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INTERMODAL EUROPE 2019

Blockchain and Machine Learning: New Technologies for Track-And-Trace and ETA

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As the backbone of international trade, container ports remain a key factor for economic success and international trade

To sustain their market position, ports need to adapt quickly to new trends and logistics demands.

Trends

E-Commerce
Growing freight volumes with shorter delivery times

Digitisation
Big Data, Blockchain, AI and high data volumes

Multimodality
Optimized usage of all transport modes

Sustainability
Emissions and energy consumption in ports

Adaptation requires innovation as a means to integrate new services into the existing port landscape.

Challenges

Port Authorities
Consolidate data streams in platforms

Shipping Liners
Contribute vessel and freight data and integrate real-time port information

Terminal Operators
Align processes with sea- and land-side operations for optimization

Logistics Partners
Provide transport capacity and scheduling data

Customs Office
Transform paper-based, manual processes into digital workflows

Logistics trends create a dynamic environment with many technological challenges for ports and the container industry.

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Blockchain (DLT) and Machine Learning: Two new technologies for the maritime sector?

	Distributed Ledger Technology	Machine Learning
Definition	» Data stored in a distributed ledger, e.g. blockchain or tangle » Transparency and immutability	» Mathematical methods » Automatic data processing » Classical statistics to deep learning
Advantage	» Data provided by different players » Transparency and accessibility » Remove middleman	» Data-driven approach » Range of available toolboxes » Modular integration into operations
What can go wrong	» Understanding DLT use cases » Performance » Integration into operations	» Needs historical data of high quality » Correct method for the use case » Labelling data & training the model

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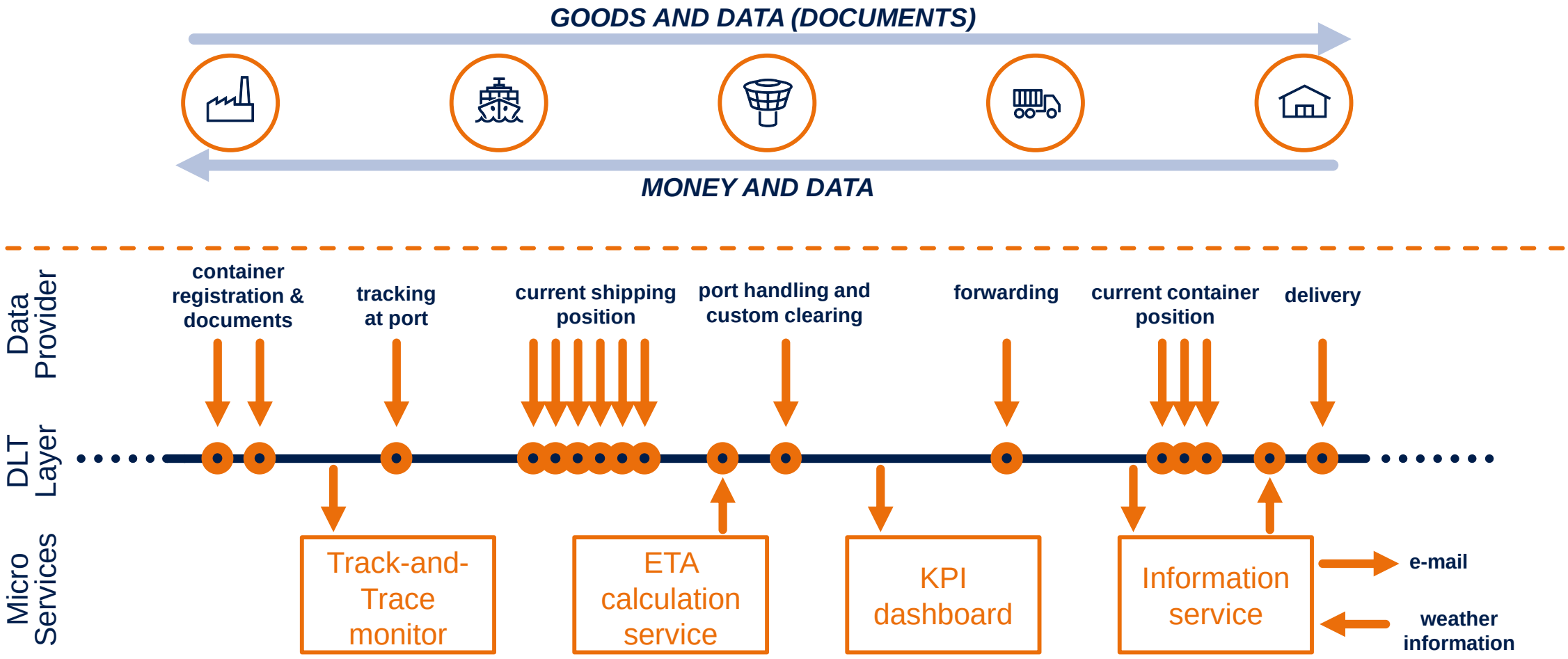
The combination of distributed ledger technologies and machine learning has the potential to drive the information chain

The transport process is more than transporting goods and receiving money.



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Today, new products and implementations are available on the market and for other business areas

Selected examples

	Shipping	Manufacturing	Parking	Financing
	TradeLens solution *(IBM, originally developed together with Maersk)*	***Information platform*** *that connects supplier with purchaser*	***Off-street parking solution***	***Debt capital markets issuance platform***
Blockchain Technology	Open and neutral industry blockchain platform **(IBM)**	Consortium solutions based on **permissioned DLT**	**IOTA tangle** technology for micro transactions	**Enterprise DLT** (R3 Corda or Hyperledger Fabric)
Machine Learning	**Prediction and optimization** of equipment utilization, queueing, …	**Consolidate data streams** from internal and external sources into platform	**Dynamic pricing** algorithm utilizing historic and real-time data	Pricing based on **pattern recognition and time series analysis**
Added Value	**Ecosystem** of freight forwards, custom, port, carriers, and more	Increase **availability** and level of **information** and simplify communication	Digital user experience, **maximisation of revenues** for parking providers	**Tokenization** of financial instruments with smart contracts for **settlement**

A typical project combines business case definition, data analysis, process design, and technical implementation

Business case definition

- *Pain points and added value*
- *Scoping and roadmap definition*
- *Token design and economics*

Data analysis

- *Review of existing data structures*
- *Data Warehousing and Data Lake design*
- *Define business logics for optimal utilization*

Process design

- *Private DLT vs. Permissioned DLT vs. Tangle*
- *Best fit ML methods*
- *Process and workflow integration*

Technical implementation

- *IT architecture and infrastructure*
- *Smart contract design*
- *Process orchestration*
- *API design and integration*

Roll-out and operation

- *Testing and validation*
- *Transaction support*
- *Secure concepts*
- *Design and implementation of enhancements*

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d-fine as a partner

Business Expertise		
Traffic simulation	ETA modelling	Routing & Navigation
Trace-and-Trace solution	Capacity optimisation	Container Handling
E-Mobility	Last-Mile-Services	Urban Air Logistics

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Data Science & IT Expertise		
Big Data Ecosystems	Machine Learning	Blockchain & DLT
Coding & DevOps	Data Ingestion & Streaming	Visualization
Optimization & Algorithms	Cloud Integration	Deep Learning

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