Intelligent Products

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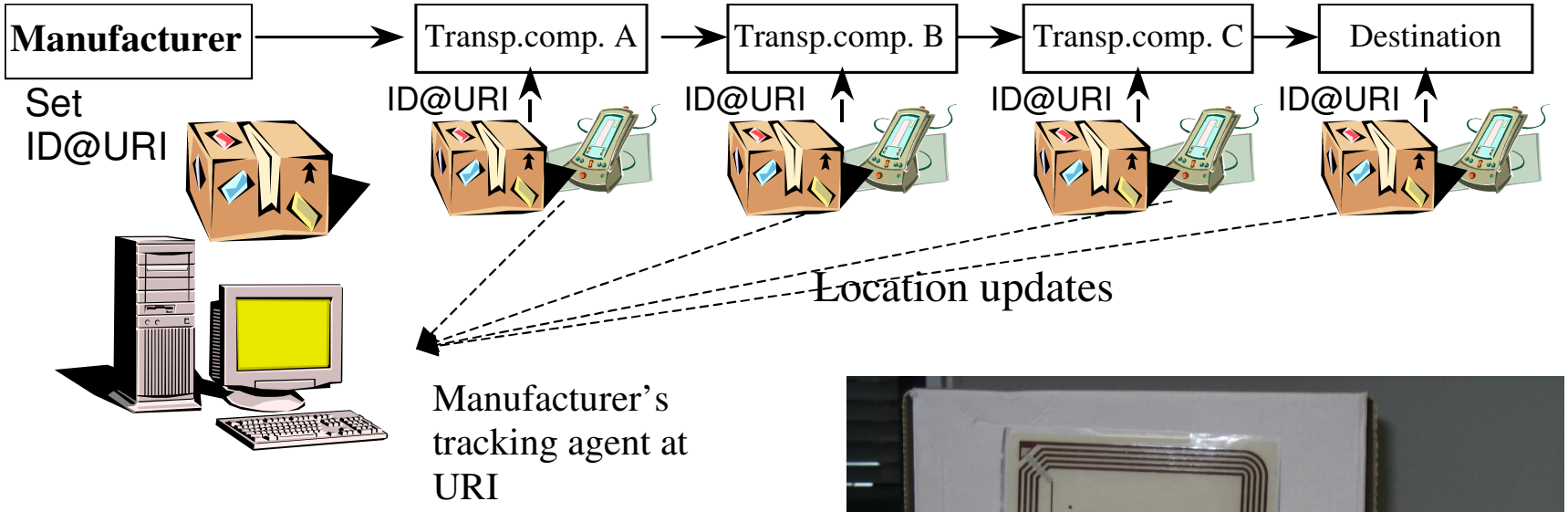
Tracking with ID@URI



Industrial pilots performed 2002, 2003 in multi-organisational and international context

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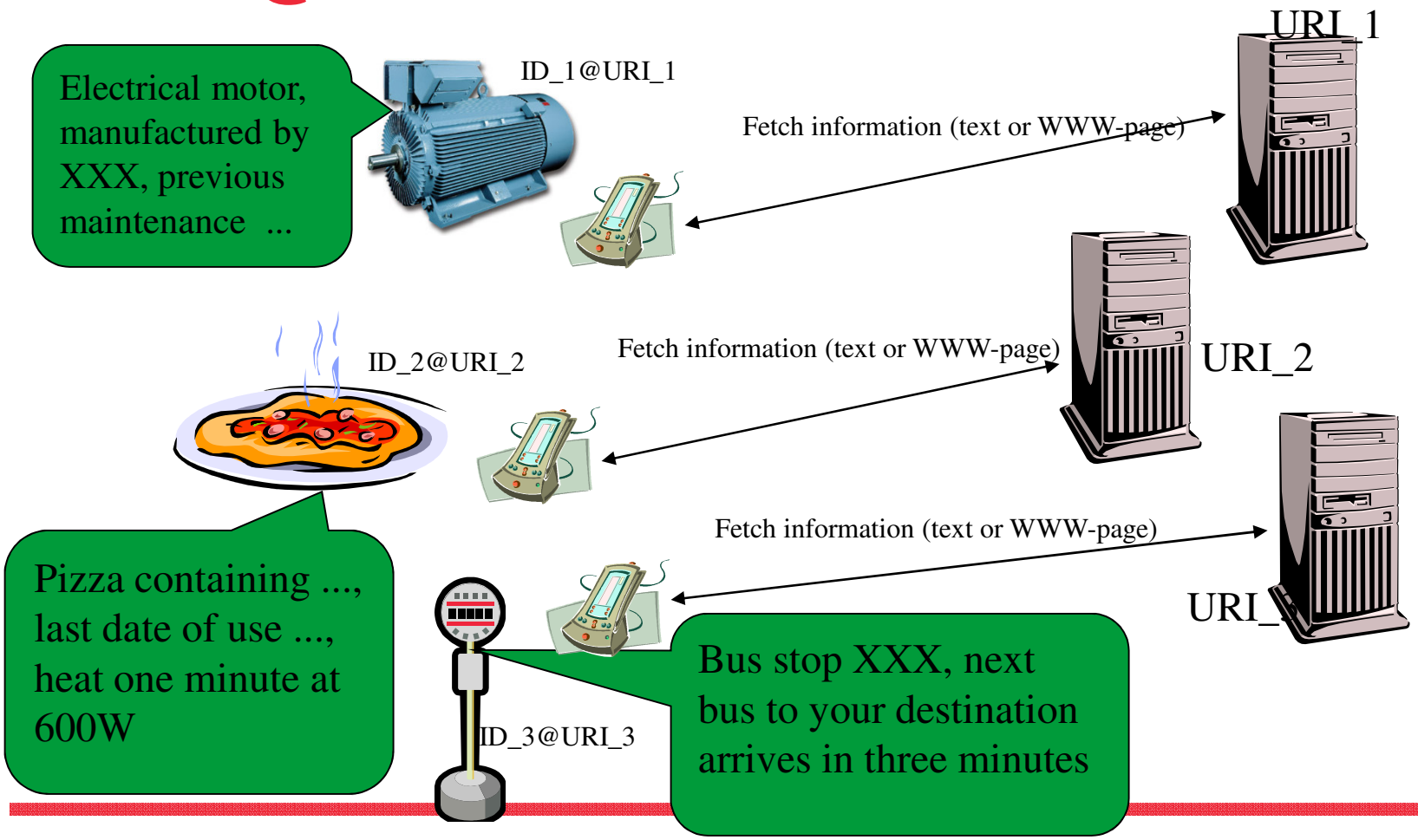
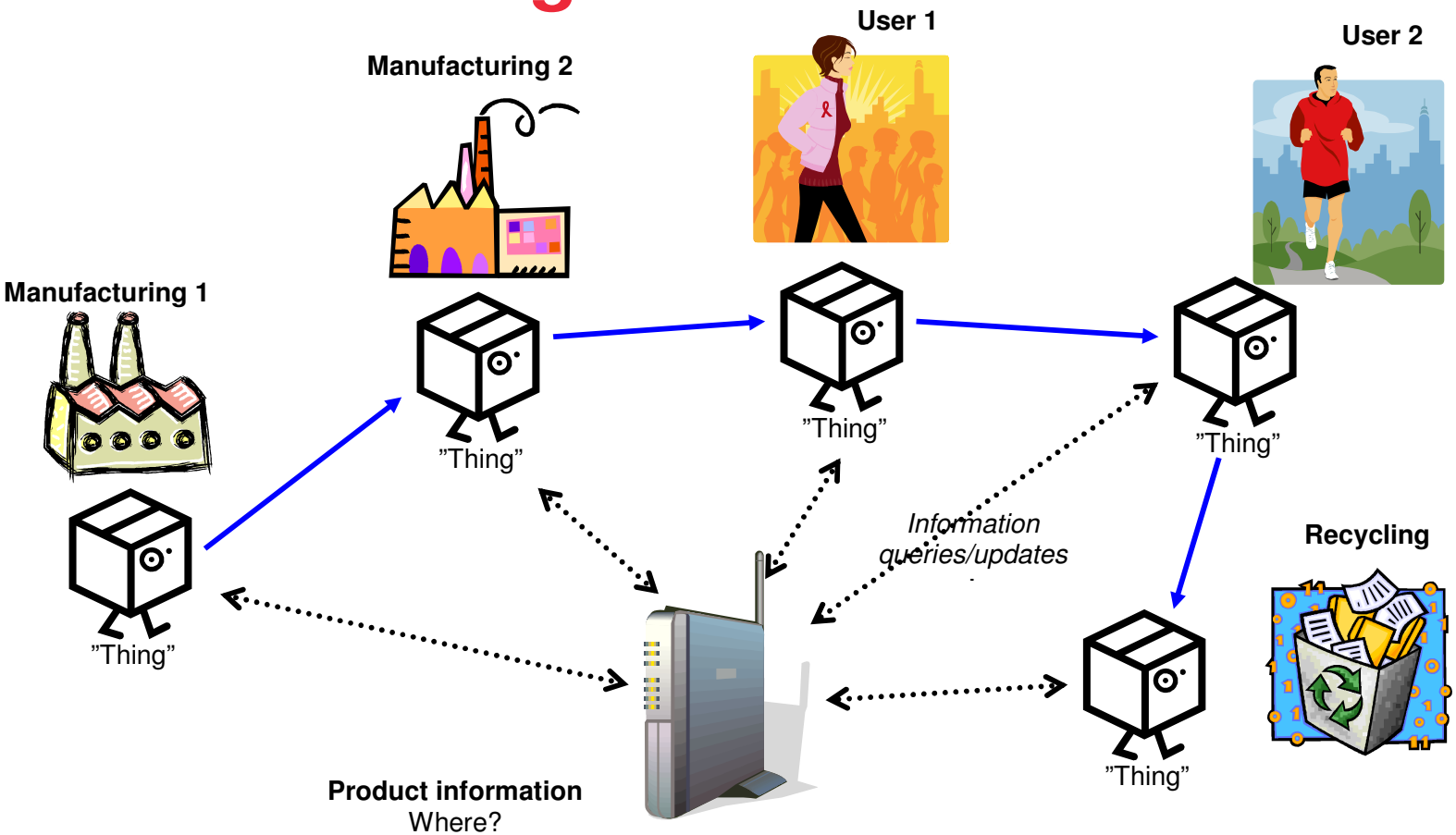
School of Science and Technology

BIT RESEARCH CENTRE

Accessing product information with ID@URI

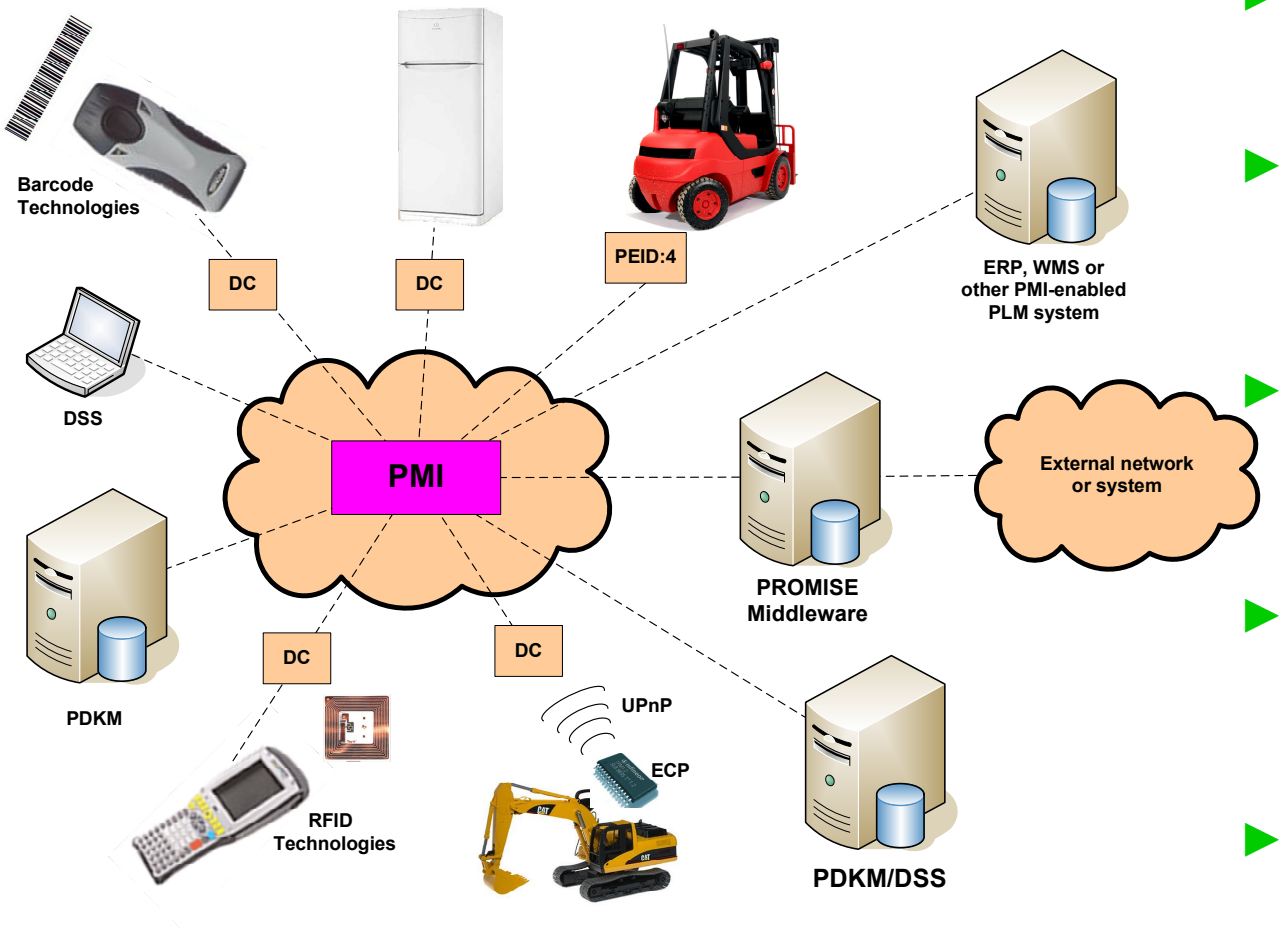


Internet of Things?



- Not only Supply Chain Management
- Not only RFID

PROMISE connectivity



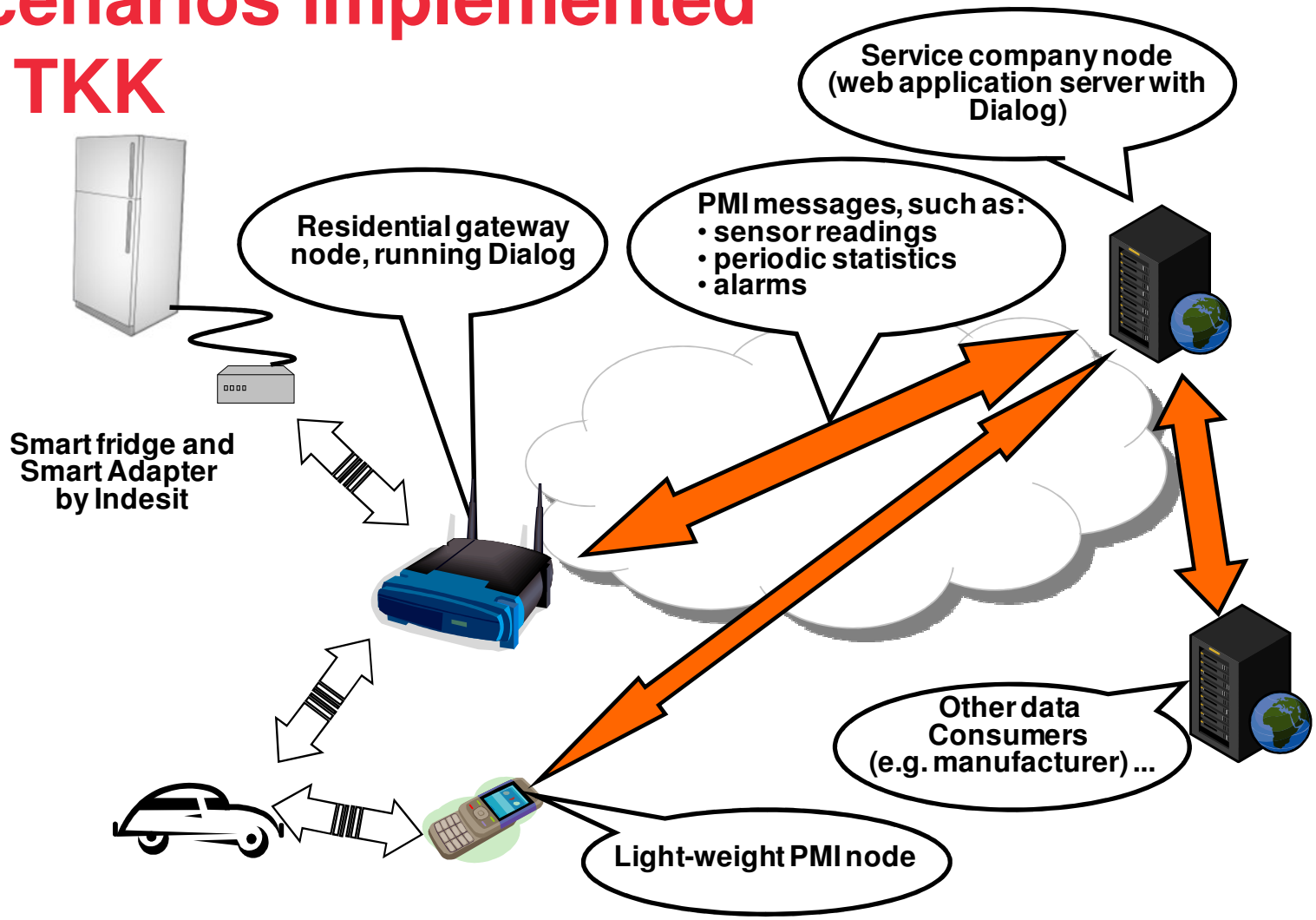
- PROMISE Messaging Interface (PMI) for inter-system communication
- PMI can be implemented by devices directly or through a PMI-compliant middleware
- Device Controllers (DC) communicate with devices that cannot implement PMI
- UPnP-enabled devices can use PROMISE CorePAC interface for DC
- Other devices can use proprietary DCs

PROMISE Messaging Interface

- Read and write operations supported
- Subscriptions are used for requesting sensor value feeds, for receiving alarms etc.
- Authorized parties can request each other for information when needed and as long as needed
- Example of a subscription message:

```
<?xml version="1.0" encoding="UTF-8"?>
<pmiEnvelope xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:noNamespaceSchemaLocation="../pmiSchema.xsd"
type="readData" version="0.8">
<readRequest ttl="1000" interval="-1" wsCallBack="http://dialog.hut.fi/pmi/services/pmi" requestTargetType="device">
        <targetDevices>
                <targetDevice>
                        <ids>
                                <id>Refrigerator_001</id>
                        </ids>
                        <infoItems>
                                <infoItem>
                                        <id>freezerDoorWarning</id>
                                        <id>powerConsumption</id>
                                </infoItem>
                        </infoItems>
                </targetDevice>
        </targetDevices>
</readRequest>
</pmiEnvelope>
```

Scenarios implemented at TKK



Hardware for connecting to car's Engine Control Unit (ECU)

- "Sufficiently new" car with OBD-II capability

- OBD-II to RS-232 converter

Car demonstration with OBD-II and UPnP/CorePAC

Accessing Engine Control Unit over Bluetooth

Bluetooth connection established

Check Engine status and Diagnostic Trouble Codes fetched

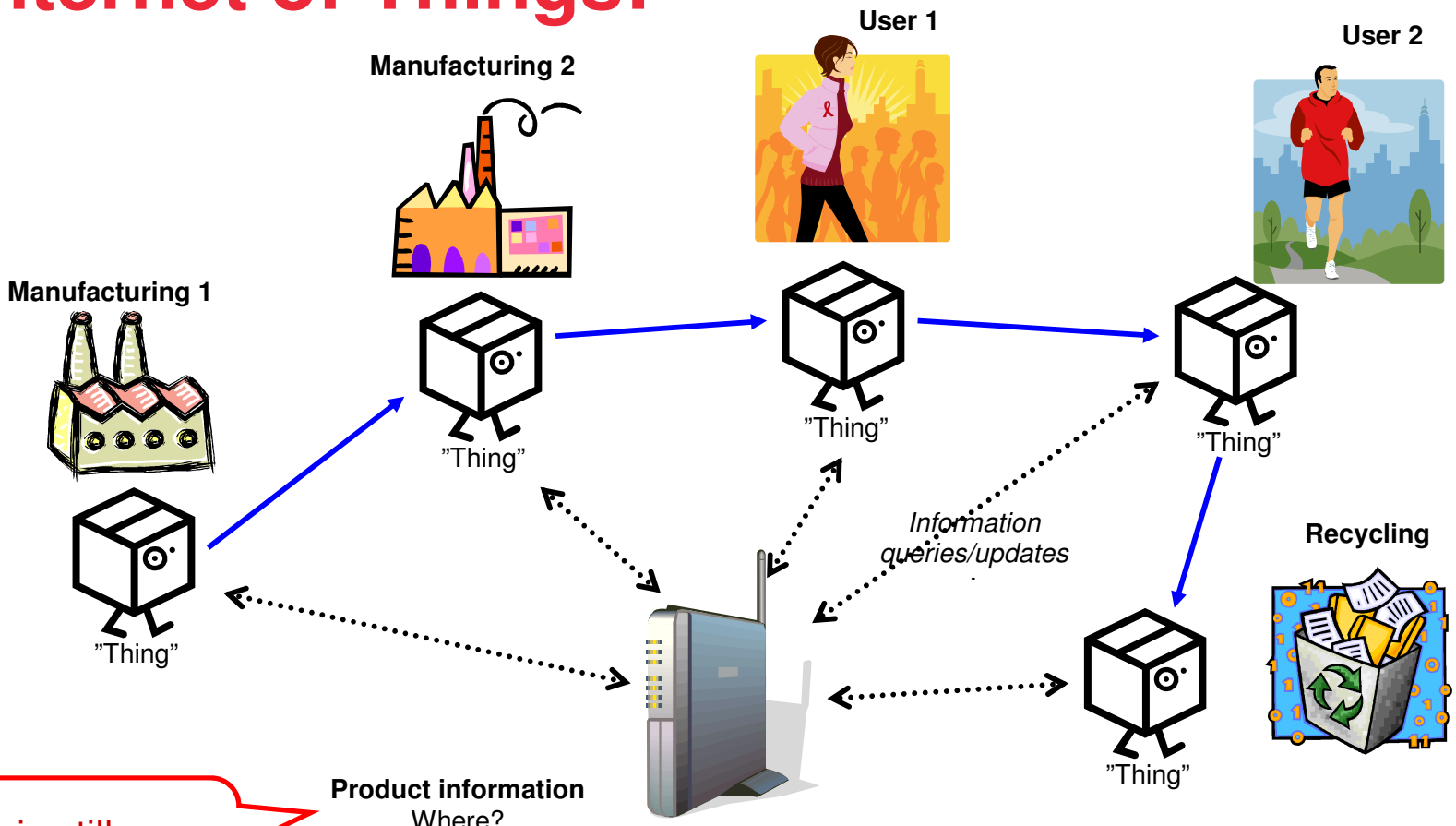
Standard Bluetooth module for wireless connectivity

- All information can be sent to remote nodes over PMI
- Subscriptions for more information could be sent to the mobile phone if needed

”Intelligent” refrigerator


(.avi)

Internet of Things!



This is still partially missing!

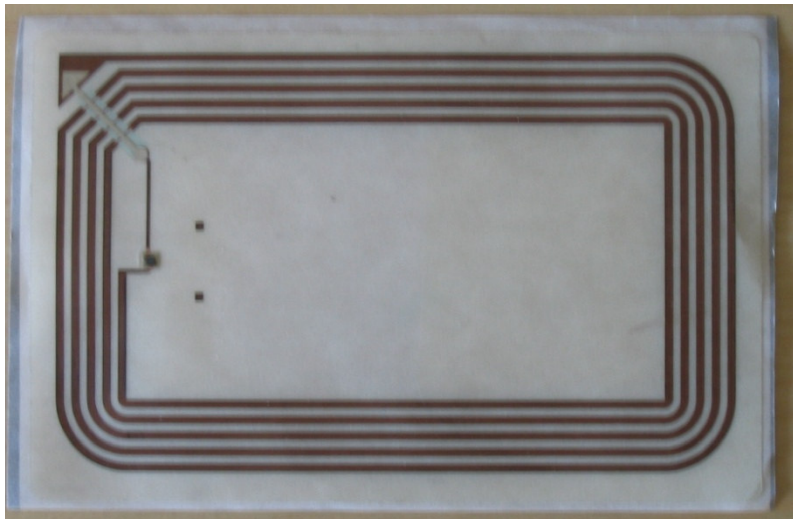
Product information
Where?
In one or many places?

- Whole lifecycle covered
- Any Auto-ID technology, embedded processing supported

Currently ongoing projects

- OptiMach:
  - Vehicle brand-independent Fleet Management
  - (Near) Real-time data acquisition from vehicles: GPS, engine running or not, speed, driving style, ...
  - First pilots up and running with industrial partners
- Building Automation projects:
  - Remote monitoring of buildings (energy consumption, indoor climate, water consumption, ...)
  - Joint control of different building systems
  - User interfaces of many kinds, including Near Field Communication (NFC)
- Use of RFID for SCM of technical wholesalers in Finland
- Under preparation:
  - Use of RFID and information system interoperability in post-disaster management
  - Implementation of Auto-ID ecosystem for tagging-based applications

RFID tag versus Intelligent Product?



Intelligent Product?

or

RFID tag?

➔Should it matter for the Information Architecture?
➔Where does logistics end and PLM start?