

RFID & Traceability Related Activities in Hitachi

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1. RFID

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RFID

1.1 μ -Chip

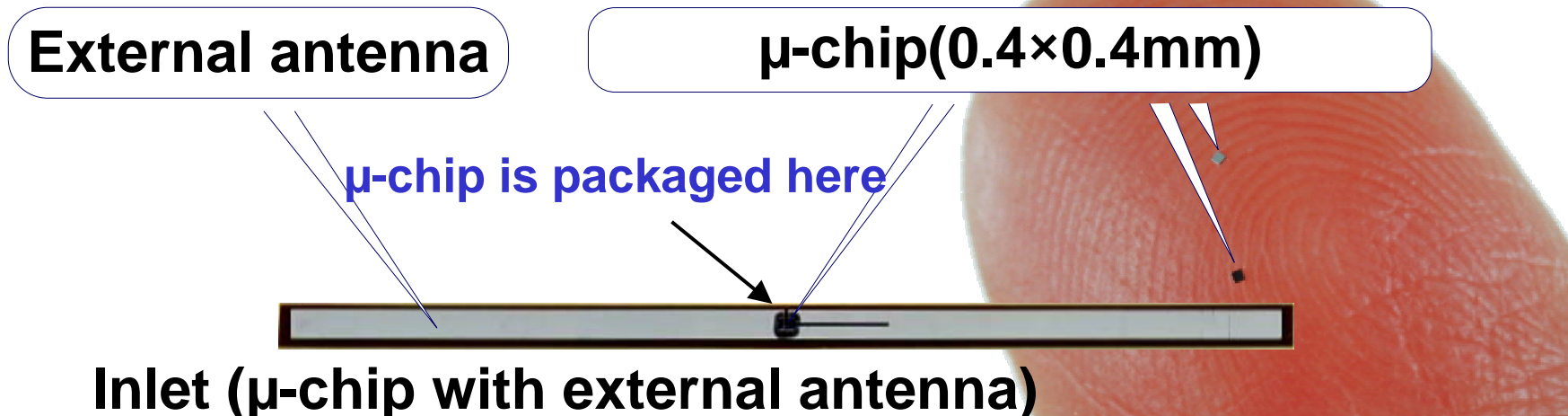
1.2 R&D Project

μ -chip -The World's Smallest RFID chip-

(Original Target : Anti-counterfeit of Banknote /

Directly embedded into Paper media)

- **Basic Features: Read only memory, battery less**
(Chip Size: 0.4mm x 0.4mm)
- **Data Capacity: 128-bits unique ROM-ID (written in product)**
(Low Cost Chip: Network based information management)
- **Maximum Communication Distance: 30cm**
(Radio Frequency: 2.45 GHz)



Relative size comparison

Inlet Sample
13.56MHz
/UHF

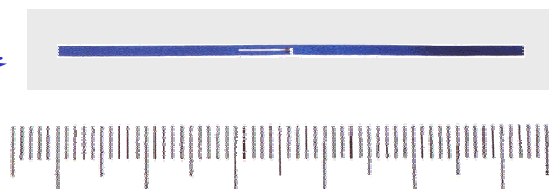
[Sample]



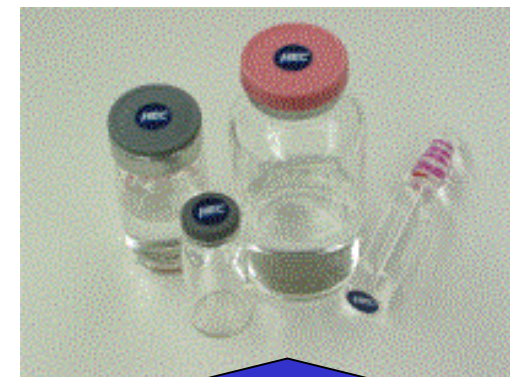
μ -chip Inlet
2.45GHz

[COA Inlet]

COA:Coil on Aluminum



1cm



Small & Thin

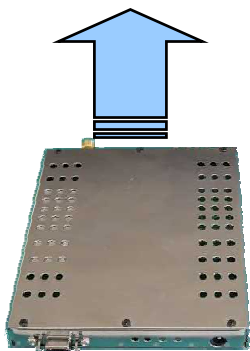
**Feasible to
Twist, Bend...
etc**

New Reader Module



New Reader Module
10*15(mm)

RF functionality
in One Chip



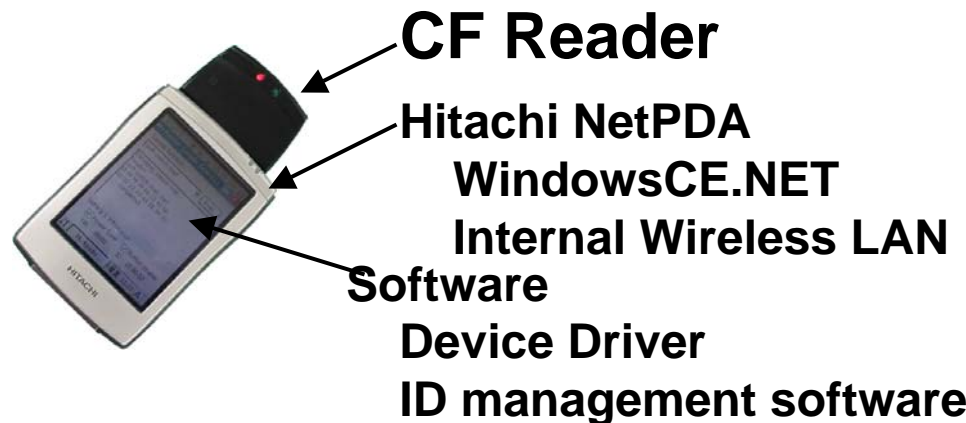
Current Reader Module
78*69*28(mm)

Example of New Reader



CF slot Compatible Reader

MU Prototype
50mW PA + One chip RF circuit
Read Distance 2cm
Hardware/Software trigger switch



CF Reader

Hitachi NetPDA
WindowsCE.NET
Internal Wireless LAN

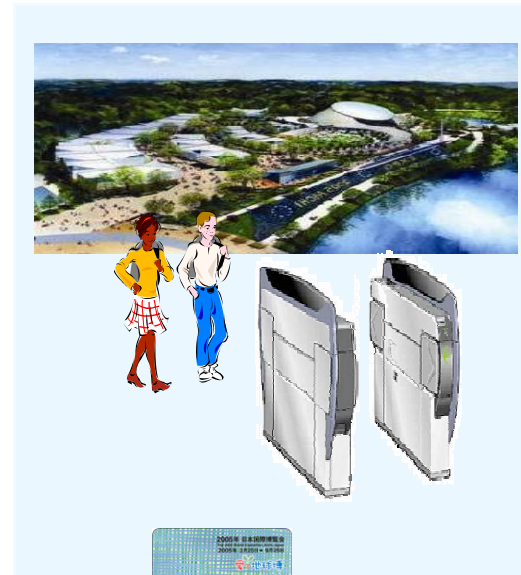
Software
Device Driver
ID management software

- Preliminary Personal Reservation through μ -ID
- Smooth Entry and Exit at the Site
- Prevent Ticket counterfeit

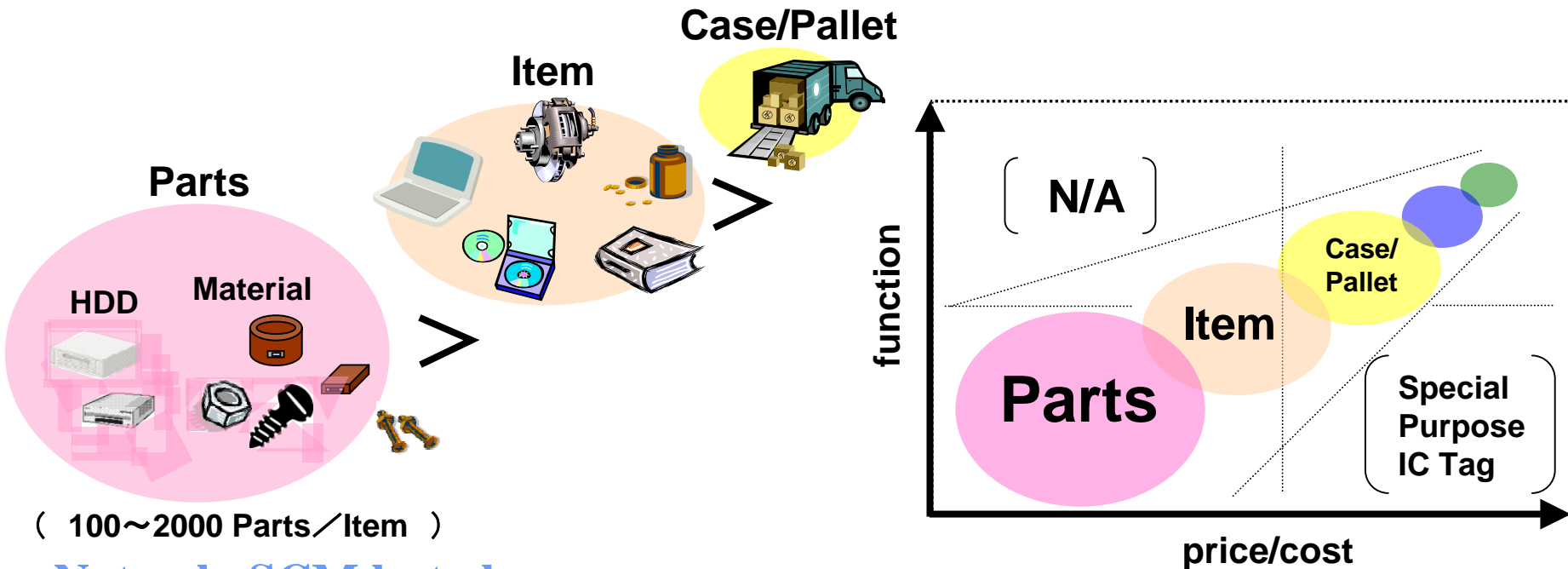
Preliminary Reservation -Pavilion, Events....



Smooth in/out Gate by μ -ID

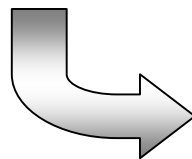


Industries in Japan (or other countries) would like to make high-quality & low cost products using RFID.



- Not only SCM but also . . .
- Parts quality management (TQC)
 - Products / Lifecycle management
 - Ecology management

R&D Project



Low price RFID Tag with fundamental feature is essential for making the market bigger and for its prevalence.

◆ Goal

- Development of **low price IC-tag Inlet technology**
- Ramp-up of **stable volume production**
- Establishment of **global standard for SCM**

◆ Scope(2 years later)

- Start up and drive the IC-tag into the market
- 5-yen/inlet, 100Munit/month
- Establishment of interoperability to international standard
- Stable supply to the market

◆ Period

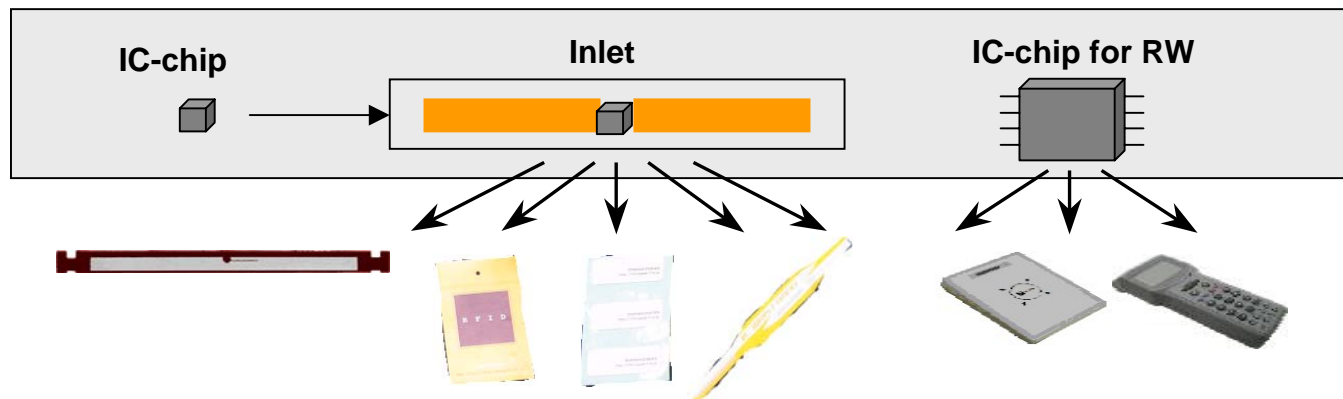
- 2004/8 – 2006/7

◆ Project leader

- Hitachi Ltd.

1. Technology development relating material, design and manufacturing process to realize for 5 yen Inlet*1.

*1: Inlet = IC-Chip + Antenna + Substrate



2. Air Protocol

- Frequency: UHF(860~960MHz)
- Achieve interoperability with forthcoming international standards

3. Target specifications

- memory size: 512bit
- Re-writable
- Reading speed: 10ms/unique ID and faster
- Read range: 3m+, Write range: 1m +

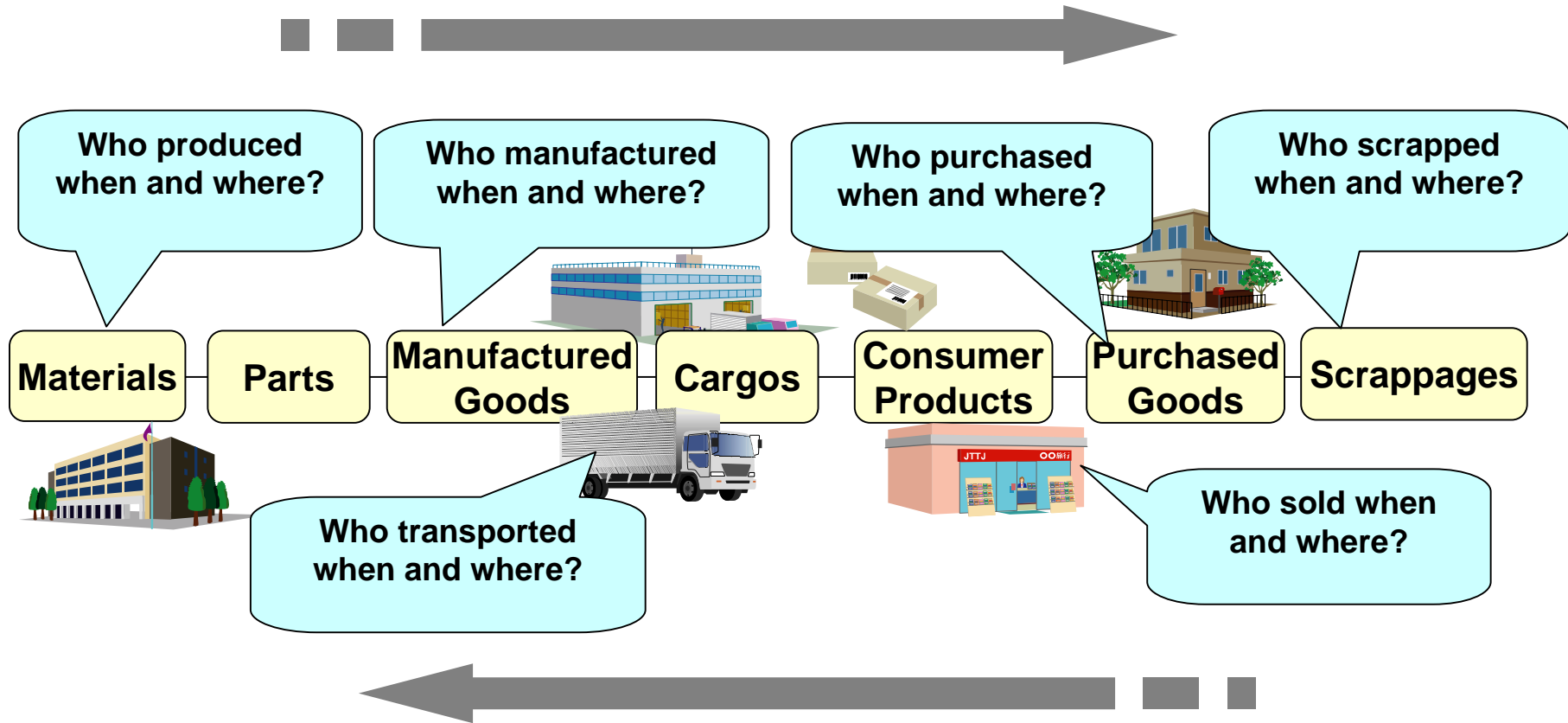
*The specification above may be changed according to the definition progress of international standards, and the radio regulations.

2

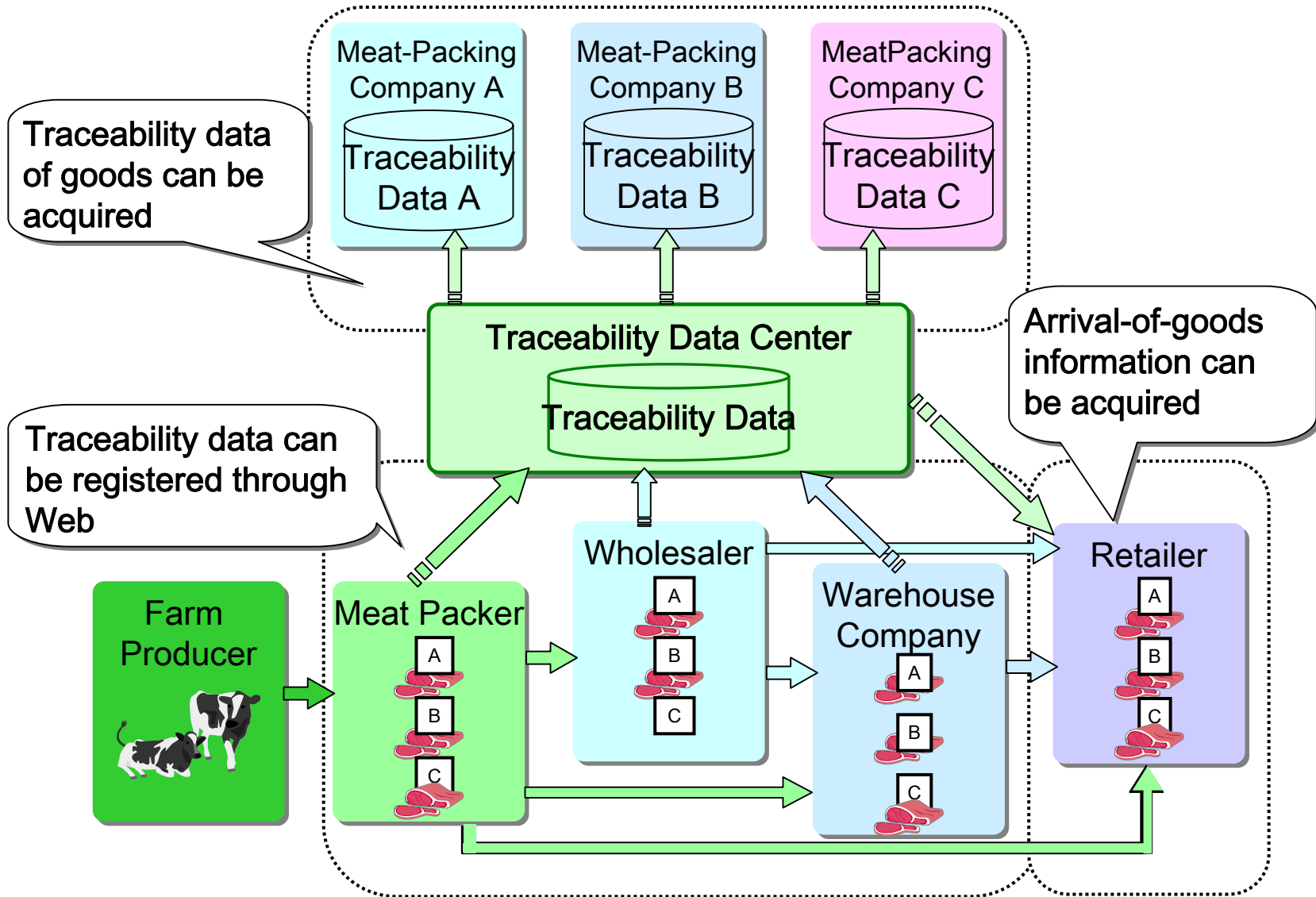
Traceability Systems

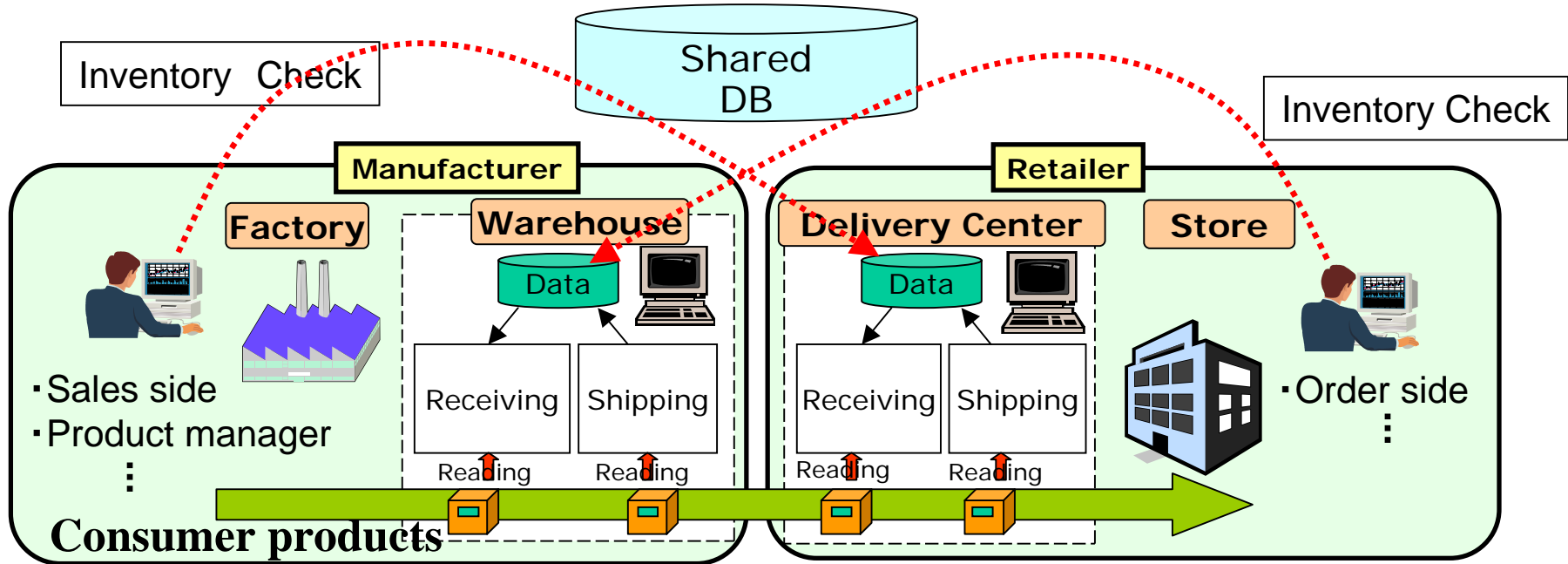
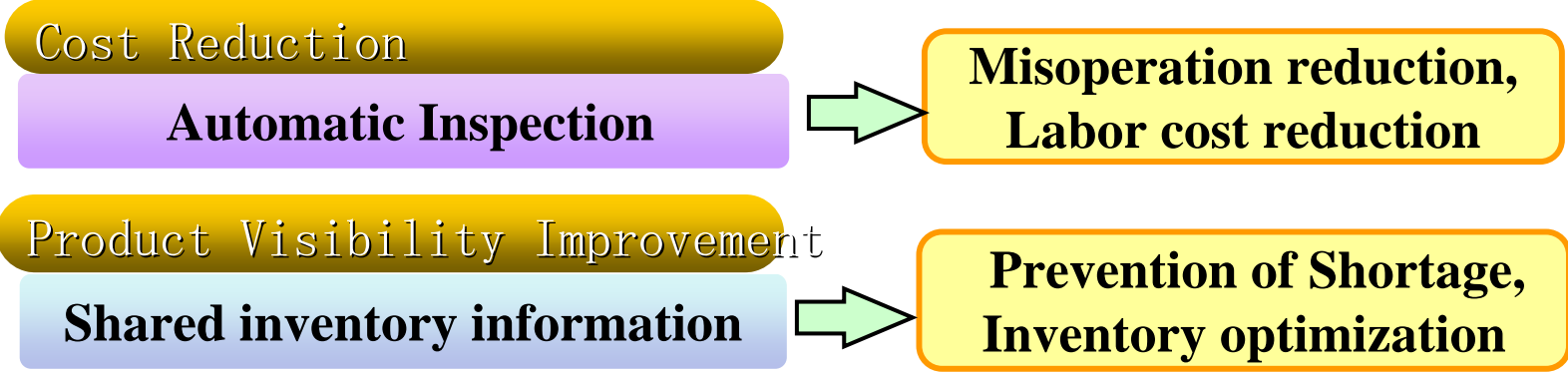
- Trace back operation for compliance
- Trace forward operation for more effective supply chain management

Trace Forward

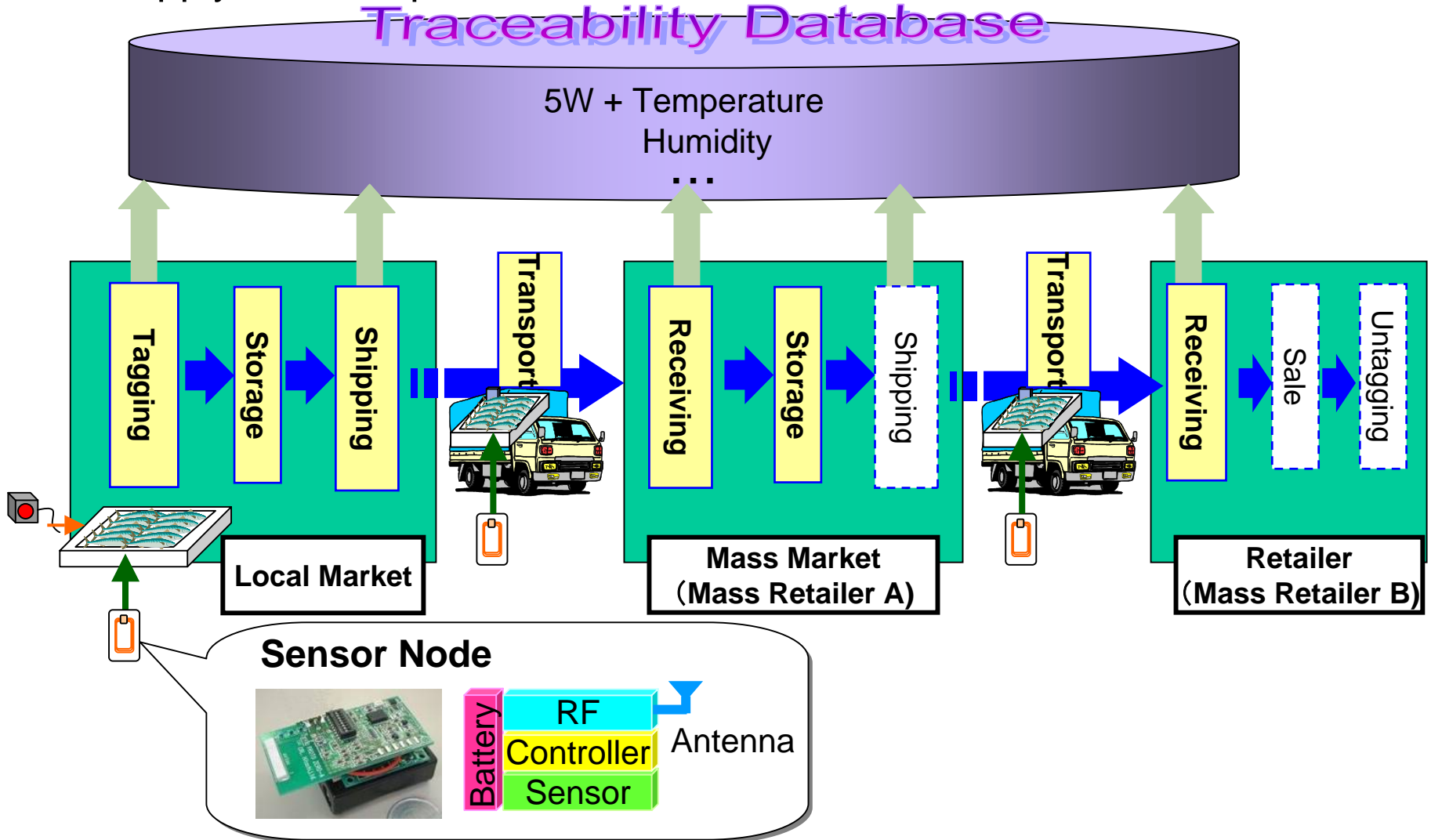


Trace Back





- Combination of RFID and sensor nodes brings about more accurate supply chain inspection and control



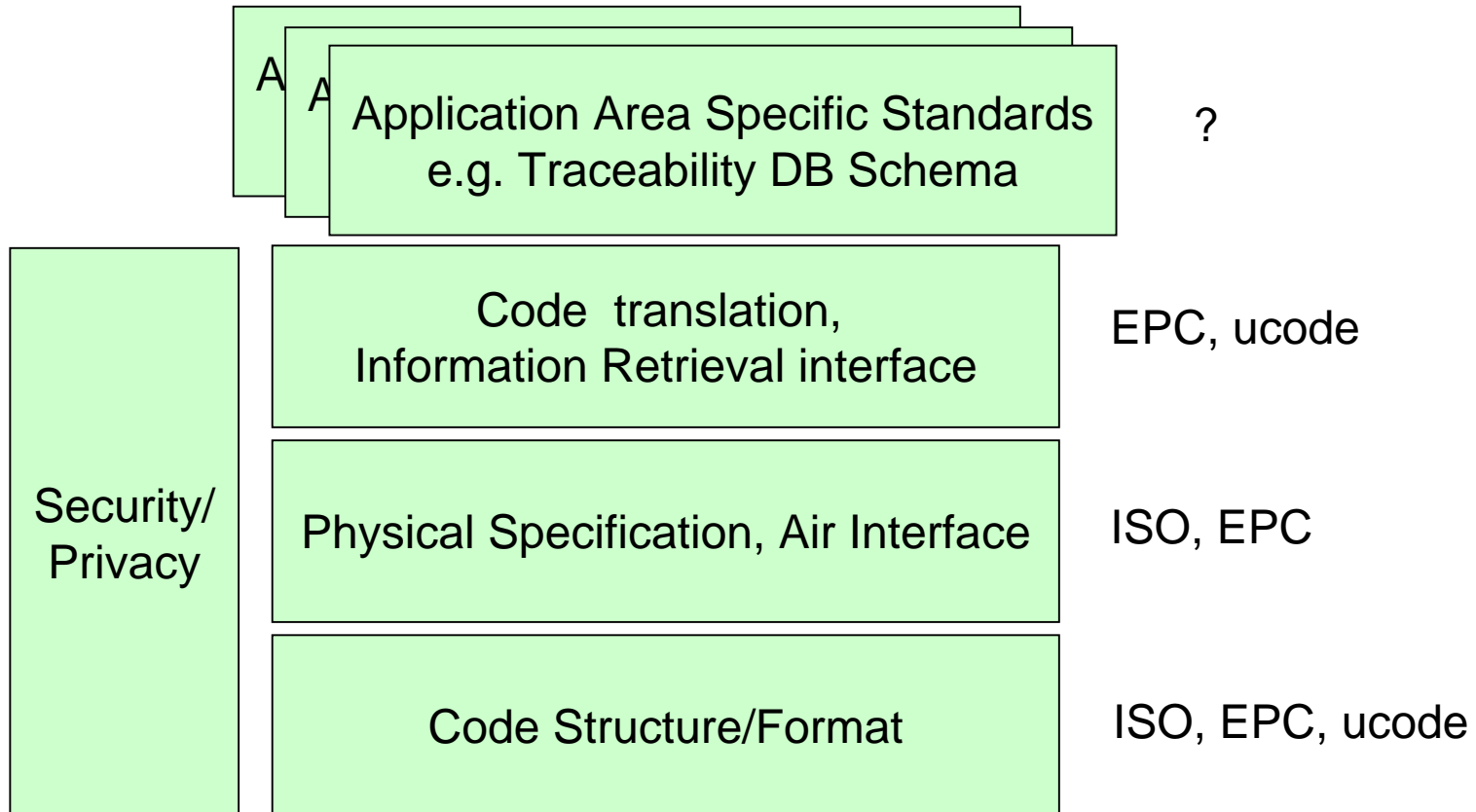
Many industry has raised their hands up to do the RFID testing, assuming they will adopt the system within a few years of time.

1. Agricultural track and trace of beef meat origin
2. Track and traceability tests based on process food supply chain
3. Pharmaceutical testing focused on infectious disease
4. Book retail market established consortium including publishers, wholesaler, retailer and second hand book store
5. Home appliance manufacturing process and SCM
6. Construct machinery tagging for real time spot location
7. Rental CD/DVD tagging
8. Apparel tagging for shoes and clothing inside department store

3

Standardization Efforts

- Low level interfaces are being standardized in a number of bodies.
- ITU-T SG chairmen's meeting agreed that networking aspects of RFIDs should be high priority topic for ITU-T. (TD44 of last TSAG meeting)
- Standardization at Application/data level will become necessary as the use of RFID gets widespread.



Thank you

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