



Business from technology

TRACKING GOODS IN REAL TIME

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*Antti Permala, Eetu Pilli-Sihvola, Karri Rantasila &
Johan Scholliers*

VTT Technical Research Centre of Finland

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The Drivers

- The White Paper and several other initiatives have pointed out the need for tracking solutions
- Enhanced visibility enabled by real time tracking improves operational efficiency, for example by
 - preventing out of stock situations,
 - detecting possible deviations,
 - increasing security,
 - reducing inventories and safety lead-times, as well as
 - by increasing delivery accuracy.
- Tracking solutions also enable the provision of value-added services for customers

The Drivers

- Major international express logistics service providers (LSPs) are providing tracking services to customers
- Same demand for service is today spreading to general cargo handling units such as pallets, semi-trailers and containers.
- Companies are demanding improved transparency of orders status, inventory, and shipments across the extended supply chain,
- The transparency is a precondition to adequately managing functions.
- Real-time tracking is related to automated processes and identification technologies (e.g. RFID) that are the enablers of improved visibility

Real time

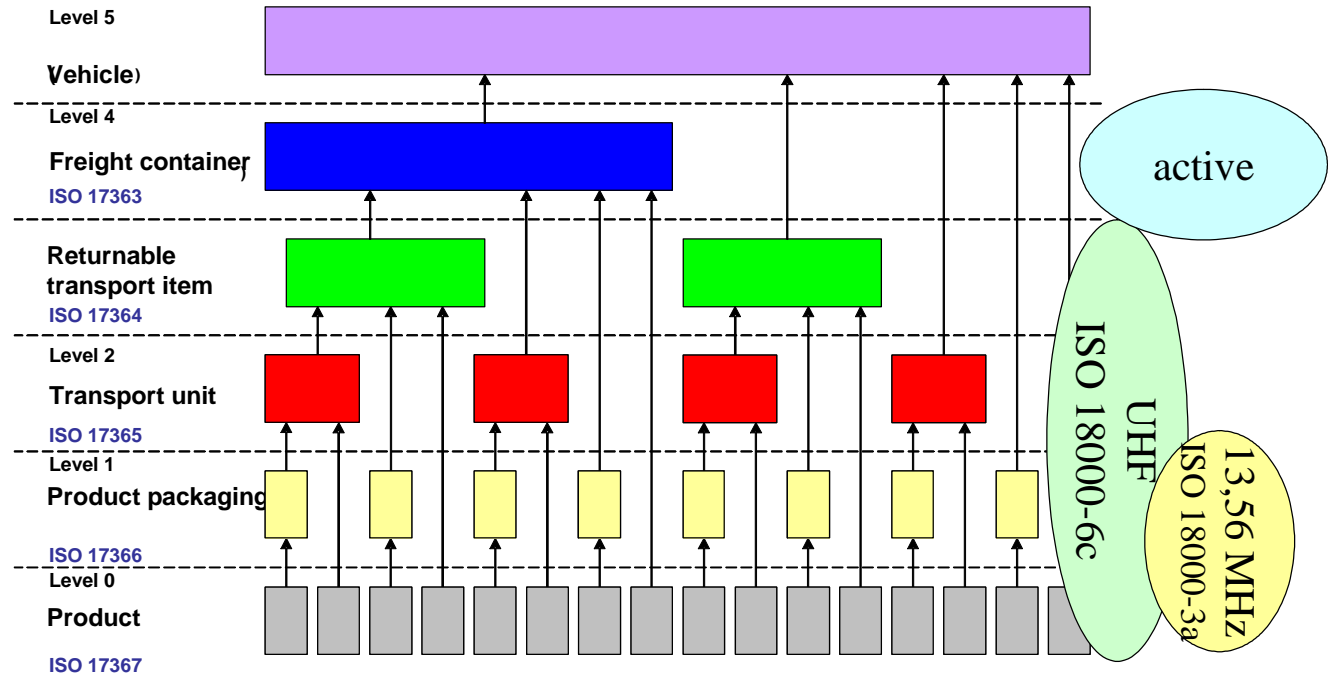
- The definition of the concept “real time” is very context related
- For example in case of security issues, it may be crucial to receive information in minutes.
- In turn of calculating ETA, in global container chains it may be sufficient that information is received within 24 hours.
- This presentation does not take any stand on defining the context of “real time”, but rather presents the current state of tracking

e-Freight solutions

- e-Freight investigates networked and interconnected solutions to be used on cargo units and vehicles / vessels.
- Ubiquitous technologies such as RFIDs and monitoring devices will provide relevant content and information on the shipments at any locations as demonstrated in Euridice, SmartCM, Integrity and Chinos
- e-Freight project will implement a standardised, easy to use mechanism for reporting the status of a shipment utilising 'Internet of Things' capabilities
- The solution is adapting the format for Transport Execution Status developed in Freightwise project and relating it to the information in the Transport Execution Plan

Different levels of tracking

- Vehicle
- Container
- Transport unit
- Product package
- Product.



- For tracking at the different logistic levels, different types of technologies and solutions are specified.



Identification



- Barcode is the most widely used method for the identification of parcel
- RFID is more suitable for automated identification for many different reasons including better readability and better environmental durability
- There is a wide range of different RFID technologies that have varying reading ranges, protocols and data contents
- The technology, which has during the last years received the most attention in logistics solutions, is the passive UHF technology.
- Efficient RFID implementation requires the involvement of all partners in the supply chain and the integration of identification information into companies' information systems.
- Use of RFID for supply chain management is modest today, average 3% in EU27 according to Eurostat



Positioning

- Satellite positioning using GPS is currently most widely used positioning technology
- In future, also other satellite positioning systems can be utilized: Galileo, Glonass, COMPASS
- Other available technologies are network based positioning using cellular or wireless network information
- Indoor positioning, utilized in closed areas where accurate position is needed like in terminals, is an upcoming technology
- Applications like asset tracking and inventory management have successfully employed the indoor positioning, but major problems are caused by the signal strength and reflections
- Hybrid solutions combine the data of two or more independent positioning technologies.



Monitoring technologies



- New disposable electronic seals, which are based on passive UHF RFID technology, have appeared on the market, which allow the use of a much cheaper infrastructure, compared to active electronic seals, and interoperability with other UHF based identification systems.
- The security of freight containers can be enhanced through Container Security Devices (CSDs), which may have the following functionalities:
 - Location measurement (e.g. GPS),
 - door sensor (open or shut),
 - communication (RFID, GSM/GPRS, satellite) and
 - power source (vehicle, battery, solar cells).

ICT and Internet of Things

- The IoT requires that all objects are equipped with some kind of identifying devices, e.g. RFID tags. In order to collect more detailed information, devices can be complemented by different sensors and chips.
- Wireless technologies such as Bluetooth, NFC, and WLAN, as well as accurate location information gained from positioning systems (e.g. GPS) have brought the Internet of Things from the concept stage to the realms of possibility.
- One of the key requirements for the Internet of Things is the utilization of SOA (Service Oriented Architecture) approach. It enables the creation of information systems in a modular way so that communication between different systems and parties is possible through standardized web services.

Example Cases

- METRO Pallet case - food pallets – passive RFID in label
- RFID pallets – Passive RFID in pallet
- Stora Enso SECU – Active RFID
- RFID at item level: Clothing – Passive RFID
- Tracking of perishable goods – Wireless network monitoring temperature
- Tracking of valuable good shipments in multimodal chains –Smart devices like CSDs



Container id tag

CSD device

e-Seal

Tags for logistics applications



Containers

- Freight containers may have 3 different tags:
 - Tag that uniquely identifies the container
 - Tag that permits an automatic interrogation of a container seal
 - Tag including an encrypted manifest of the container's contents.

- Containers; OCR (number), RFID / e-Seal, CSD ...

Conclusions

- The technologies for tracking and tracing exist, but the implementation of the technologies still requires progress.
- Critical points in the processes are linking and synchronisation of data from one logistic level to another
- RFID is an affordable technology which allows to automatically identify goods at critical points of the supply chain, such as warehouse entry and exit
- Partners involved should take the technology in use and transfer the information to the other partners involved.
- Information about the status of goods is transmitted quite well within companies – the future challenge lies in promoting the exchange of information between different parties in the supply chain – the challenge for e-Freight project



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