilization

Solution

The Critical Resource Tracking solution has been based on mature IBM software platform that processes high data volume. It will give flexibility to implement deployment architectures that are scalable, maintainable, and robust meeting the strict availability requirements needed for mission critical applications. It is based on a number of wireless RFID technologies including UWB and WLAN

Benefits

- Real time location of all personnel in emergency situations
- Disaster avoidance by detecting unqualified personnel or tools entering a danger zone.
- Reduction of lost/missing mobile tools and production assets
- Ability to fully complying with regulations
- Insurance claim protection



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RFID in Work In Process

Inventory management

Process of replenishing materials to effectively feed manufacturing production processes and keep visibility and control of finished or semi-finished goods inventory

- Replenishment Signalling
- Parts sequencing
- Production batch Localization
- Yard Management (overlaps with Asset Tracking)

Asset Tracking

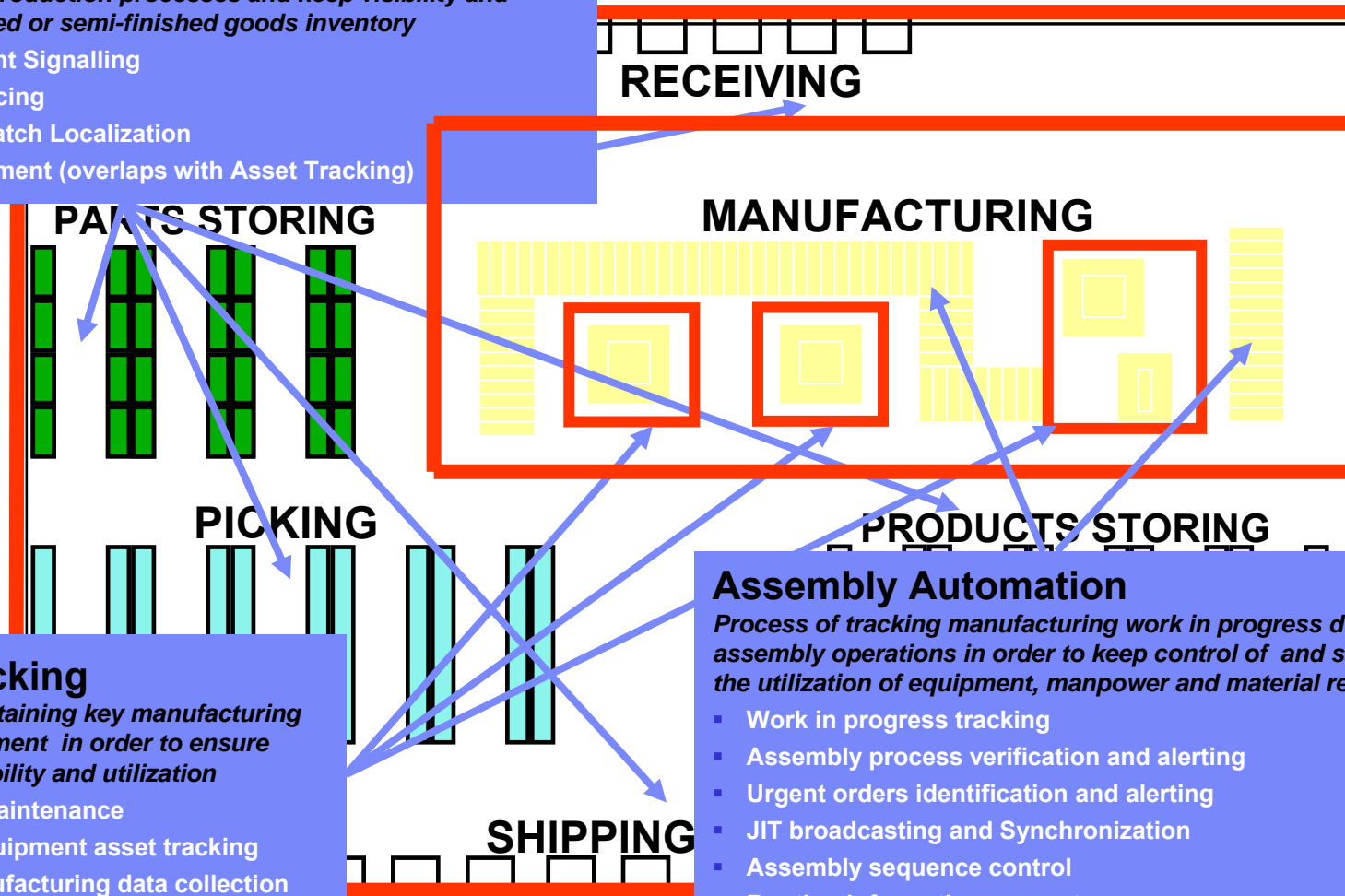
Process of maintaining key manufacturing tools and equipment in order to ensure full asset availability and utilization

- Equipment maintenance
- Tools and equipment asset tracking
- Product manufacturing data collection

Assembly Automation

Process of tracking manufacturing work in progress during assembly operations in order to keep control of and synchronize the utilization of equipment, manpower and material resources

- Work in progress tracking
- Assembly process verification and alerting
- Urgent orders identification and alerting
- JIT broadcasting and Synchronization
- Assembly sequence control
- Routing information support



Gulf States Toyota: RFID in Work in Process

Challenge

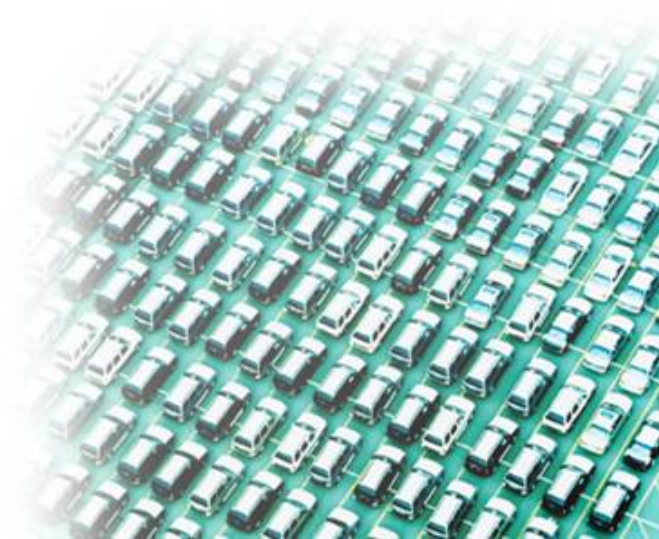
Large Toyota distributor in U.S with annual volume of 190,000 vehicles, projected to double in 3 years. Vehicles arrive and are unloaded and accessorized in VPC before being shipped off to 145 regional dealerships. Lacked way to efficiently locate, track and prioritize vehicles within the VPC, preventing staff from responding quickly to dealer requests and slowing overall throughput. Wish to reduce "Order To Delivery" by 2 days

Solution

Vehicle tracking and management system provided by IBM and partner WhereNet. Handheld Intermec devices and RFID WhereTag transmitters enable the company to check vehicle location and status in real time, constantly optimizing workflow by prioritizing the processing of specific vehicles. Solution handles 6000 vehicles on 84 acres with 4 processing buildings and 850 units processed daily

Benefits

- Reduced average processing time by 50%
- Track labour productivity in cells
- Increased customer service levels by allowing dealers to make changes to orders while the vehicle is in-process
- Reduced risk of Quality defects by ensuring vehicle follows assigned work order plan
- Expected ROI within 1 year.



IBM: RFID in Work in Process

Challenge

IBM makes \$2.5B Corporate investment in 300mm Semiconductor Manufacturing and Development plant. Challenge was to create a real time common container tracking system, which requires thousands of active containers transferred from storage areas, process tools and manufacturing facilities - all of which are very valuable (\$1K per container holding goods worth potentially ~\$2M).

Solution

Every container has an integrated passive RFID tag with a unique ID - know where its been, where its going and its history. IBM SW is used to create and write the ID to all new containers. Container contents, wafer or reticle, are associated with the ID in the Factory Control System's DB2 database. The transponder is read at every processing step to validate that the correct container and material are going to the correct process tool.

Benefits

- Real-time, point to point tracking of production containers providing true track/trace capability.
- Increased efficiency, decreased error rates, and reduced labor requirements.
- Facilitated prioritization of orders, processing of specialty orders, and order routing accelerating time to market



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Major Global Drug Manufacturer: RFID in Traceability

Challenge

Meet federal mandates to provide a safe and secure drug supply chain by identifying the “pedigree” of medications. Demonstrate end-to-end drug tracking for one SKU at one packaging line and one distribution center, Integrate with legacy systems and partners and provide inventory visibility.

Solution

IBM is providing project management, development, and implementation using WebSphere RFID technology to track drugs through the supply chain. IBM also is developing an EPC-compliant product information management systems based on WebSphere Product Center. The project includes supplier integration and track and trace to facilitate downstream information sharing with trading partners.

Benefits

- Compliance with FDA mandates
- Improved inventory management for delivery, returns, and charge backs
- Consumer confidence and security of the drug supply chain



European Food Retailer: RFID in Traceability

Challenge

To retain its position as a leader in the competitive retail food industry, this customer needed to optimize the tracking of its products, cut costs and reduce shelf vacancy. Additionally, they needed to prepare for an onslaught of government regulations regarding the transport and monitoring of food products..

Benefits

- Cut overall costs by 11 percent
- Reduce product loss during transportation and storage by 11 percent to 18 percent
- Eventual full solution rollout is projected to reduce instances of shelf vacancy by up to 14 percent, thus increasing product availability

Solution

IBM developed and implemented a small-scale food traceability pilot program. IBM extensively evaluated multiple radio frequency identification (RFID) technologies in an IBM RFID laboratory and then created the IT architecture and provided the application development required for the solution. IBM WebSphere RFID premises server provides the platform for the end-to-end RFID solution.



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Overview of RFID in Auto Industry in Europe

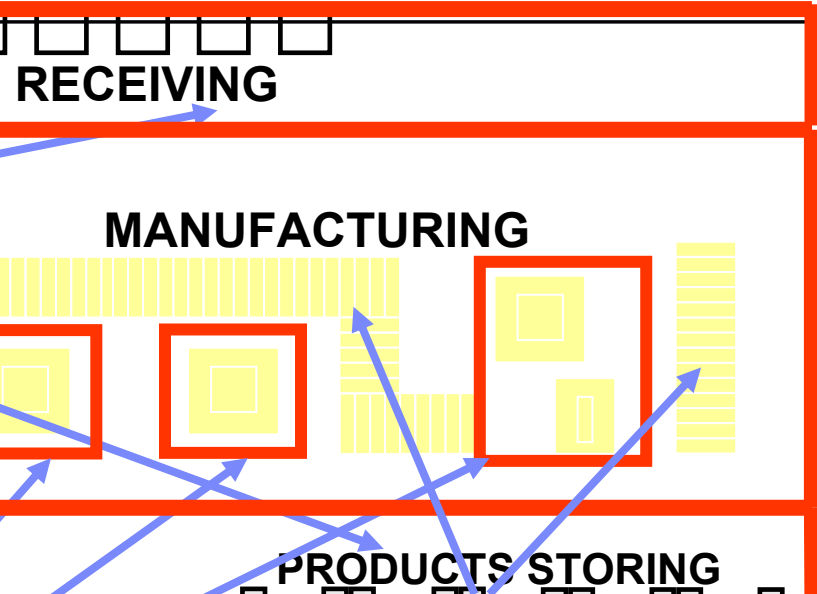
- The automotive sector will see the most aggressive adoption of RFID out of all sectors moving forward (*CompTIA and Frost & Sullivan*)
- Major vehicle manufacturers and providers in Europe are conducting limited tests to learn about RFID and application areas
- RFID has been in use in the automotive industry for 20 years, but only to a limited extent. Vehicle Entry and Security (immobilizers) is currently dominant application area.....
-but greatest growth potential probably lies in *automating the manufacturing process*, to streamline assembly lines. RFID can also play a more traditional role, providing *visibility and security* to the supply chain (longer terms, when standards evolve)
- Currently, most RFID pilots application are primarily focused on *closed-loop systems*, such as container tracking and management
-
- RFID applications for *open loop systems* (ex. automotive SCM) require an open and global vehicle manufacturing standard for interoperability – this does not exist today
- RFID standards definition in the automotive industry could define the tipping-point of large-scale RFID introduction, however timing of this is unclear

RFID Focus Areas in Automotive

Inventory management

Process of replenishing materials to feed effectively manufacturing production processes and keeping visibility and control of finished or semi-finished goods inventory

- Replenishment Signalling
- Parts sequencing
- Production batches Localization
- Yard Management



Asset Tracking

Process of maintaining manufacturing key tools and equipments in order to ensure full asset availability and utilization

- Equipment maintenance
- Tools and asset tracking
- Product manufacturing data collection

Assembly Automation

Process of tracking manufacturing work in progress during assembly operations, in order to keep control and synchronize the utilization of equipment, manpower and material resources

- Work in progress tracking
- Assembly process verification and alerting
- Urgent orders identification and alerting
- JIT broadcasting and Synchronization
- Assembly sequence control
- Routing information support

Assembly Automation - Opportunities and benefits

Assembly automation concerns the process of tracking manufacturing work in progress during assembly operations, in order to keep control and synchronize the utilization of equipment, manpower and material resources.

RFID opportunities

Work in progress Tracking

Assembly process verification & alerting

Urgent orders identification & alerting

JIT Broadcasting and Synchronization

Assembly sequence control

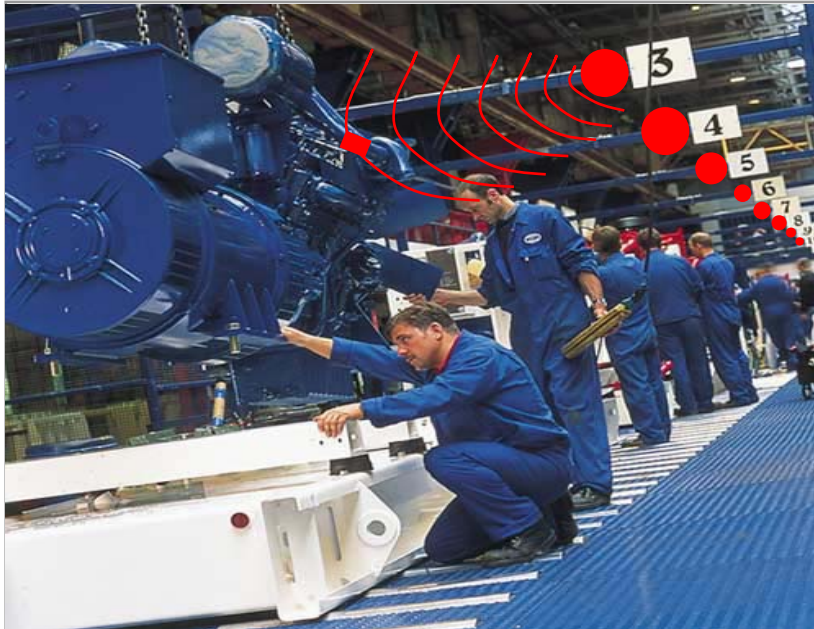
Routing information support

Main Benefits

- Real time visibility of Work In Progress status
- Reduction of mistakes and labor for WIP tracking (no manual scan)
- Continuous inventory of parts in transit
- Early notification and retrieving of quality issues
- Reduced defective production
- Reduction of missing parts/batches
- Improved service level
- Reduced work in progress and inventory
- Reduced throughput time
- Improvement in productivity (reduction of idle times)
- Labor reduction for urgent batch retrieving
- Labor and paper work reduction to support synchronization and sequence control
- Reduced work in progress and inventory due to fewer mistakes in set out/in operations
- Improvement in flexibility in highly automated environment (robot operations can be automatically triggered)

Assembly Automation - high level use cases

Work in progress tracking



High level use case

- RFID tag is attached to each item/batch
- At the end of specific production phases, RFID readers (e.g. gate) detect automatically batch/item transit and thus trigger a progress in the production process
- RFID tag can contain the batch/item ID, BOM, Routing, defective status, etc.

Business Requirements

- **Environment:** batch manufacturing job shop where line rate depends on task accomplishment and is driven by the operator
- **Requirements:** Automatically track work in progress status of semi-finished assembly through the production process

Benefits

- Real time visibility of Work In Progress status
- Reduction of mistakes and labor for WIP tracking
- Early notification and retrieving of quality issues
- Elimination of manual barcode scanning
- Continuous inventory of parts in transit

Components

- RFID tag: usually rewriteable
- RFID antennas at specific check points:
 - transit gate,
 - fixed position tag and antenna,
 - RFID handheld reader.

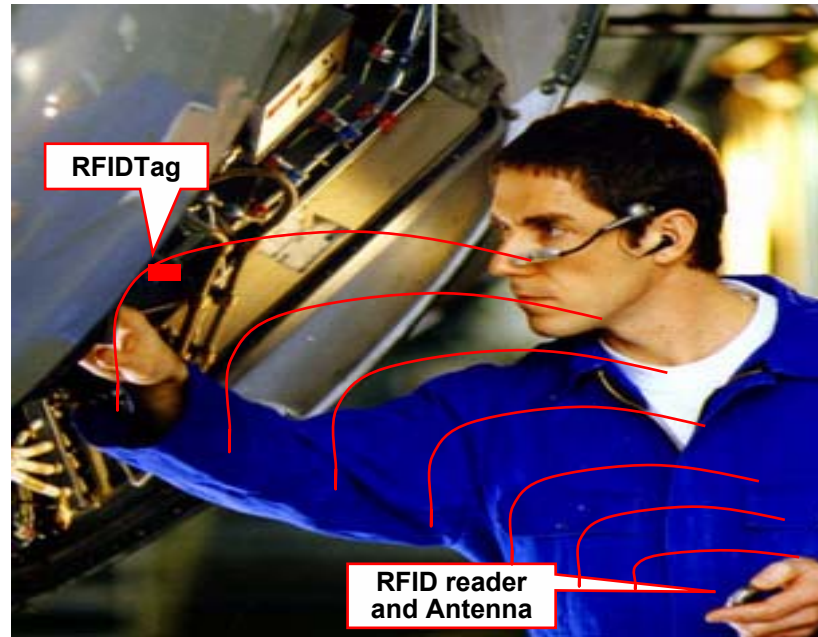
Asset Tracking - Opportunities and benefits

Assembly Management concerns the process of managing and maintaining key manufacturing tools and equipment to ensure full asset availability and utilization.

RFID opportunities	Main Benefits
Equipment maintenance	<ul style="list-style-type: none">▪ Reduced mistakes in identifying equipment▪ Reduced labor for supporting immediate updates and equipment reconfiguration▪ Quality improvement for updated and complete asset critical data on board▪ Fewer missing Tools/Assets▪ Improved utilization and availability of manufacturing equipment▪ Improved service levels▪ Reduced labor in retrieving tools/assets▪ Reduced cost of product maintenance▪ Reduction in defective production▪ Early notification of quality issues▪ Improvements in claim management accuracy
Tools and asset tracking	
Manufacturing process data collection	

Asset Tracking - high level use cases

Equipment Maintenance



High level use case

- RFID tag is attached to a critical equipment.
- Maintenance operator is equipped by an handheld RFID reader.
- RFID tag contains asset history and status data such as last maintenance date and status, maintenance operator IDs, accomplished maintenance tasks, parts upgraded, actions taken, working time.
- Maintenance operator reads tag to verify equipment and location, perform maintenance or repair, and update RFID tag with newest data.

Business Requirements

- **Environment:** Job shop or flow shop with high value equipment or continuous process manufacturing
- **Requirements:** Automatically identify assets and keep track “on board” of accomplished maintenance activities and asset history

Benefits

- Mistakes reduction for proper equipment identification
- Labor reduction for supporting immediate updates and equipment reconfiguration
- Quality improvement for updated and complete asset critical data on board

Components

- RFID tag: usually rewriteable
- RFID handheld reader: shows the equipment ID, maintenance date, maintenance operator IDs, parts upgraded, actions taken, working time.

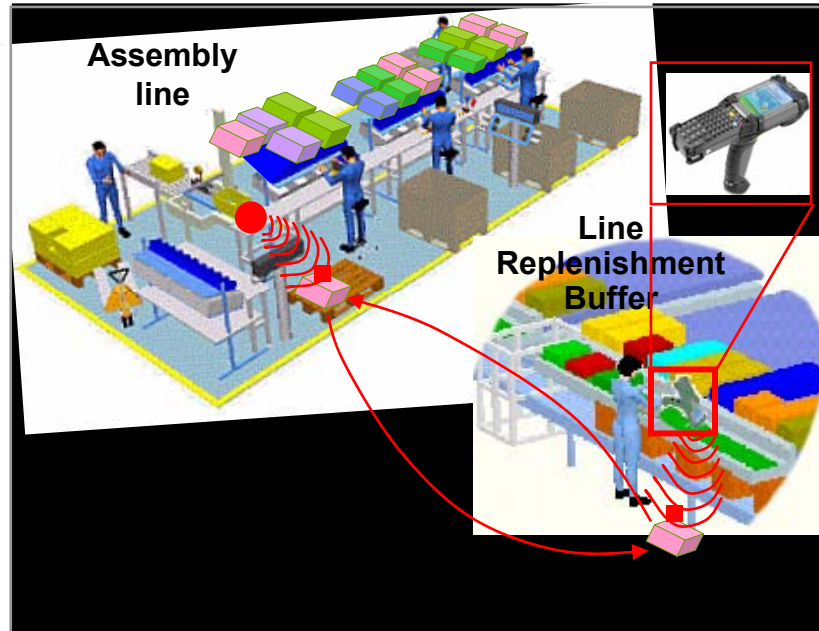
Inventory Management - opportunities and benefits

Inventory Management concerns the process of replenishing materials to effectively feed manufacturing production processes and to keep visibility and control of the finished or semifinished goods inventory.

RFID opportunities	Main Benefits
Replenishment Signaling	<ul style="list-style-type: none">▪ Ensures accurate replenishment▪ Decreases or eliminates down time▪ Supports direct replenishment communication▪ Improves work cell efficiency▪ Increases on-time delivery▪ Reduces throughput time▪ Reduces work in progress and inventory▪ Labor and paper work reduction in providing parts to the assembly line in the requested sequence▪ Fewer missing parts▪ Improved service levels▪ Reduced labor in retrieving production batches▪ Fewer missing vehicles▪ Labor & paperwork reduction (automatic yard transactions)
Parts sequencing	
Production batch localization	
Yard Management	

Inventory Management - high level use cases

Replenishment Signaling



High level use case

- RFID tag is attached to each material container reporting part number ID and container quantity
- When a container is empty, the operator place it in a specific place near his workstation
- An RFID reader detects container consumption and writes on the tag a time stamp and the workstation
- An operator collects empty containers and through an handheld RFID reader knows part numbers, quantities and workstation to be replenished

Business Requirements

- **Environment:** Assembly line with materials at the point of use and continuous replenishment system with a replenishment storage buffer
- **Requirements:** Automatically detect consumption and trigger replenishment at the point of use

Benefits

- Ensures accurate replenishment
- Decreases or eliminates down time
- Supports direct replenishment communication
- Improves work cell efficiency
- Increases on-time delivery

Components

- RFID tag: usually rewriteable
- RFID antennas (near one or more workstations):
 - transit gate,
 - fixed position tag and antenna
- RFID handheld reader: shows the part number ID, quantity, container type and workstation to be replenished.

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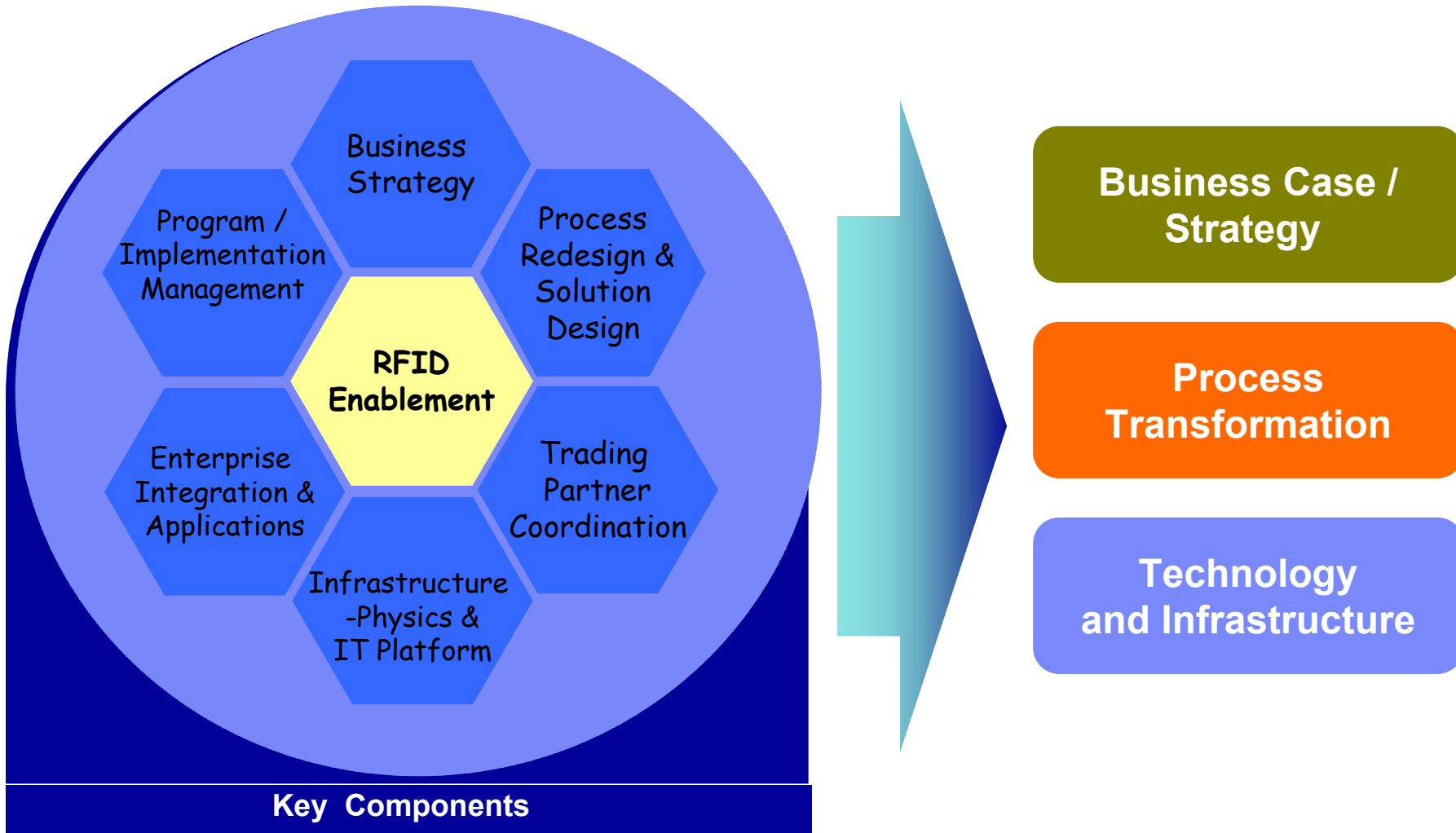


IBM Recognized the Value of RFID Early On, and Committed to Supporting the Industry

- IBM Research is an RFID technology pioneer
- Member of EPCglobal™
- IBM is a community leader:
 - Began with Auto-ID Center Technology Board
 - Supporting EPCglobal board and committees
- Facilitator of the “knowledge transfer” process
 - IBM Auto-ID Business Case White Paper Series
 - Global Commerce Initiative (GCI) “EPC Roadmap”
 - Growing a strong partner ecosystem
- Deployment partner for leading industry players:
 - Over 150 RFID engagements
 - Business Case, pilot planning, delivery & management for industry leaders
 - Investing in First Of a Kind (FOAK) technology pilots
- IBM uses RFID in its own semiconductor manufacturing

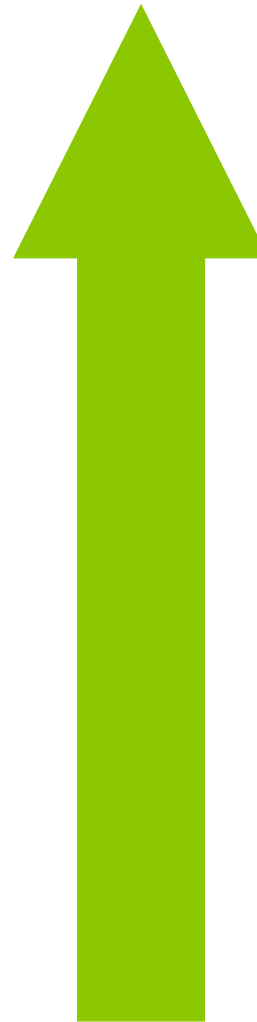


Successful RFID implementations also require many capabilities and 3 critical focus areas



Three Phases For Implementing RFID

- Phase 3: Roll-out RFID Implementation
 - Validate full scale roll-out plan
 - Develop success criteria and metrics
 - Roll-out implementation
 - Track and evaluate performance metrics
 - Realize benefits
- Phase 2: Launch RFID Trial/Pilot
 - Conduct vendor selection
 - Develop trial/pilot success criteria and metrics
 - Launch trial/pilot
 - Track and evaluate performance metrics
 - Design full scale implementation program
- Phase 1: Develop RFID Value Assessment & Implementation Plan
 - Define strategic alternatives
 - Develop benefit/cost model
 - Drive stakeholder validation
 - Develop an implementation and pilot plan



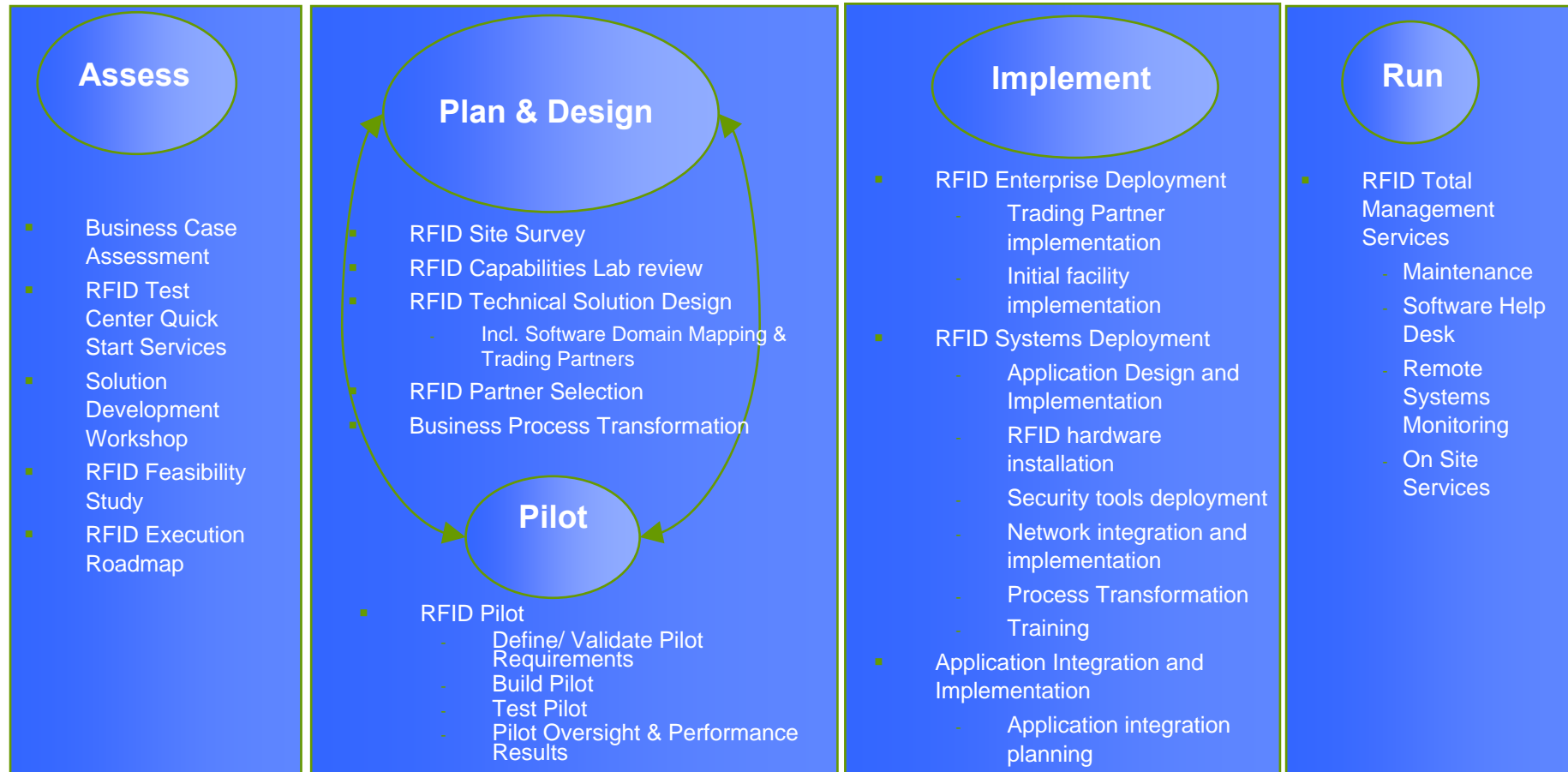
Roll-out structured to achieve maximum ROI

Trial/pilot validates value proposition and technology

Determine ROI potential and prepare implementation plan accordingly

IBMs RFID Offerings to Support Multiple Customer Needs

Integrated and Concurrent Work Streams to Accelerate Readiness



IBM RFID Centers of Excellence

Helping clients understand RFID -- from physics through business value – and implement industry specific RFID solutions.



La Gaude, France



Dublin, Ireland



Raleigh, NC USA



São Paulo, Brazil



Dallas, TX USA



Yamato, Japan



Bethesda, MD USA



Markham, Canada

Thank You!

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