

PROTO-PI

Digital Gateway to the **PHYSICAL INTERNET**

London, 10th of July 2019

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SAVES TIME AND MONEY

Development of an **integrated conceptual framework** for a digital gateway to the Physical Internet

- (1) A larger number of different **transport service providers** must be integrated into an envisaged transport management platform;
- (2) Their **service offerings** must be sensibly segmented according to certain criteria so that they also contribute to higher profitability through more adequate logistics structures;
- (3) The **role of the platform operator** must be defined in such a way that it does not have a negative impact on the actors involved.
- (4) Standardized **returnable transportation items** should be integrated into the concept.

Prototypical implementation of an advanced web-based transportation management platform (“G2PI-platform”)

- by digitalizing the transport management process as far as possible
- and integrating all relevant players in the process (TSPs, HUB-operators, logistical service providers)

Benefit evaluation through use cases of the companies involved in the project

- increasing the shipment size and utilization of truck capacity and therefore generating cost savings
- through **case study simulation** and **prototyping with company partner**

PROJECT TEAM

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REALITY CHECK

OPEN LOGISTICS SYSTEM WITH **INTERCONNECTIVITY** THROUGH ENCAPSULATION

There is **no way to deliver** these 4 items on the same day to the same hospital **with the same truck..**

- even if these items would be ordered from the same supplier for the same delivery date

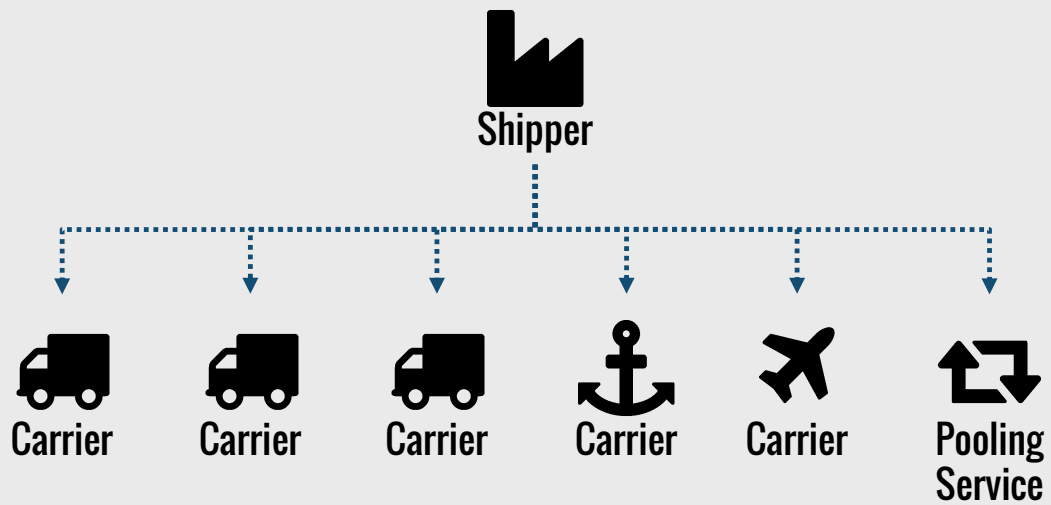


- there are **bans** on loading between certain goods (**medicine/food**);
- specific **temperatures** are required for transport (**chilled/frozen goods**);
- larger devices are usually supplied with a crew of 2 (**technical services**);
- certain goods require a **higher delivery service** or shorter delivery times (**same-day services**).

REALITY CHECK




USE OF TRANSPORT SERVICE PROVIDERS

..this is why companies (as shippers) use a large number of transport/logistical service providers (TSP/LSP)



Typical structure of TSP used enlarges:

- the bigger the company (or the more significant transportation costs)
- and the greater the variety of **services** offered
- the greater the number of transport service providers used.

	 Small Enterprise	 Medium-size Enterprise	 Large Enterprise
parcel service	0-1	1-3	1-5
groupage freight forwarder	1-2	1-5	3-7
FTL carrier	0-3	1-10	5-25

REALITY CHECK MODERN TRANSPORTATION MANAGEMENT SYSTEMS

Starting Point: complete outsourcing of transports through a TMS

- selected examples from the Austrian market



Key Features:

- web-based transportation order allocation
- administration of service provider tariffs
- mobile feedback via app



Key Features:

- digital platform for automating the procurement and delivery process
- transportation and freight price module



Key Features:

- contracting platform for shippers
- connection to a large number of TSPs
- individual services available



Key Features:

- digital trading platform for FTL transports
- truck loads are priced and sold based on algorithms



- in most cases, these TMS are used particularly as **digital purchasing platforms** for transportation services
 - little optimization of the **goods flow** (through bundling)
 - almost no **cooperation** between different TSPs (therefore fewer multimodal transport chains)
 - not designed for **returnable transportation items (RTIs)**

STARTING POINT

TRAFFIC, TRANSPORT AND LOGISTICS SECTOR IN AUSTRIA

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- a highly segmented market

€ 44.1 billion turnover

213,224 annual average number of employees

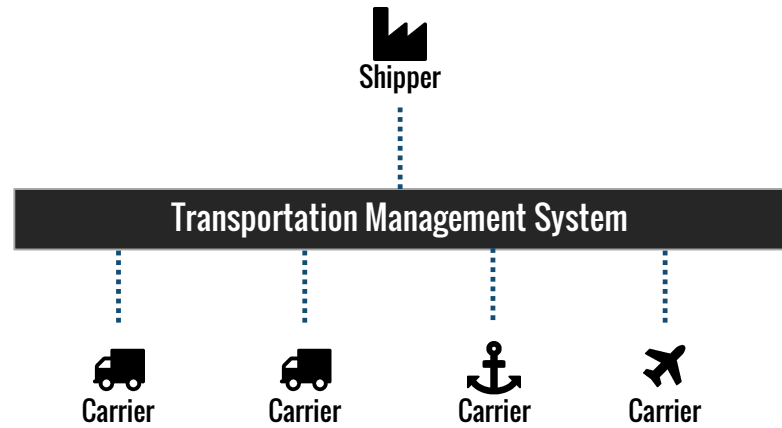
11,082 Enterprises in the freight transport sector

1,645 freight forwarders

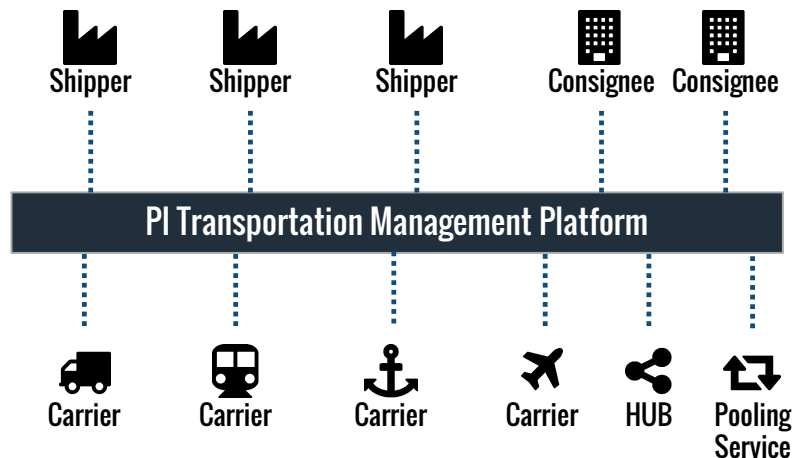
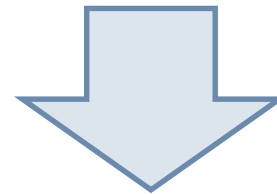
109 railway operators

- with a rather **low level of process digitalization**

CONCEPTUAL FRAMEWORK: FROM THE TRADITIONAL TO OPEN-TMS MODEL



- restricted proprietary **service provider pool**
- static integration of new service providers through **tenders**
- service provider **tariffs** apply only to the individual shipper
- **new service providers** are de facto unknown
- mainly **carriers** are listed
- **transport documents** are not shared



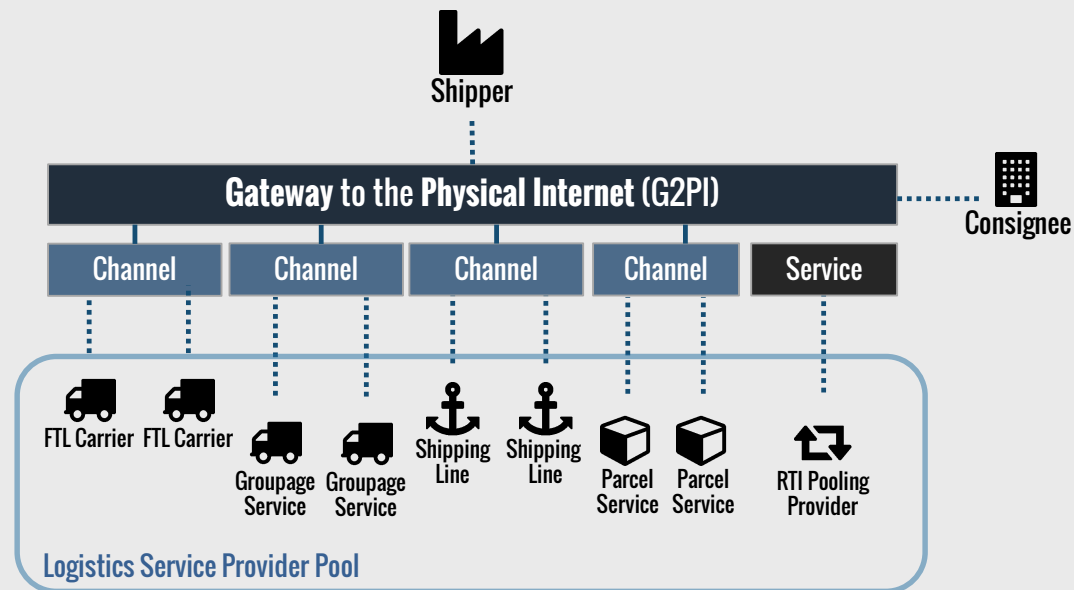
- joint, open pool of **service providers**
- dynamic integration of **new service providers**
- service provider **tariffs** might apply to all shippers
- a **history** is available for each service provider
- neutral **HUB operators** and **pooling services** will be listed
- **transport documents** are **shared**

CONCEPTUAL FRAMEWORK: SYSTEM ARCHITECTURE / BUSINESS MODEL

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Role of the Platform Operator

- is a **neutral** platform provider, financed by a commission rate for each freight assignment and fixed listing fees of the TSP
- manages **channels** and respective TSPs (inviting, qualifying and auditing them = 3-step supplier development)
- offers a variety of additional **services** (reports, analysis, connectivity links,..)



..in this respect, the platform operator acts as a kind of neutral and comprehensive **4PL logistics provider**.

SOLUTION APPROACH: INTRODUCTION OF **TRANSPORTATION CHANNELS**

Definition of a **Transportation Channel**

- PI channels improve **bundling** of mutually compatible goods via an adequate system configuration
- with a concrete **service description** (e.g. temperature-controlled transport of standardized parcels and individual pallets within a country in the next-day logistics network with delivery van with lifting platform).

The Physical Internet thus consists of a **multitude of PI channels** existing side by side, which have the following practical characteristics - **a system of systems (B. Montreuil)**:

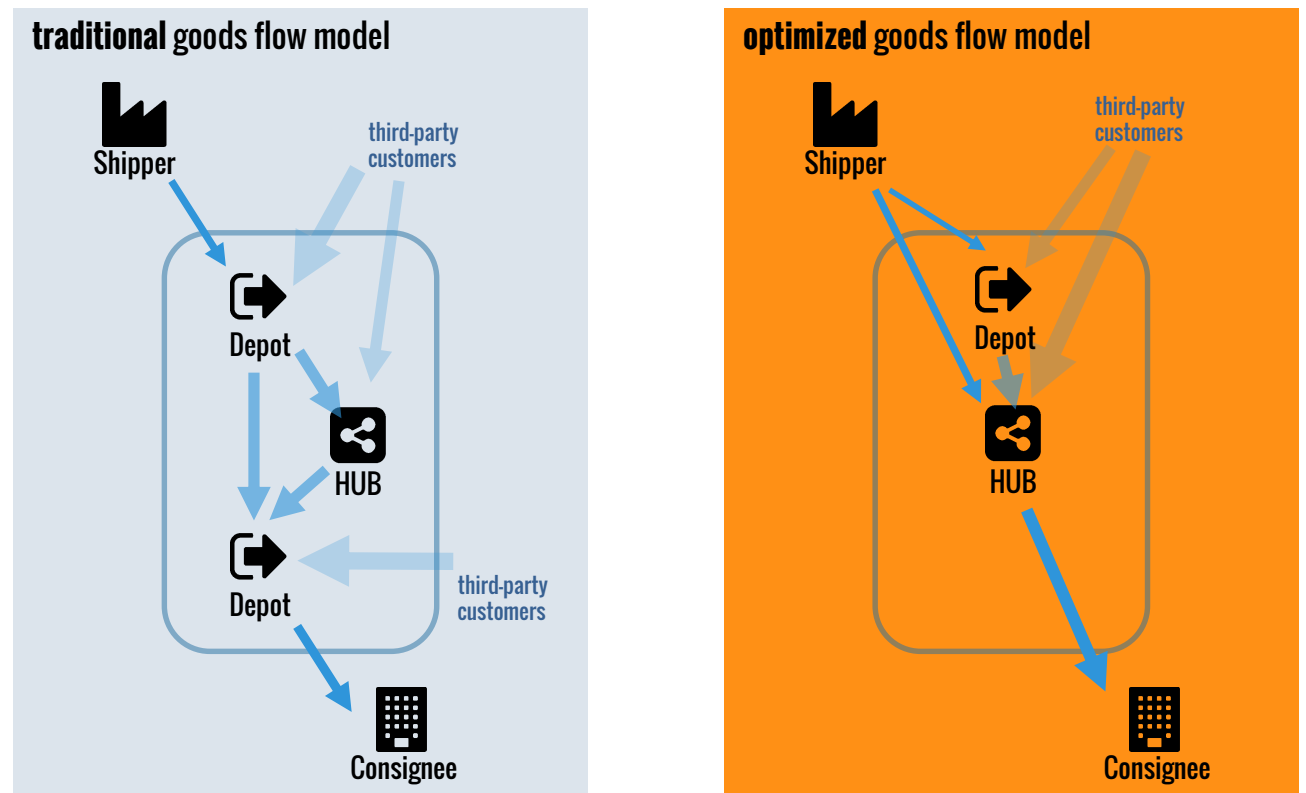
- a) **Industry-specific channels**, e.g. for temperature logistics, hazardous goods logistics.
- b) Channels related to **means of transport**, e.g. parcel service, sea and air freight.
- c) **Receiver-related channels**, e.g. cross docking systems for branch distribution

New functionalities for open-TMS (PI-Hypersystem):

- | | |
|-------------------------|----------------------------------------------------------------------------------|
| (1) PLATFORM OPERATOR: | Setup and administration of Transportation Channels |
| (2) PLATFORM OPERATOR: | Managing the TSP listed inside the Transportation Channel |
| (3) SHIPPER: | Requesting the TSP of a specific Channel to provide transportation offers |
| (4) PLATFORM ALGORITHM: | Help the shipper to find the best TSP with the most specific service description |

SOLUTION APPROACH: OPTIMIZING THE GOODS FLOW THROUGH SPECIALIZED TRANSPORT CHANNELS ¹¹

- receiver-related **bundling** (through more specific Transportation Channels)
- via appropriate **hubs**, open to any PI-certified users (with neutral HUB operators as part of the concept)

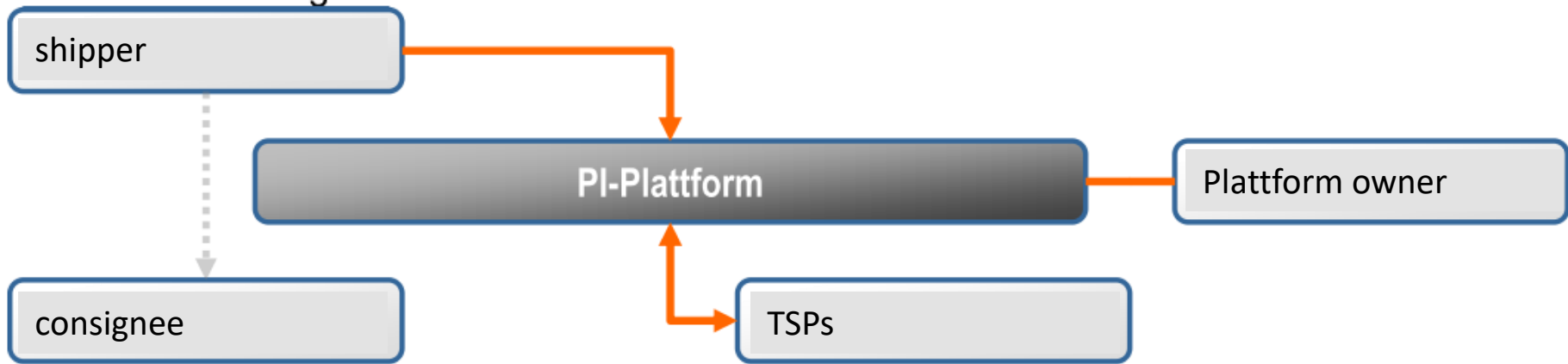


Practical example from the project:

- Through the use of the **more specific C&C-distribution channel** (instead of a general cargo channel for the whole of Austria), the prices offered by the C&C-channel operator were -20% lower, significantly **increasing bundling** of deliveries at the same time.

SOLUTION APPROACH: G2PI PI-HYPERSYSTEM

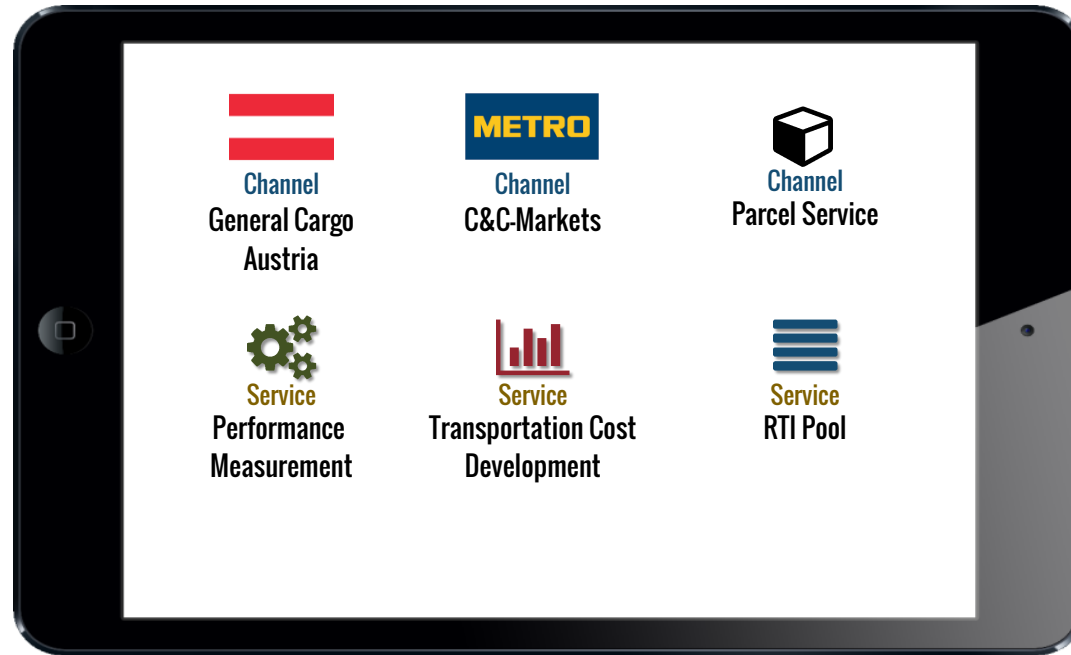
PI-Hypersystem (generation and optimization)
with standardized ID and documentaion



DEMONSTRATION: PROTOTYPICAL IMPLEMENTATION OF THE G2PI PLATFORM

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- web-based JAVA application (**G2PI = Gateway to the Physical Internet**) with integrated mobile apps
- evaluated in the course of the project



Key Findings:

- Choosing the **right channel** for a shipment is more important than choosing the right TSP, because the more specific the channel is, the higher is the **bundling rate** in customer delivery.
- Based on a underlying **generic data platform** a variety of **channels** as well as **services** (e.g. data analysis tools, management of RTI,..) can be offered / implemented.

DEMONSTRATION: G2PI PI-HYPERSYSTEM DEMONSTRATION PROTOTYPE

disposition

CHANNELS AUFTRÄGE **DISPOSITION** SERVICES

Transportaufträge

Sendungsnummer	Abholung	Zustellung	Lademeter	Gewicht	Channel	Status
000120456001	Greiner GmbH A-4600 Wels, Industriestraße 16 07.02.2017 13:00-16:00 Uhr	Packaging Austria GmbH A-8020 Graz, Uhrturmgaße 17 08.02.2017 07:00 - 13:00 Uhr	7LDM	4.500 kg	FTL Österreich Gartner KG	bestätigt
000120456002	Greiner GmbH A-4600 Wels, Industriestraße 16 07.02.2017 13:00-16:00 Uhr	Manufacturing GmbH A-8471 Spielfeld, Hauptstraße 24 08.02.2017 07:00 - 12:00 Uhr	3LDM	2.150 kg	Österreich Dachser Austria	> vorgeschlagen
000120456003	VFI GmbH A-4600 Wels, Vogelweiderstraße 71 07.02.2017 12:00-17:00 Uhr	MERKUR Markt A-8071 Hausmannstätten, Bundesstraße 83 08.02.2017 07:00 - 12:00 Uhr	5LDM	3.150 kg	MERKUR SCHACHINGER m.&f.	> vorgeschlagen

Sendung **000120456001** TDL auswählen

Transportdienstleister	Preis	Rating
Spedition Schneckenröthner A-4052 Anstelden	EUR 125,00	★★★
Dachser Austria A-4063 Hirsching	EUR 131,40	★★★★★
DHL Freight A-4600 Wels	EUR 155,90	★★
Gebriider Weiss A-4020 Linz	EUR 170,00	★

order management

CHANNELS AUFTRÄGE DISPOSITION SERVICES

Transportaufträge Neue Sendung Sendung ändern

Sendungsnummer	Abholung	Zustellung	Strecke	Lademeter	Gewicht	LKW-Typ	Status
000120456001	Greiner GmbH A-4600 Wels, Industriestraße 16 07.02.2017 13:00-16:00 Uhr	Packaging Austria GmbH A-8020 Graz, Uhrturmgaße 17 08.02.2017 07:00 - 13:00 Uhr	220 km	7LDM	4.500 kg	alle	> erfasst
000120456002	Greiner GmbH A-4600 Wels, Industriestraße 16 07.02.2017 13:00-16:00 Uhr	Manufacturing GmbH A-8471 Spielfeld, Hauptstraße 24 08.02.2017 07:00 - 12:00 Uhr	245 km	3LDM	2.150 kg	Hebebühne	> erfasst
000120456003	VFI GmbH A-4600 Wels, Vogelweiderstraße 71 07.02.2017 12:00-17:00 Uhr	MERKUR Markt A-8071 Hausmannstätten, Bundesstraße 83 08.02.2017 07:00 - 12:00 Uhr	225 km	5LDM	3.150 kg	alle	> erfasst

EXAMPLE: LOI PARTNER → USE CASE TRANSALP CORRIDOR



HOME > RWA GROUP > THE LAGERHÄUSER

- > About us
- > **The Lagerhäuser**
- > Management
- > Group Structure
- > RWA Locations
- > Key Numbers
- > Shareholdings
- > Mission Statement
- > Compliance
- > History

ANNUAL REPORT 2017

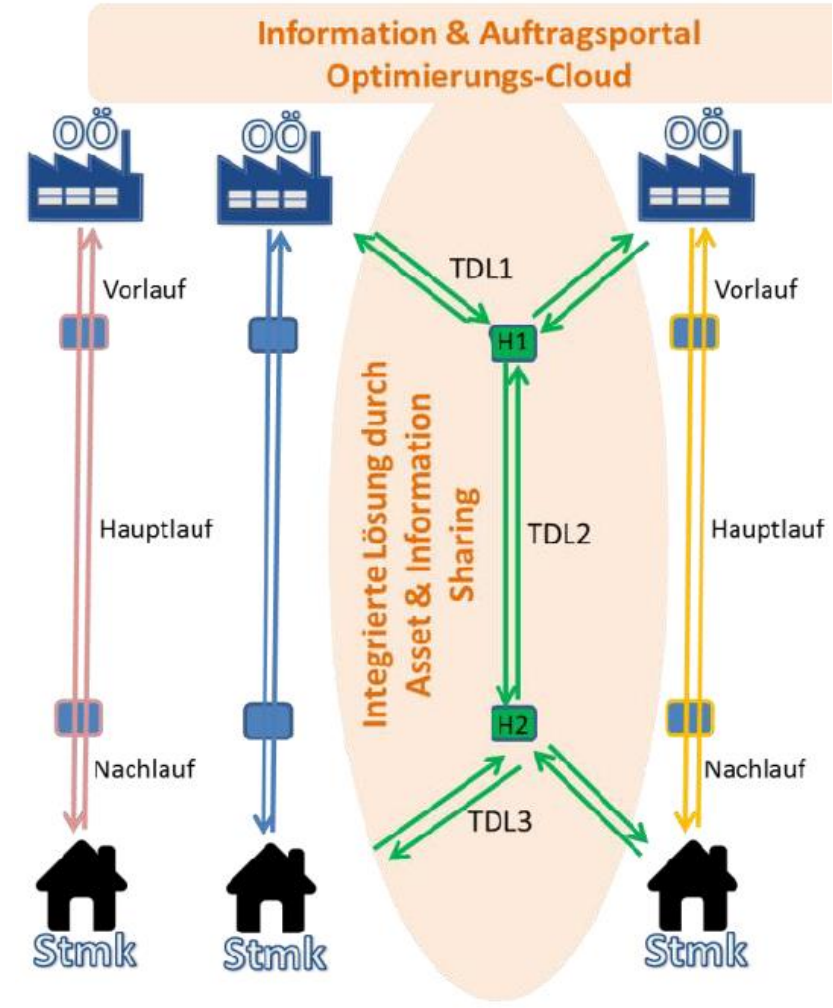


THE LAGERHÄUSER

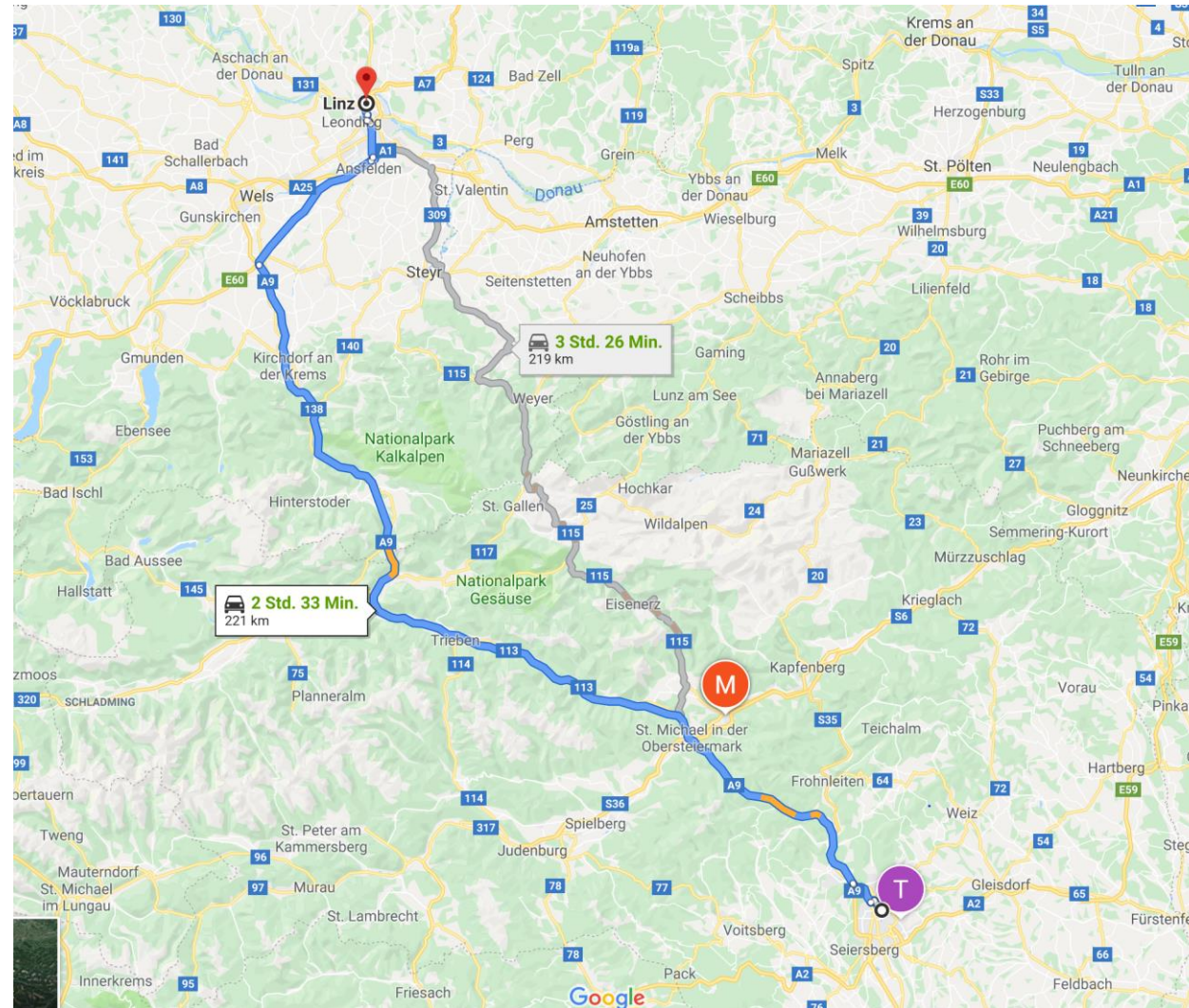
With their 120,000 members and 12,000 employees the approximately 90 Lagerhaus cooperatives in Austria are independent and democratically organised companies which are firmly anchored in their home regions. Many of these join together under the aegis of RWA to create a strong and efficient group which works for the benefit of all.



© RWA



EXAMPLE: TYPICAL TRANSALP CORRIDOR FOR LOI PARTNER RWA



EXAMPLE: TYPICAL TRANSALP CORRIDOR FOR LOI PARTNER RWA



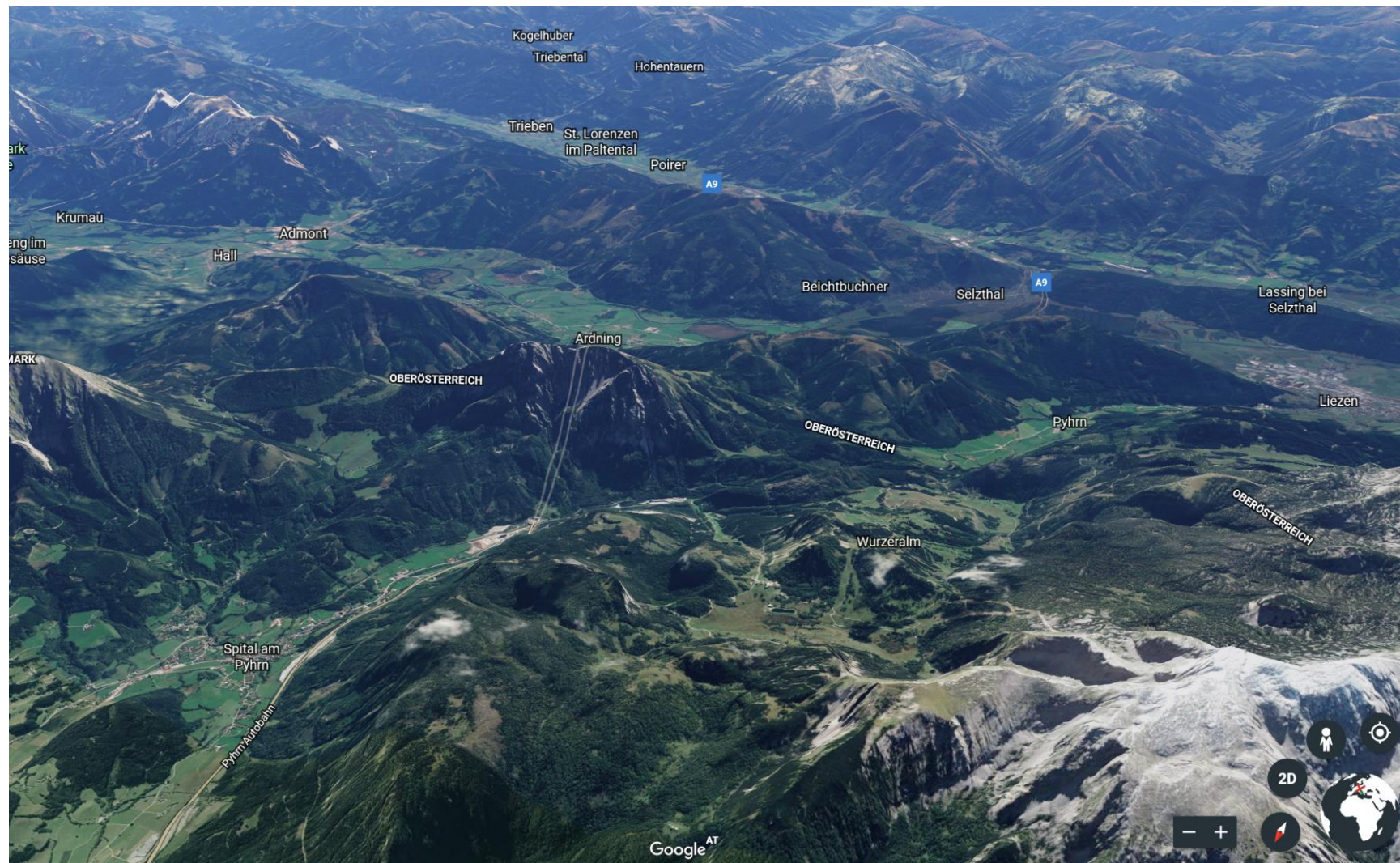
EXAMPLE: TYPICAL TRANSALP CORRIDOR FOR LOI PARTNER RWA



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EXAMPLE: TYPICAL TRANSALP CORRIDOR FOR LOI PARTNER RWA



EXAMPLE: TYPICAL TRANSALP CORRIDOR FOR LOI PARTNER RWA



EXAMPLE BENEFIT EVALUATION: USE CASES EXAMINATION OF COMPANIES INVOLVED IN THE PROJECT

(1) Reduction of **transport costs**

- by using specialized TSPs in specifically defined PI Channels
- therefore changing the physical goods flow to a direct delivery from a dedicated HUB location

Traditional Groupage System	<u>per pallet</u>	Direct Delivery from HUB	<u>3 pallets</u>	<u>4 pallets</u>	<u>5 pallets</u>
Main run Upper Austria - Styria	€ 12,50	Main run (as direct run)	€ 12,50	€ 12,50	€ 12,50
Depot handling	€ 2,00	Direct stop costs (€ 50,-/ stop)	€ 16,67	€ 12,50	€ 10,00
Last Mile Delivery	€ 17,50				
Total Cost per pallet	€ 32,00	Total Cost per pallet	€ 29,17	€ 25,00	€ 22,50
			-9%	-22%	-30%

(2) Stronger **bundling** in delivery

- through consolidating small items according to delivery addresses at a dedicated HUB location

(3) Savings in loading space due to the use of **PI containers**

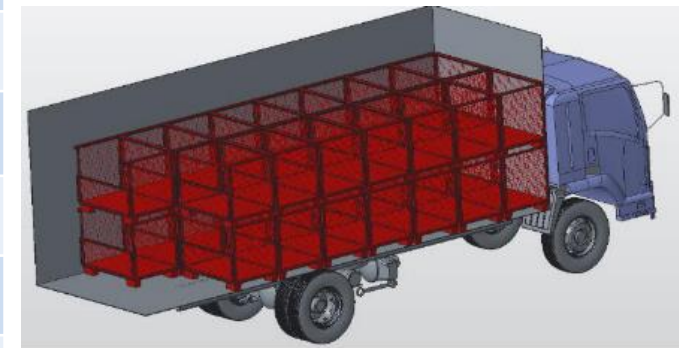
- through improved stackability & folding of PI grid boxes

(4) Full **digitization** of the transport order process

EXAMPLE: FURTHER DEVELOPMENT OF A **PI CONTAINER** BASED ON A STEEL BOX PALLET

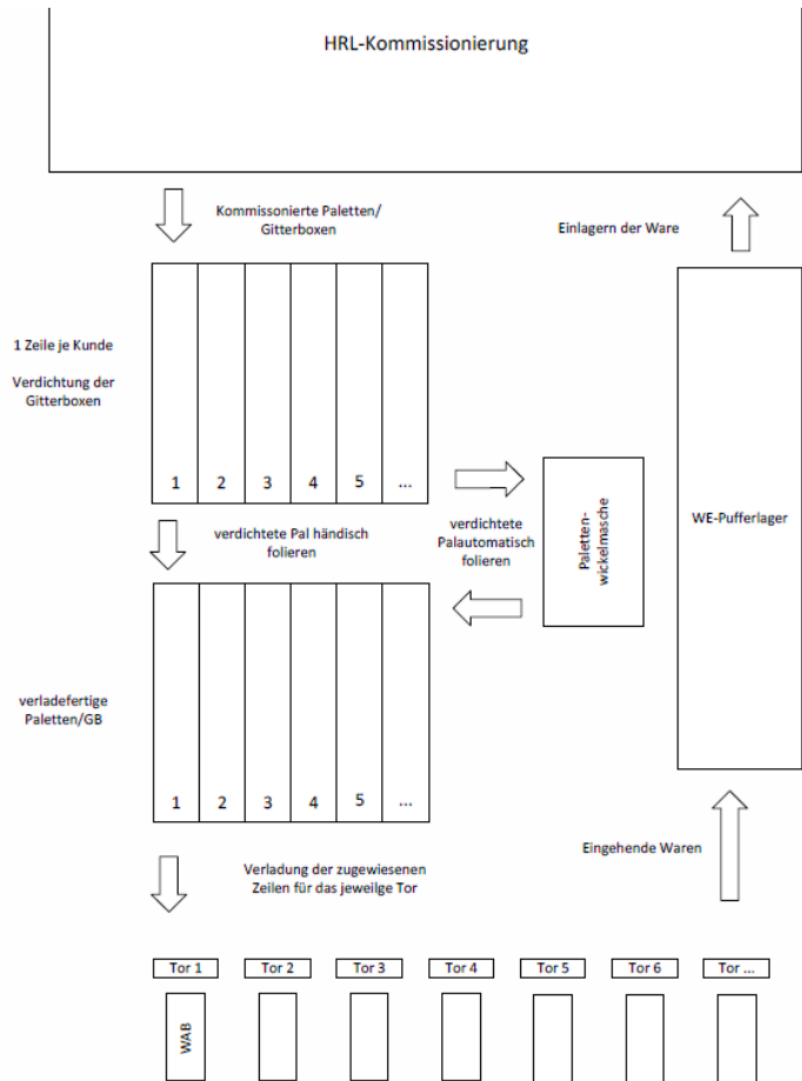
Comparison of **Key Requirements**

Standard steel box pallet	PI-Container
standard height (2.5m) of a truck fully usable	flexible size due to modular design
stackable	stackable
non foldable	foldable for space-saving storage and transportation of empty containers
box with grids on the sides	lockable
compatible with euro pallets	compatibility with truck load space
space for RFID tags in the stand blocks	integrated RFID tag for identification
space for further sensors in the stand blocks	integrated sensor technology for measuring environmental influences
space for tracking system in the stand blocks	integrated tracking system
easy assembly/disassembly by one person	easy assembly/disassembly by one person
cost-effective production	cost-effective production
boxes are stacked and secured against lateral slippage	integration of several containers to a single shipping unit
handling with conventional equipment (forklift, etc.) possible	handling with conventional equipment (forklift, etc.) possible

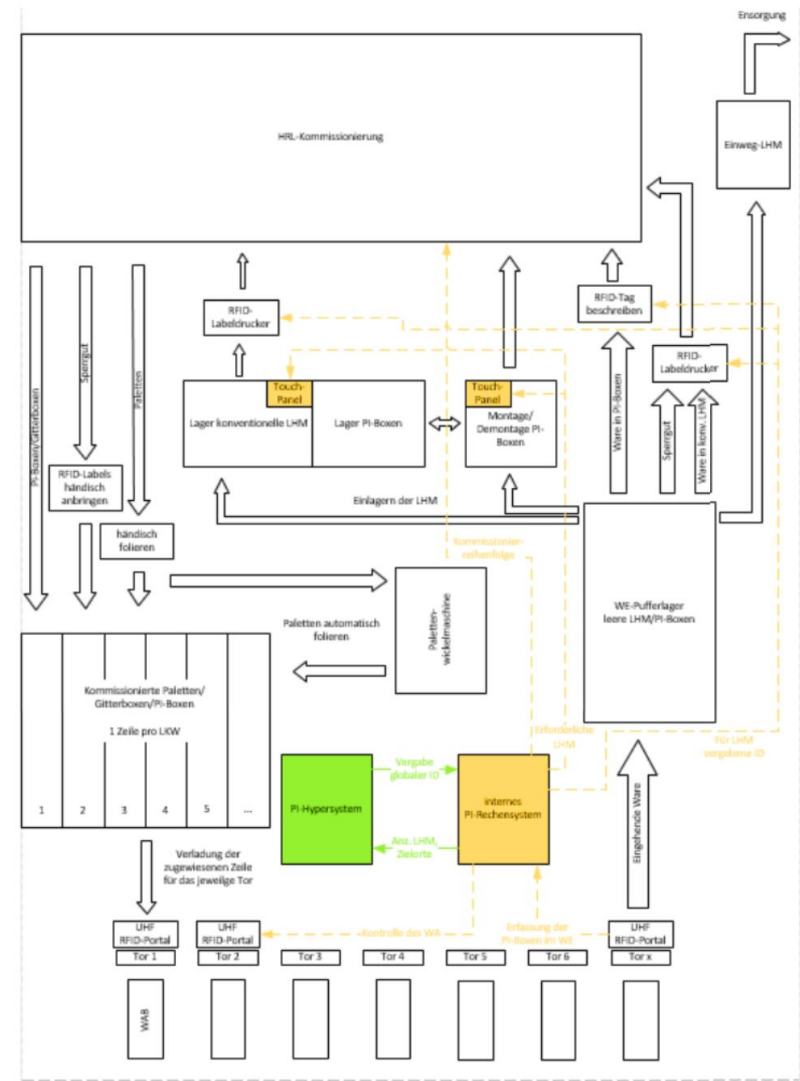


EXAMPLE: FURTHER DEVELOPMENT OF WAREHOUSES

Current layout

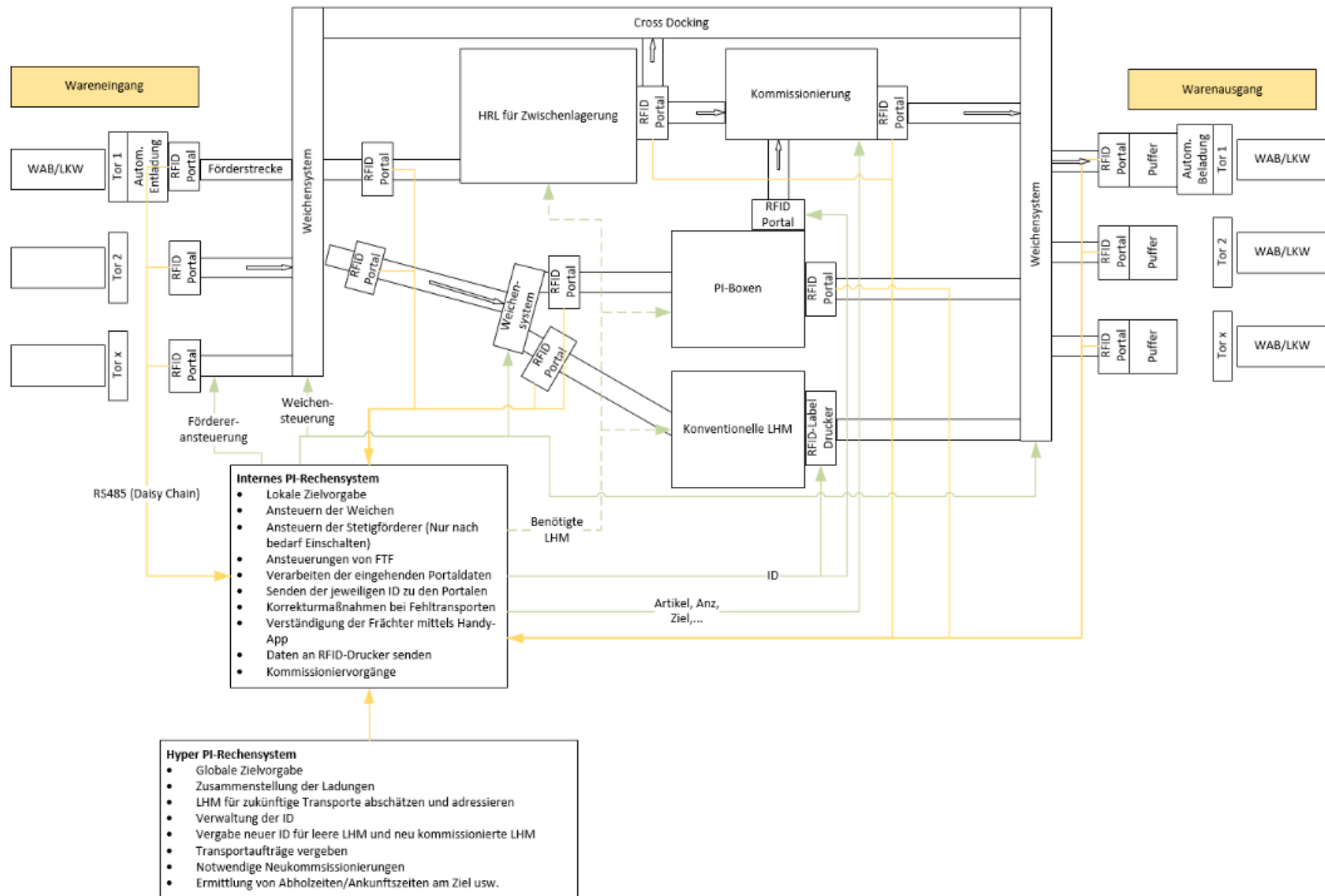


Ideal layout



EXAMPLE - GENERALIZATION: FURTHER DEVELOPMENT OF A WAREHOUSES

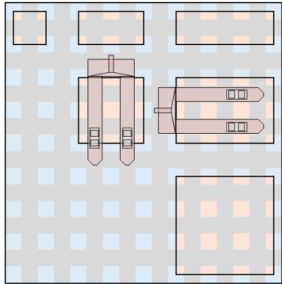
Generalized layout



One more thing!

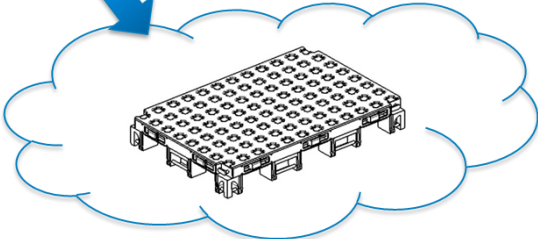
PROTOTYPE PI-PALLET

- Ongoing discussions from MODULUSHCA on (2015) show: **there is a need for a pallet**
- PI-Pallet: **Interlocks** with M-boxes or any other physical connection
- **Modular** up to 1200 x 1200 mm

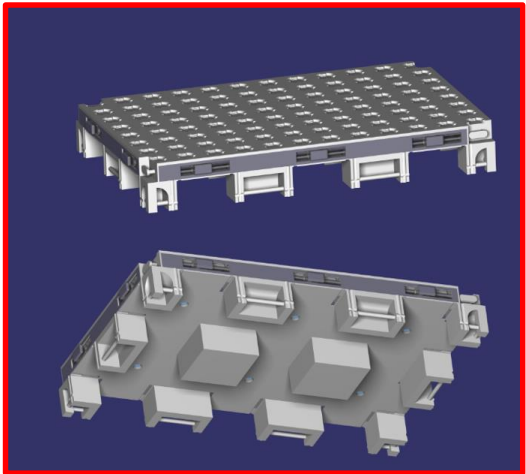
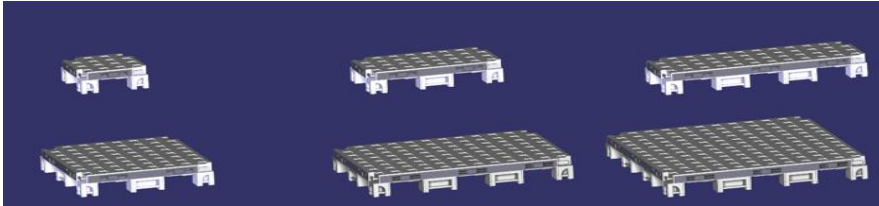
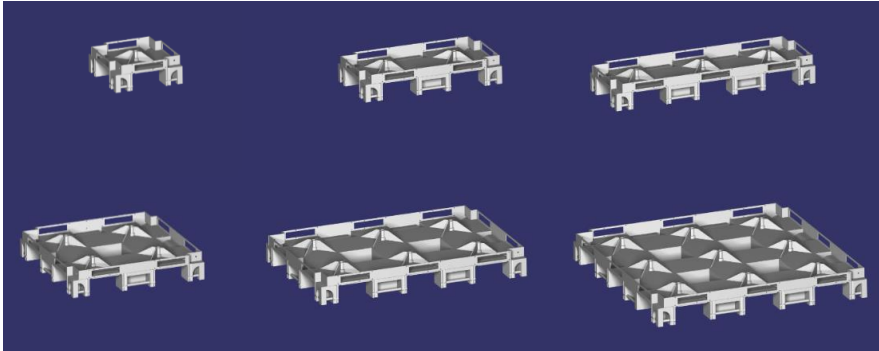
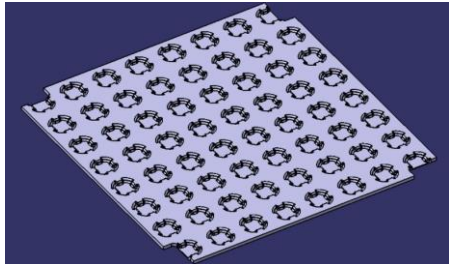
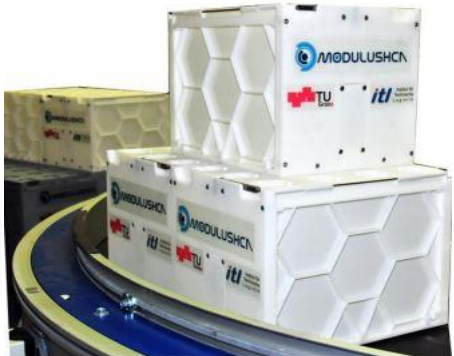


Current Logistics
manual handling of goods

Physical Internet
Modular/encapsulated goods

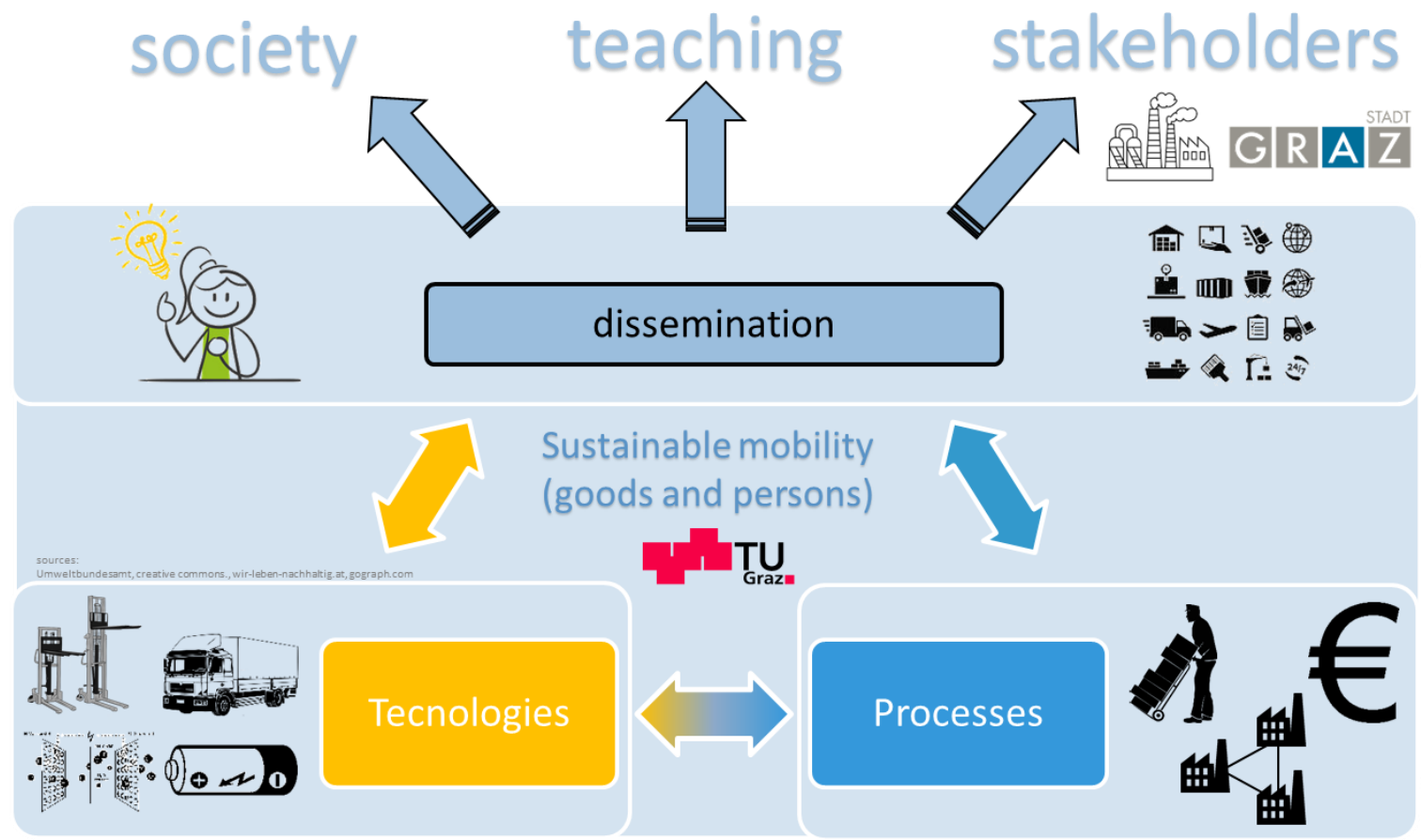
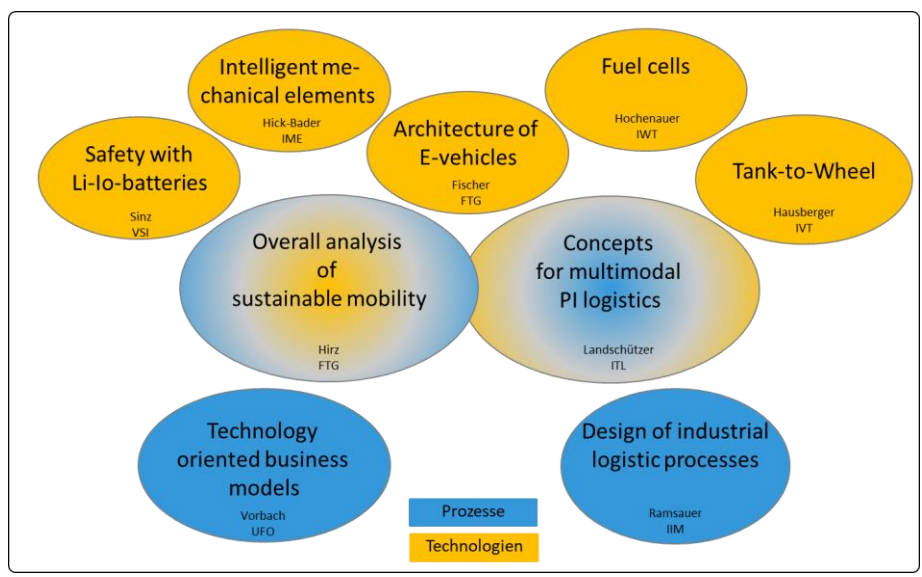


Physical Internet Logistics
Manual handling of modular/encapsulated goods within first-mile and last-mile transportation



One more thing!

- **9 PhD Candidates - 8 institutes**
 - **Organizational and technical topics**
 - **PI focus!**
 - **Networking and influencing**
- **Join us!**





Thank You for Your Attention!