

Applying blockchain to ease and digitise the exchange of pallets

Dr. Ralph Tröger | GS1 Germany
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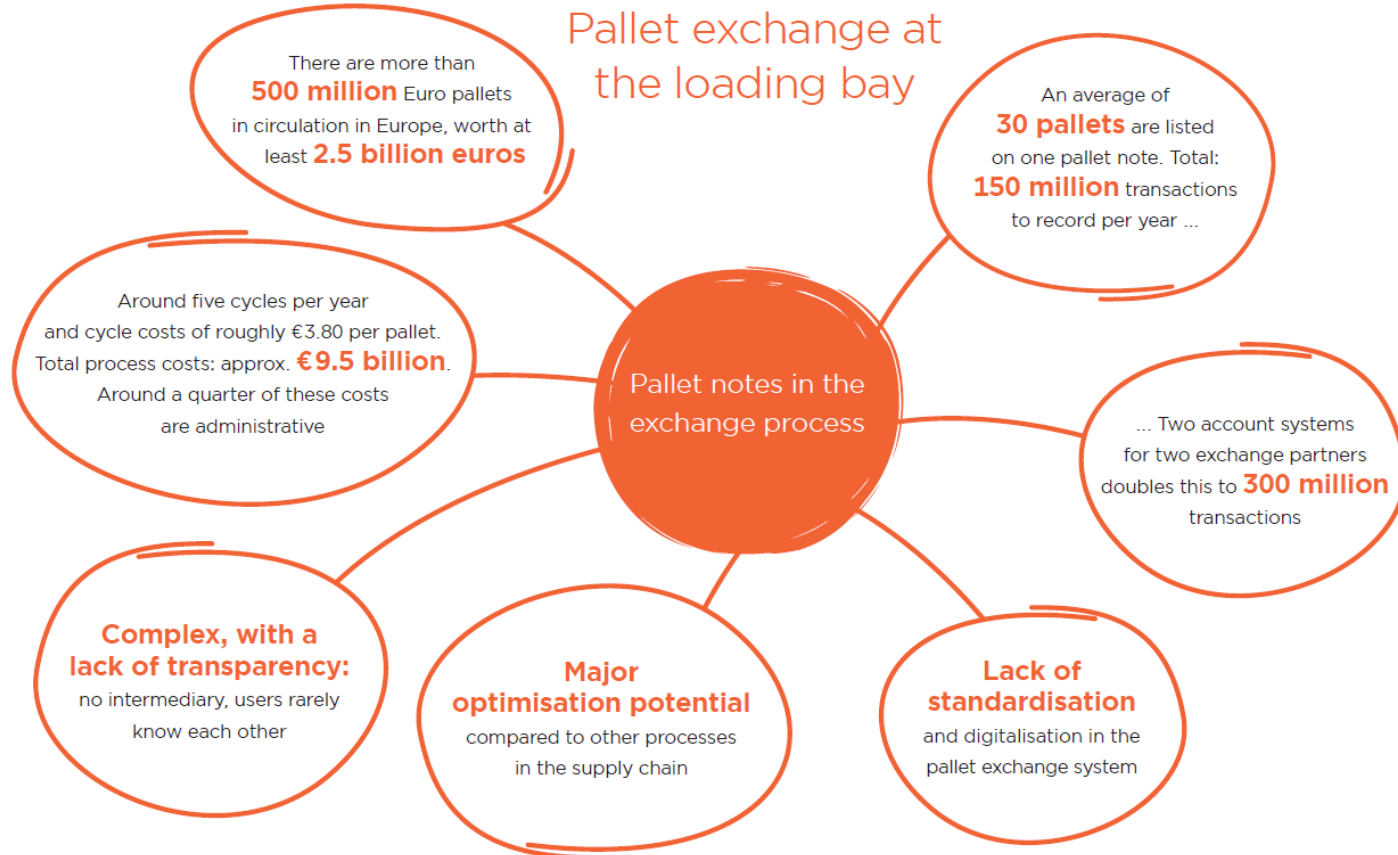
Lumos! Expelliarmus! Blockchain!

Some people consider Blockchain to be the magic wand to get rid of all of our problems...



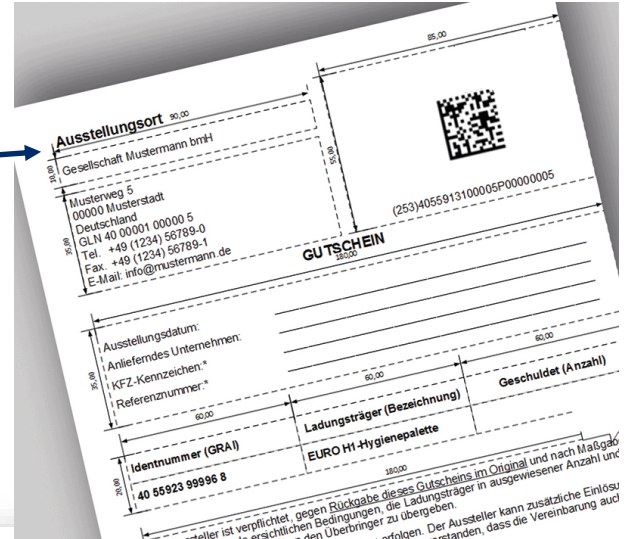
...really? We wanted to take a closer look if this is true.

Our use case? A real business issue



Project goals

- **Test blockchain technology** taking the example of the pallet exchange process
- **Digitise the pallet note**
- **Create** an exemplary network of trading partners exchanging pallets
- **Conduct a realistic trial**
- **Qualitative benefit analysis**
- **Gain and transfer knowledge**



before



after



Facts and figures

Participants

35

Exchange parties

17

Locations

20

BC nodes

11

Project duration

12
months

Protocol

MultiChain

Transactions

543
in field test

Transactions

116.665
in load test

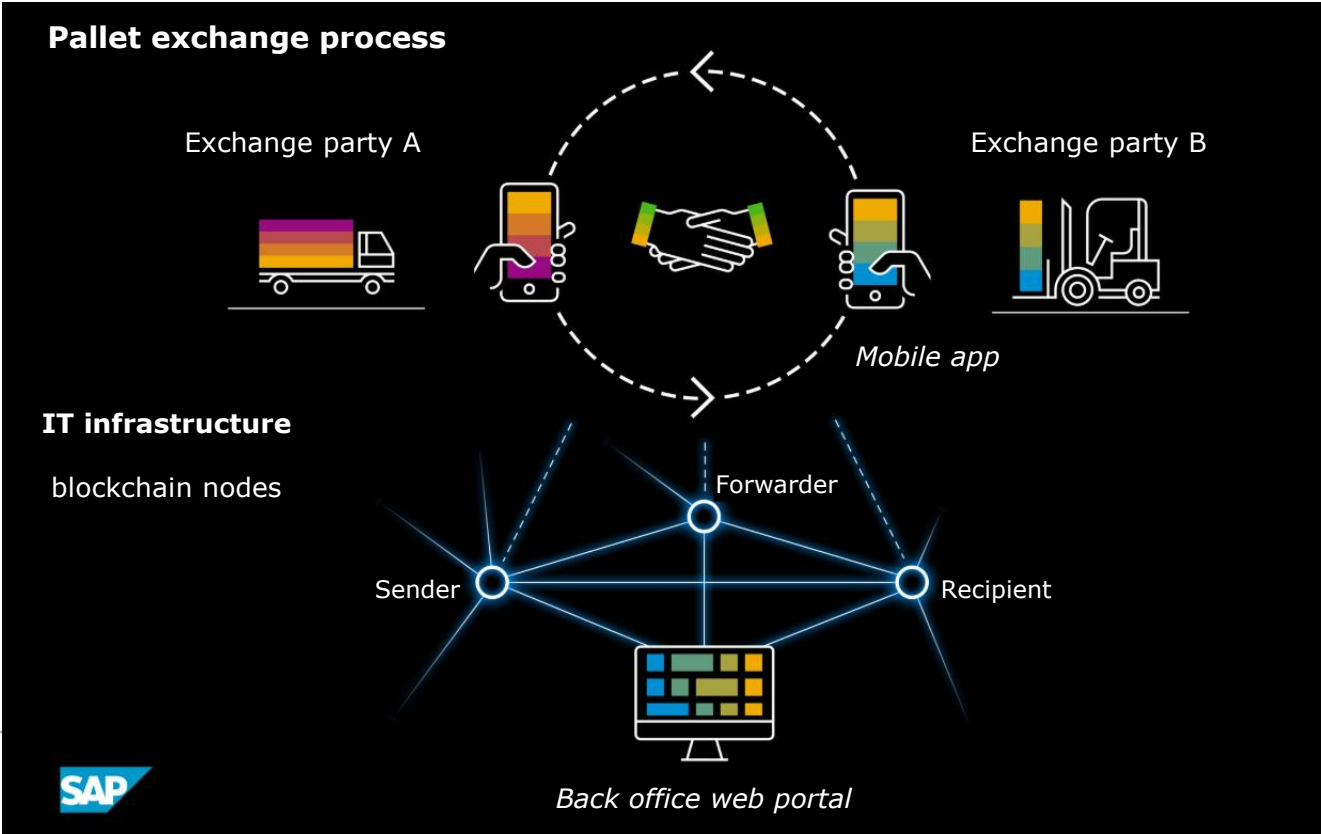
Project participants



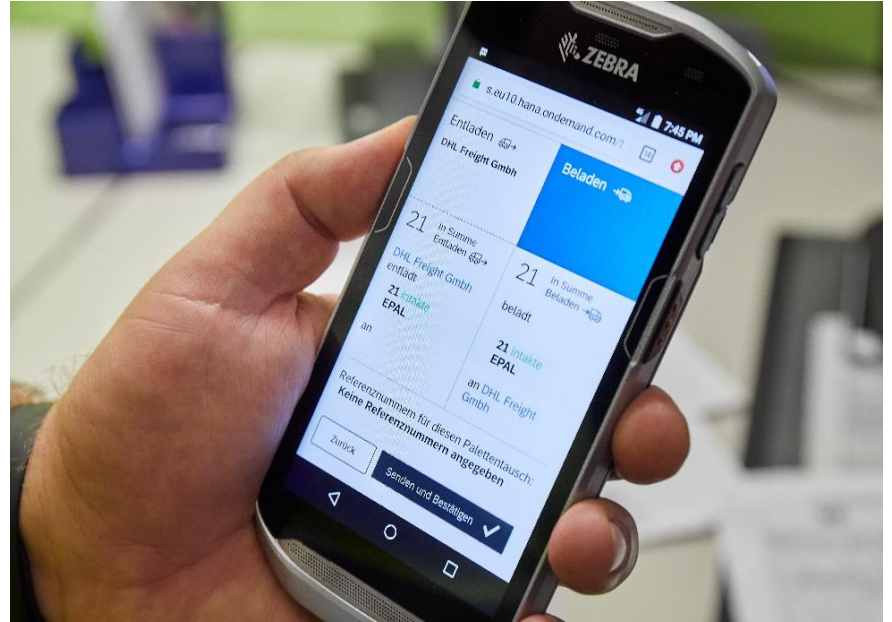


Impressions

Solution approach illustration

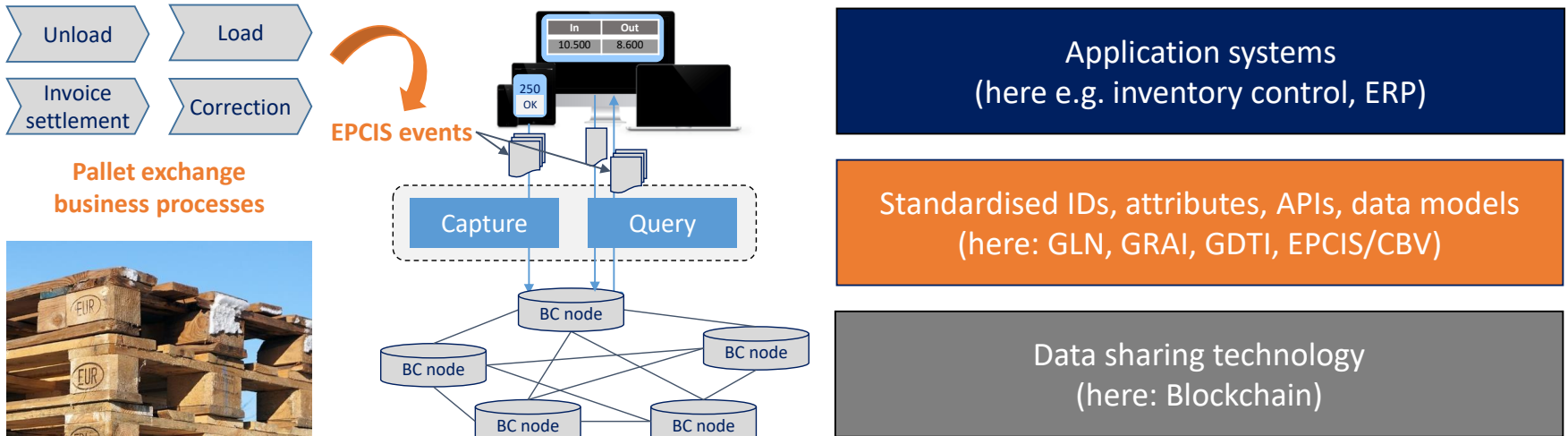


Look and feel



How did GS1 standards help?

PoC solution sketch for the digitised pallet exchange in a consortium blockchain



Blockchain transactions

Pallet exchange transaction (simplified)

EPCIS Event	Object Event
Error Declaration (optional)	Date, time and reason of an error declaration, e.g. Nov 2 nd 2018, 16:15, incorrect data
WHEN	Date and time of event, e.g. Nov 2 nd 2018, 14:30
WHAT	Number of full or empty pallets, identified by a GRAI
WHERE	GLN identifying the location of where an exchange of pallets took place
WHY	<ul style="list-style-type: none">• Business process step (e.g. "arriving")• GDTI identifying pallet exchange transaction• GLN identifying submitting/receiving party
Extensions	(optional) License plate (optional) Exchange omission reason (e.g. "no pool pallets available")

Based on EPCIS event

Blockchain transactions

Master data transaction for a given GLN (simplified)

Attribute	Description
Vocabulary Type	"SourceDestination" (for parties) "ReadPoint" (for locations)
Name	Name of the party/ location
Street Address One	Street and street number
City	City
Postal Code	Postal code
Country Code	Country code (ISO 3166-1 Alpha-2-Code)

Based on EPCIS
master data document

Blockchain-based pallet accounting

Consistent, reliable and transparent data base

Pallet exchange partner					
From		Name: Oetker		GLN: 4000521000004	
To		Name: KV Nagel		GLN: 4045575000006	
#	GDTI	Time	Business Step	Quantity	Error Declaration
1	A	Oct 1 st 2018, 15:00	Departing	30	
2	B	Oct 2 nd 2018, 09:30	Departing	55	
3	C	Oct 3 rd 2018, 14:30	Departing	20	
4	D	Oct 4 th 2018, 17:45	Departing	45	
5	E	Oct 5 th 2018, 14:30	Departing	60	
6		Oct 6 th 2018, 11:15	Accepting	45	
7	C	Oct 3 rd 2018, 14:30	Departing	20	Error Declaration for #3 Time: Oct 6 th 2018, 12:00 Correction in #8
8	C	Oct 3 rd 2018, 14:30	Departing	15	Correction
9	F	Oct 6 th 2018, 14:55	Departing	27	



From/ To	Oetker	KV Nagel
Oetker		91
KV Nagel	-91	

Key learnings

- Blockchain is **no plug and play**
- **Using established systems** (e.g. GS1 IDs, EPCIS data model) **reduces project duration** significantly
- **Establishing** a business **partner network** is **quite challenging**
- **Transparency** is **both blessing and curse**
- Blockchain **needs** a **change in people's mindset**
- **Bumps wait where you expect them the least** (e.g. connectivity issues due to mobile network gaps or shielding ceilings/walls)

Coming back to our initial statement...

Unfortunately, Blockchain is NOT the magic wand....



**...at the same time, it is a promising technology
– *IF(!)* it fits the underlying use case**

Next steps

- Many participating organisations indicated their **interest to continue this initiative** and help in **paving the way for a productive solution**
- This opens a number of **exciting further learning opportunities**, e.g.:
 - the development of a 'code of conduct' (including membership management, voting procedures, handling of malpractice, etc.)
 - refinement of the data sharing concept (on-chain vs. off-chain)
 - identity management
 - the application of smart contracts
 - and much more

**Interested in joining us?
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Putting blockchain to the test

Key findings from Germany's largest cross-company pilot project



<https://www.gs1-germany.de/innovation/trendforschung/blockchain/pilot/>

Process analysis: design thinking led to a collaborative solution



The project resulted in a shared pallet exchange process that was developed by employees from different companies. These companies were using a diverse range of exchange processes, from a "letterbox" solution to a customised extension of the company's ERP system. The project team managed to employ the right method to arrive at a shared solution. [Read more here](#)

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Governance: reaching a charter for a blockchain consortium



A consortium blockchain network must agree on rules from the outset. A trivial question is "Who can decide what, and when?" A somewhat harder issue is "How should decisions be made?" This could be, for example, a "no-code" or "no-people" decision, i.e. people and committees, versus smart contracts. Which data should be visible to whom? What is allowed, what is not allowed and what do people want? There are many questions and a lot of unknown territory. There's no point searching for an example of established best practice here. [Read more here](#)

(GS1) standards used in the blockchain



Standards range from pallet identification to data exchange in the blockchain. Which key standards did project participants agree upon? How have they actually been integrated in the blockchain solution? What data do blockchain transactions contain? And how can it be used to feed data into the pallet accounts of participating exchange partners? [Read more here](#)



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Questions | Feedback | Discussion



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