

Learnings from the BRIDGE project



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Based on an original presentation material by **Mark Harrison**



Building Radio frequency Identification solutions for the Global Environment

Content

I. BRIDGE description

II. Areas of development

III. Pilots

IV. Contributions

BRIDGE

Building Radio-frequency Identification solutions for the Global Environment

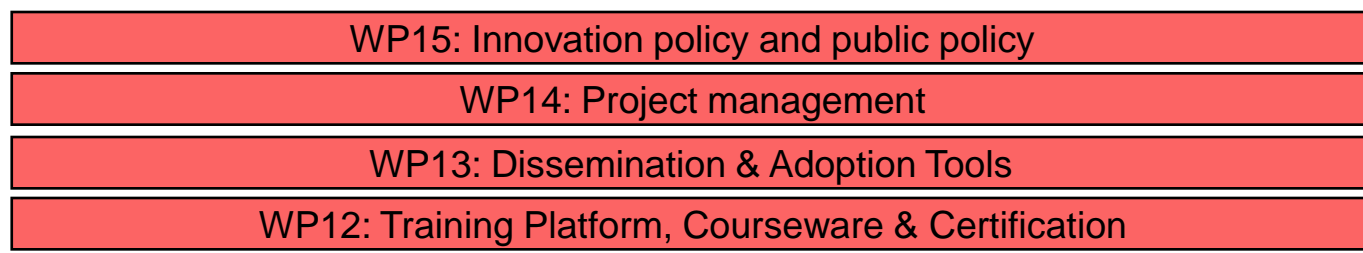
- 3 year integrated project in FP6
- 1st July 2006 - 31st August 2009
- 31 Partners
- 15 work packages
- Total budget: €13 million
- European Union funding: € 7.5 million

BRIDGE Partners

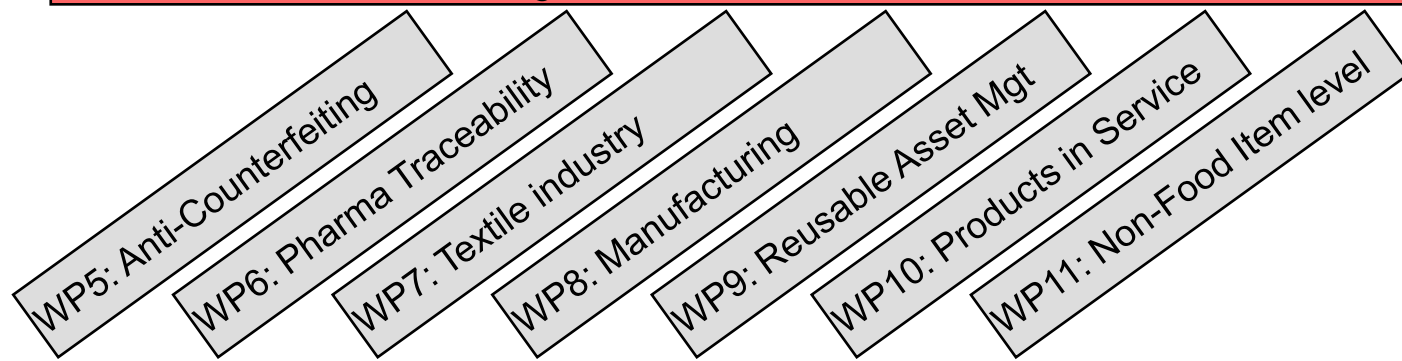
GS1	Labs/ Universities	End users	Solution Providers
Global Office (Co ordinator) China France Germany Poland Spain UK	Cambridge ETH Zürich Fudan TUG Graz UPC Barcelona	Bénédicte Carrefour gardeur Kaufhof Nestlé UK Northland Sony COVAP	AIDA Centre AT4 wireless BT CAEN Confidex Domino JJ Associates Melior SAP UPM Raflatac Verisign UK
7	5	8	11

BRIDGE structure

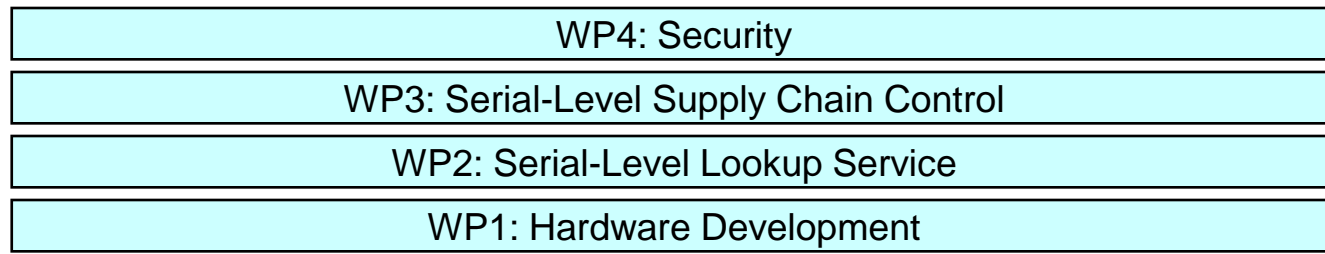
Horizontal
Activities



Business
Development



Technical
Development



Hardware R&D

- low-cost reader
 - Saving in reader volume: 95%
 - Saving in PCB area: 85%
 - Saving in number components: 65%



Total cost saving: about 75%

- A far field UHF tag prototype
 - Split ring resonator
 - Tested for a read range of 3.1m with a size of 21X31.5mm
- Sensor enabled tag (Gen2)
 - Improving reader performance using phased array antennae
 - Overcome blind spots due to multi-path cancellation
- Smart Object system
 - Integration of RFID and sensor, remote asset monitoring

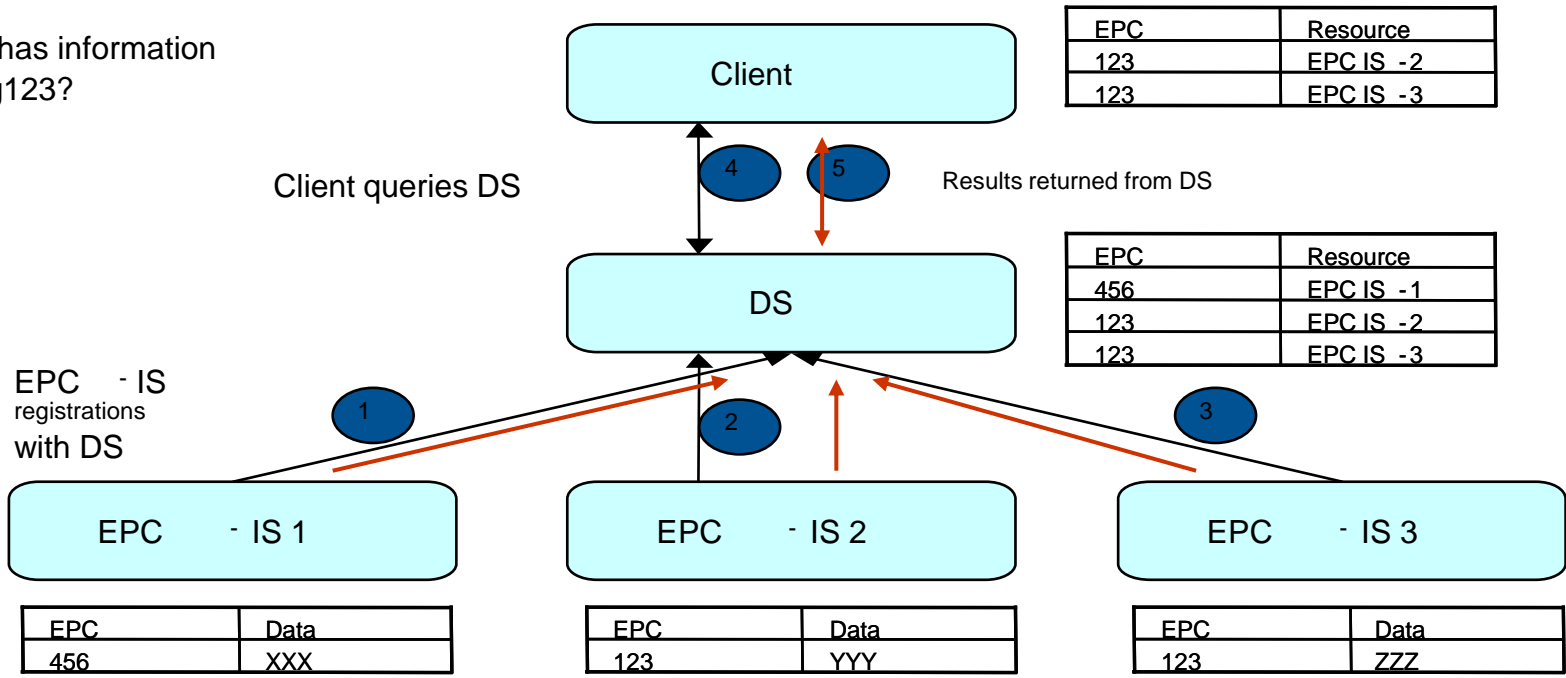


Discovery Services

- Key part of the network architecture
 - Similar to a search engine, but sources publish information about specific objects
 - Query DS with ID or EPC to retrieve list of links
 - Issue: Scalability, performance and security
- Design option analysed
- Implemented within open source software
- Extended with authentication and access control framework
- Directly contributing to Standards
 - IETF and GS1/EPC global
 - User requirements from multiple industry sectors
 - Chartering technical WG by the end of 2009

Discovery Services

Who has information
 ontag123?



Directory of ResourcesModel

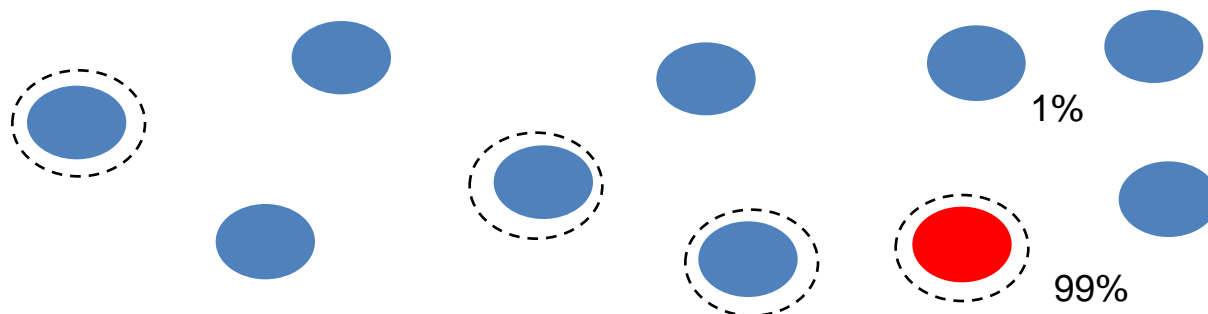
Serial level supply chain control

- Use fine-grained event data from DS to monitor supply chain more efficiently
- Developed track & trace analytics framework
 - Interface with DS to gather events across SC and lifecycle
 - Automatic following containment or aggregation changes
- Graph building
 - Locations, hierarchies and connections
 - Uses probabilistic T&T algorithms (hidden Markov models)
 - Where is now
 - Where will it be
 - Unusual behaviour → deviations, delays
- Contextual models to extend
 - Reusable assets
 - Manufacturing
 - Sensor-based condition monitoring

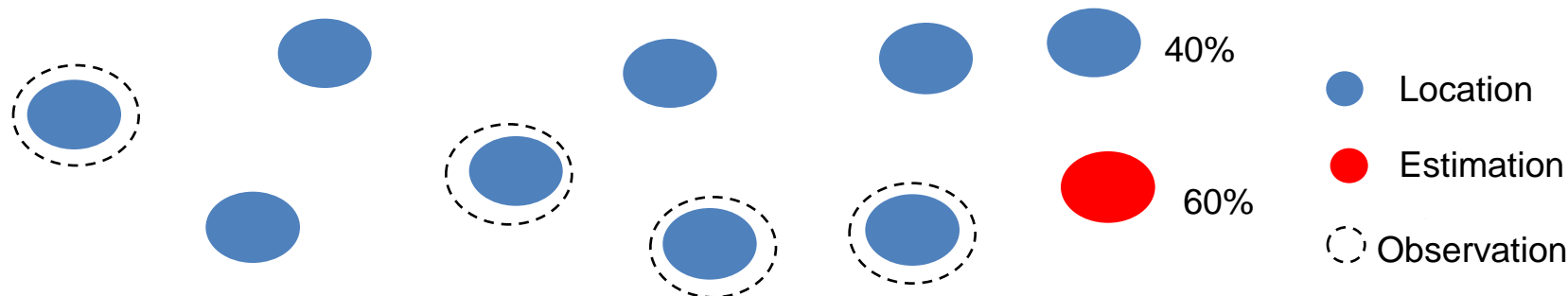
Serial level supply chain control

Probabilistic reasoning enables:

- Filtering: **Where is it now?** Estimate current location given observations so far

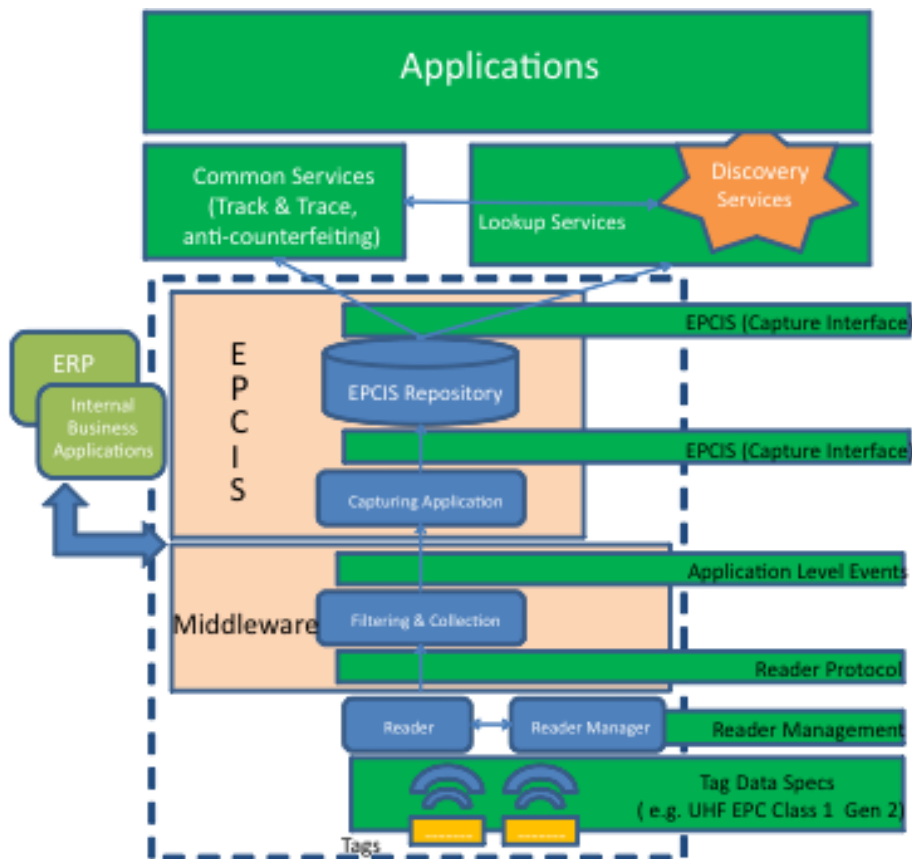


- Prediction: **Where will it be next?** Estimate *future* location given observations so far



Security

Required for RFID and Data Exchange



Collaborative application will not happen unless each party can control the release of sensitive business data

EPCIS / Discovery Services

- Web Service security
- Confidentiality & Integrity
- Authenticated access
- Flexible security policies

Readers/ALE

- Trusted Software Build
- Remote Integrity Checks
- Route enforcement

Tag Security

- Access control
- Authentication
- Manufacturer TID
- Trace information

Generic Capabilities

- Framework for authentication, authorization and flexible access control policies EPCIS and Discovery services
- Information integrity → automated rules

Anti-Counterfeiting

Mission

Build **Product-trace based anti-counterfeiting** solution, using an extended EPCglobal Network Infrastructure.

Application Context

Detection of counterfeit products in **licit distribution channels**.

Goals

- **Increase detection rate** of counterfeits
- Increase counterfeiters' **risk of detection**
- **Lower profit margins** for counterfeiters

Techniques

- Detection of **cloned tags** and **duplicate IDs**
- **Authentication** based on unique tag ID and sync secret approach
- **Flexible rules** approach and **statistical analysis** of T&T data

Business case

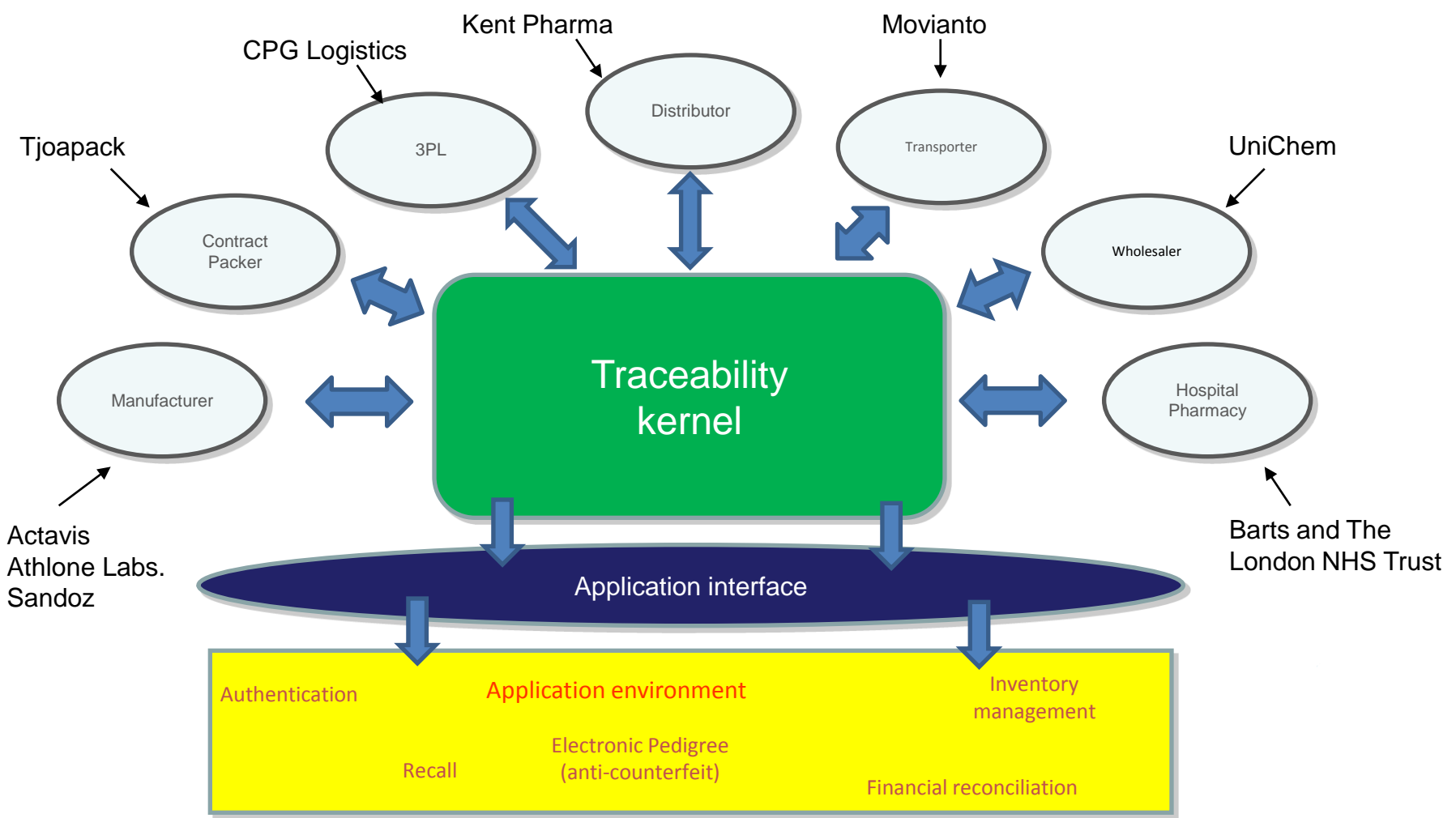
Roadmap and guidelines of **benefits**, choice of **security measure** and **locations of checks**

Pharmaceutical traceability

- Pilot that uses unique ID and EPC network
 - End to end traceability
 - Manufacturers, contract packers, logistic companies, distributors, wholesalers and hospitals and pharmacy
 - Uses EPCIS and DS (Verisign)
- Recorded events
 - RFID and DataMatrix 2-D
 - Changes of aggregation
- Three different supply chains converging at the hospital pharmacy
 - UK
 - Ireland
 - Netherlands

Pharmaceutical traceability

www.bridgewp6.eu



Textile supply chain

- Pilot assessing feasibility to use RFID in clothing sector and developing RFID solutions
- Problem analysis, requirements, business case development, empirical studies and implementation guidelines
- **GaleriaKauhof**: Customer applications: Smart mirrors and fitting rooms
 - Additional info such as sizes, colors, matching accessories and availability
- **Gardeur**: Develop garment report: location and movement
 - Provide greater visibility
- **Northland**: Efficiency of inventory processes
- Challenges
 - High reader density
 - Read-range and reliability
 - Customer acceptance
 - Exception handling (e.g missing tags)


Textile supply chain



www.gardeur.com

gardeur

Ausdrucksstarke 5-Pocket-Jeans aus lässigem Baumwollstretch – Die zieht alle Blicke auf sich! (GJ21N 71497/69)



98% Baumwolle, 2% Lycra
Öko-Tex Standard 100

gardeur WASH-OUT - Spezielle Produktions- und Färbverfahren verleihen dem Produkt seinen einzigartigen Look. Ein individueller Charakter kann sich beim Tragen entwickeln. Unverwechselbar wie ein Daumenabdruck.

Auf diesem Warenträger befinden sich folgende Artikel:

Artikel	Farbe	Größen
5-Pocket Jeans GJ21N 99	schwarz	24, 26, 28, 27, 29, 48, 50, 52, 54, 96, 98
5-Pocket Jeans GJ21N 79	oliv	24, 26, 28, 27, 29, 29, 48, 50, 52, 54, 96, 98, 100
5-Pocket Jeans GJ21N 69	blau dark	25, 26, 27, 28, 29, 48, 50, 52, 54, 98, 102
5-Pocket Jeans GJ21N 29	rotbraun	24, 26, 28, 27, 29, 48, 50, 52, 54, 98, 96, 102
5-Pocket Jeans GJ21N 27	braun	25, 26, 27, 28, 50, 52, 54, 98, 102
5-Pocket Jeans GJ21N 14	stein	24, 26, 28, 27, 29, 48, 50, 52, 54, 96, 98
Baumwollhose GJ18N 28	rotbraun	24, 48, 50, 52, 98, 102
5-Pocket GJ20N 96	anthrazit	25, 27

Ich freu' mich drauf!

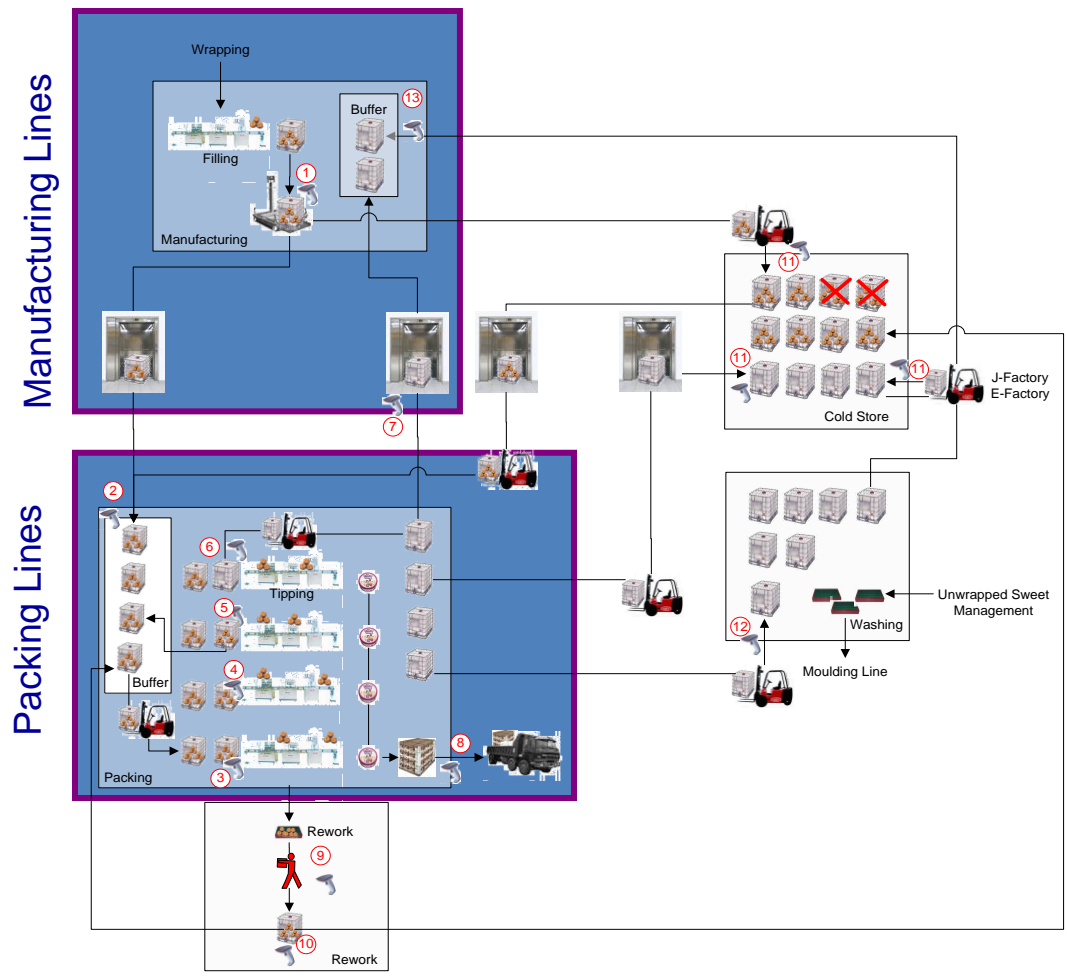
GALERIA
KAUFHOF

Smart Shelves & product information

Manufacturing

- Initial focus on management of intermediate bulk containers (Nestle)
 - Fact moving consumer goods at the WIP stage
 - Improve reliability of traceability using RFID
 - Eliminate manual reads at different locations
 - Reduce amount of scrapped products
 - Identified opportunities for using RFID and EPC for organizations
 - Move to a leaner mode of operation
 - Eliminate unnecessary waste, motion, processing and defects
- Pilot in a Spanish producer of Iberian ham (COVAP)
 - Long lead times
 - Tag hams to be tracked at various stages
 - Increase visibility
 - Eliminate waste
 - Understand connection between production and quality

Manufacturing



Reusable Transport Items

- How can a secure T&T based on EPCglobal standards improve management of RTI between trading partners?
- Market analysis
 - Management models: Pooling and exchange
 - RFID can help in:
 - Reduce overstocks
 - Shortages
 - Reduce size and asset pools
 - Identify where loss or damage is occurring
- Pilot between warehouse and retail store
 - 5 months
 - Over 5000 exchange of pallets
 - Focus on exchange of visibility data and read tag in harsh environments
- Guidelines and recommendations

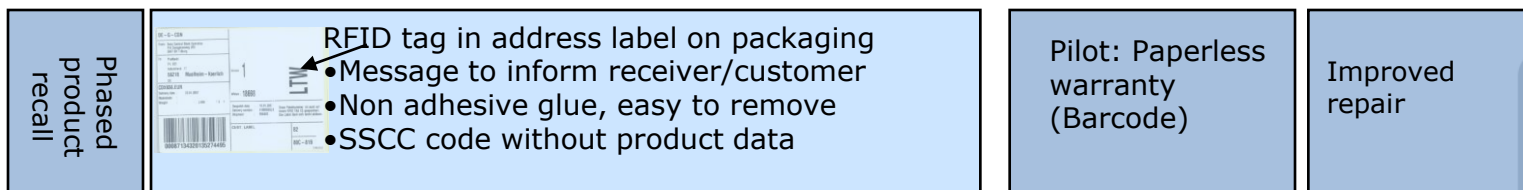


Products in Service

Sony Logistics Europe

- Consumer electronics sector
 - Benefits of RFID not only in SC logistics but also after-sales processes
 - Paperless warranty management
 - Improved repair process
- Use of the Discovery Services prototype from WP2
 - Gain experience
 - Prepare larger roll-out (factories, distribution centres, retailers, service centres and repair centres)
- Phased product recalls
 - Benefit of RFID, enhanced visibility (DS + EPCIS + T&T)
 - Quickly remove dangerous or defective products from supply chain
 - Send advisor notices

WP 10 pilot scope



Item level tagging

Carrefour

- Pilot consisted of 3 phases
 - Tagging of CDs, DVDs and computer games
 - Tagging of clothing and textiles
 - Tagging of books
- Aimed at retail operations
 - Improved customer service
 - In-store replenishment and inventory checking
 - Automatic reconciliation of inbound goods
- Pilot results
 - Improvements in speed and accuracy of receiving goods
 - In-store inventory checks
 - Staff quickly familiarize with RFID equipment
 - Integrated in existing processes where possible

Item level tagging

Carrefour

Shipping
Warehouse



1. Control of cases / pallets sent to the store

Store

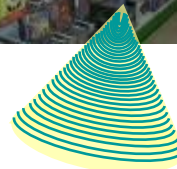
Backroom



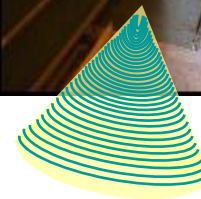
2. Receiving control

3. Inventory and cycle counting
4. Returns management

Sales area



Warehouse
for returns



5. Control of cases / pallets sent by the store

Education, Dissemination, Policy

- Comprehensive training material including e-learning
 - Introductory
 - Advanced technical courses
 - Business oriented courses
- Portable demonstration of the EPCglobal network
 - Interfaced to concept animations in Flash
 - Driven by real data observed from tags
- Economic study
- Awareness tool kit
- Reports
 - Innovation strategy
 - Public policy
 - Data protection

BRIDGE Contributions

Technical Performance

- Read rates & reliability
- Security

Gen2 sensor enabled tags, high-read rate antennae, low cost reader
Secure hardware and network

Data Management

- Find required information
- Manage massive amounts of data

Discovery Services design & prototype
Standardisation for Discovery Services
Track & Trace analytics framework

Applications

- Business case
- Pilots and guidelines

6 pilots:
Anti-counterfeiting, pharma traceability, textile, manufacturing, assets, service, item-level tagging

Education and dissemination

- How does it work?
- What does it mean for me?

Blended learning solution.
Demonstration, Animations,
Virtual and physical road shows
Conferences and workshop support



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www.bridge-project.eu

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