The Role of New Technology for Logistics Operations

7th of November 2014
Andreas Nettsträter
Current Situation (not only) in Logistics

- Companies request:
  - Individual logistics services
  - Fulfillment of flexible and extensive turn-key 3PL services
  - Support for tailor-made processes and value-added services
  - Transparency of costs and performance

- What companies don’t want
  - Long contract periods
  - High basic investments
Those Requirements are true for both…

ICT

Logistics equipment
IT-Architecture: TODAY
Monolithic Software Blocks
IT-Architecture: TOMORROW
Internet of Services

Logistics Mall
Logistics Mall – Cloud Computing for Logistics

- Virtual marketplace for logistics and IT apps
- The way from application-centric processes (like MES, WMS and ERP) to service-oriented processes
Fields of Innovation

- **Logistics-by-Design (Standards)**
  Standardized structures called *business objects* for the definition and modeling of logistics services and objects
  ➔ Allowing easy integration of business processes and services

- **Logistics-on-Demand (Tools)**
  Cloud-based tools for the integration and development of logistics services
  ➔ Support for the creation of flexible business processes

- **Logistics-as-a-Product (Marketplace)**
  Virtual marketplace for custom-made logistics processes ranging from single services to complete software solutions
  ➔ Logistics processes as tradable goods
Internet of Services - Business Objects

Domain model

- Avis

Business Objects
- Standardized
- Independent from technologies
- Interfaces enabling compatibility for apps

Logistics & IT
- Functional
- Technical

Container
- Gross: 650 kg
- Type: 20 Feet
- ISO 3801
Those Requirements are true for both…

ICT

Logistics equipment
Intelligent Objects - Timeline

2009
Intelligent Bin

2011
DyCoNet

2012
WÜRTH iBin

2013
HMI - Debrunner intelligent Display

2014
HMI - COASTER
Smart Transport Items

- Examples for smart load carrier / smart transport items
  - Inbin, the intelligent bin (Fraunhofer)
    - Saves and communicates information about goods
    - Organizes and controls the material flow
  - IBin, storage solution (Würth)
    - C-part management based on image recognition
    - Kanban: automatic reordering when bin gets empty

Reference: Würth Industrie Service GmbH & Co. KG
Transport Systems Innovations - Timeline

- **2009**: Multishuttle
- **2011**: Multishuttle Move
- **2012**: LOCATIVE
- **2013**: serva transportsystems
- **2014**: RackRacer
Cellular Transport Systems

- Combination of smart transport items and cellular transport systems
- Flexible flow of goods
  - Routes
  - Throughput
- Ad-hoc adaption to changing environments
- (Static) infrastructure-reduced logistics
- Cooperation of men and machine
Cellular Transport Systems
Swarm Intelligence

- Exchanging of sensor information in a mesh network
- Autonomous behaviour detects relevant changes in the environment
- Coordinated, free path planning to reduce waiting time and to guarantee the achievement of transports
- Consideration of mission/transport priorities and vehicle properties
Industrie 4.0: Developments towards Smart Factory

Intelligent Transport Items
→ Sensor intelligence
→ Communicating
→ Energy harvesting

Cellular Transport Systems
→ Autonomous driving
→ Self-controlled behaviour
→ Swarm intelligence

Rack Racer
→ Autonomous vehicle
→ Diagonal movements in the shelf
→ Bionic shape
New ICT and Equipment Technology will enable Logistics Systems which are:

- Scalable (in costs and throughput)
- Flexible (in tasks and usage)
- Adaptable (to changing environments and requirements)
- Ad-hoc useable (without long ramp-up or development times)
- Affordable (even for small enterprises)
THANK YOU FOR YOUR ATTENTION

Andreas Nettsträter