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digital.industry – Data Spaces and Digital Twins for industry applications

Jens Lachenmaier, DTC Meeting, Jan, 29th, 25

Goal

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Provide a basis for comparison between Catena-X/IDTA activities and FSTI-activities (DTC-inspired)

Shared Digital Represetations – The Case of Logistics

In-use?

Fork hight

Weight

ids

position

- Business Ecosystem involving 3 companies:
  - logistics service provider
  - Industrial company
  - Sensor manufacturer
- Common interest: transparency, “what is going on“
- Information demand of involved parties (information type and quality)
- Shared access to digital twin data, such as
  - Usage of forklifts
  - Goods transported
  - Positioning of goods and forklift
  - ..
- Next step: optimization and scaling

Shared access to the digital twins

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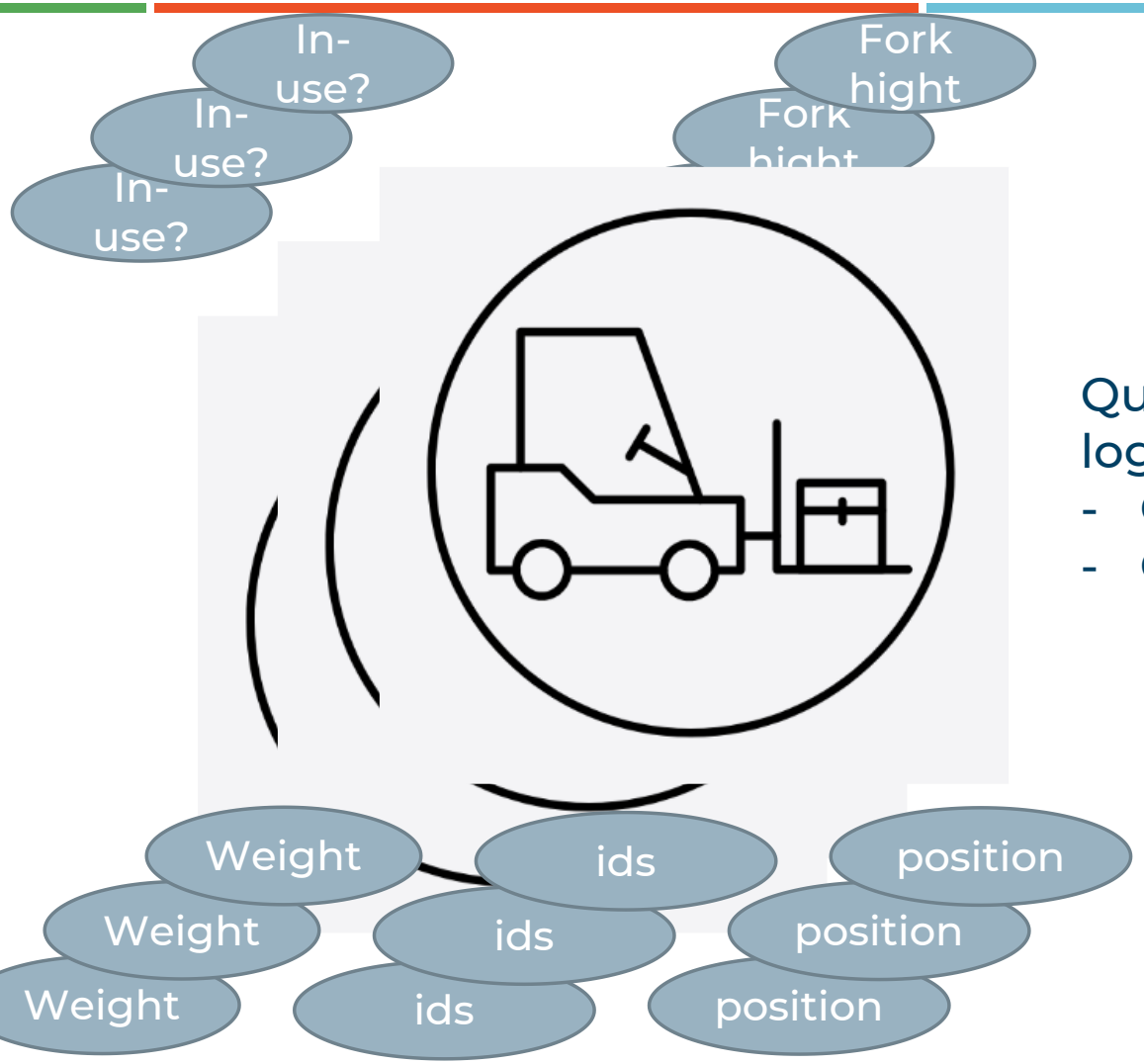
Questions from the sensor vendor:
- Failure rates
- Predictive Maintenance

Questions from the industrial company:
- Where are my goods?
- Performance of logitic service provider



Questions from the logistics service providers:
- Capacities match demand
- Optmization

Shared Data – the Skytrain Case

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- From the train station to the terminal

Challenge: Deploying the best number of automated train cabins

SkyTrain Data Space

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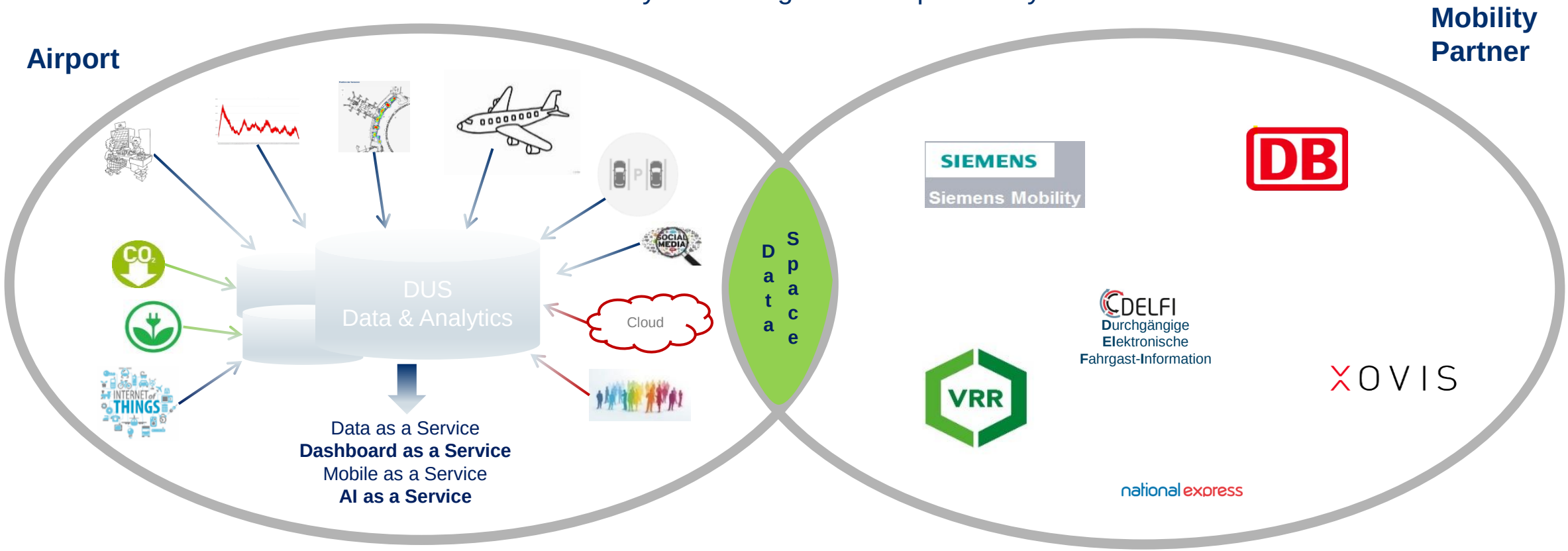
Development of a cooperative data space for fully automated public transport systemspublic transportation systems to create an ecosystem using the example of SkyTrain.



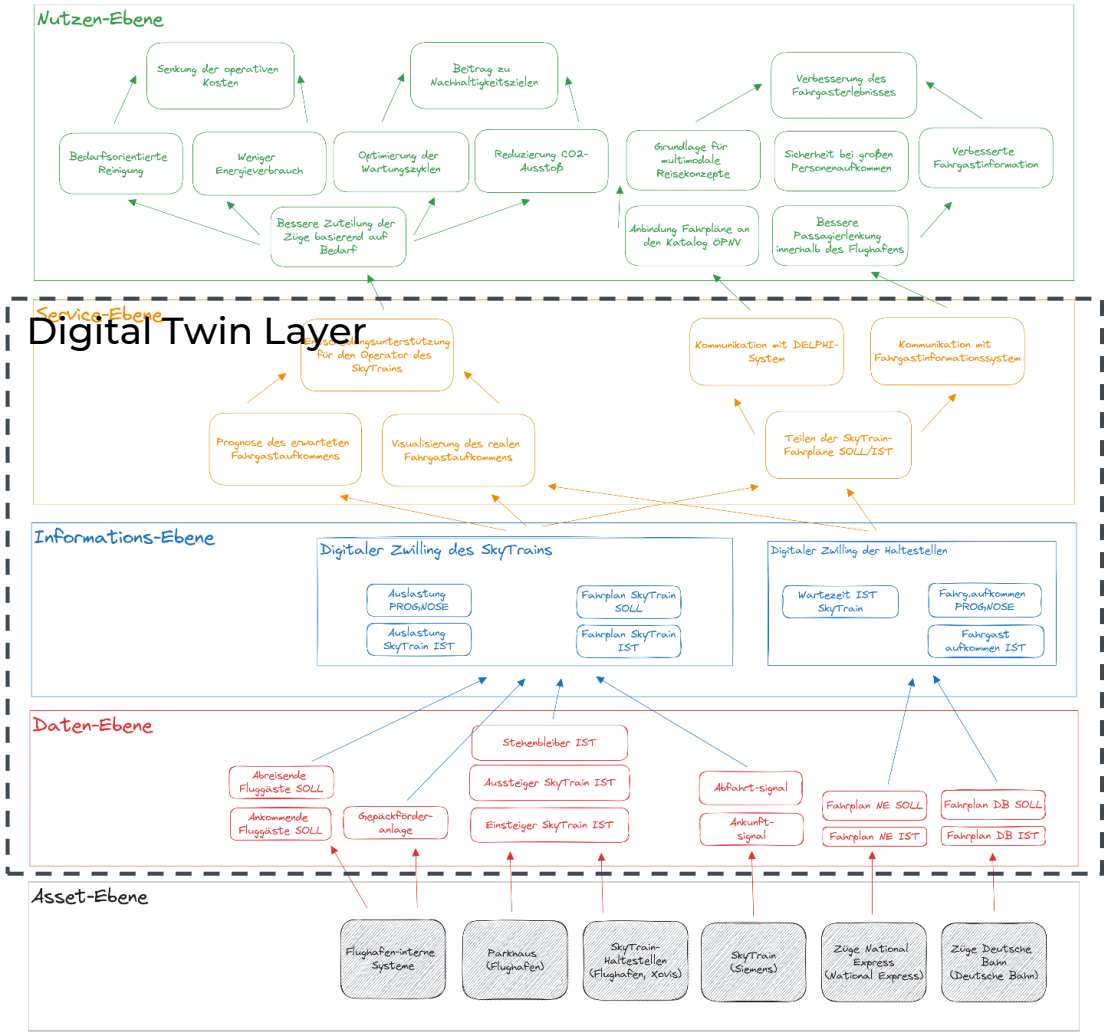
The data space is used to integrate various stakeholders so that local potential for improvement in passenger transportation, sustainability and economic efficiency can be achieved. In addition, theSkyTrain Data Space is connected to the DELFI national background system to enable supra-regional services.

Approach

1. Workshops to identify information need

2. Available assets and data

3. Getting the missing data



Availiable Data

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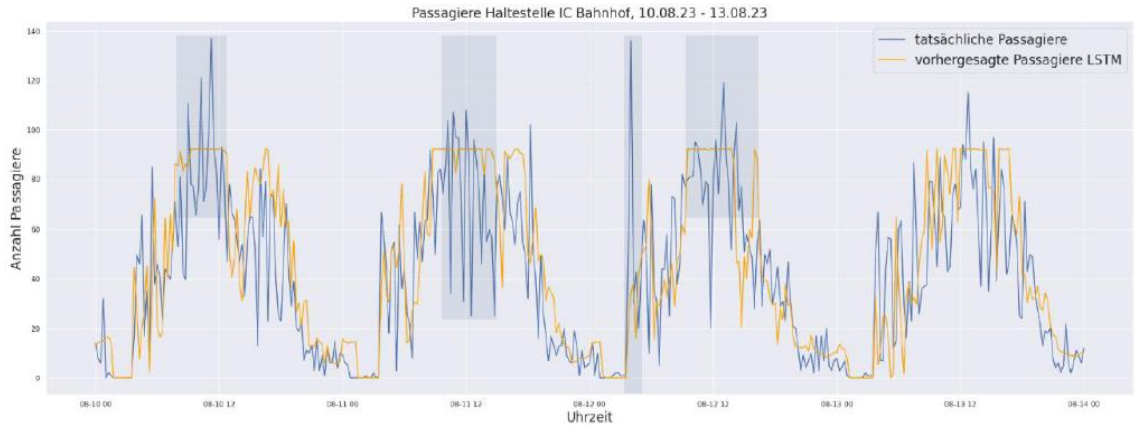
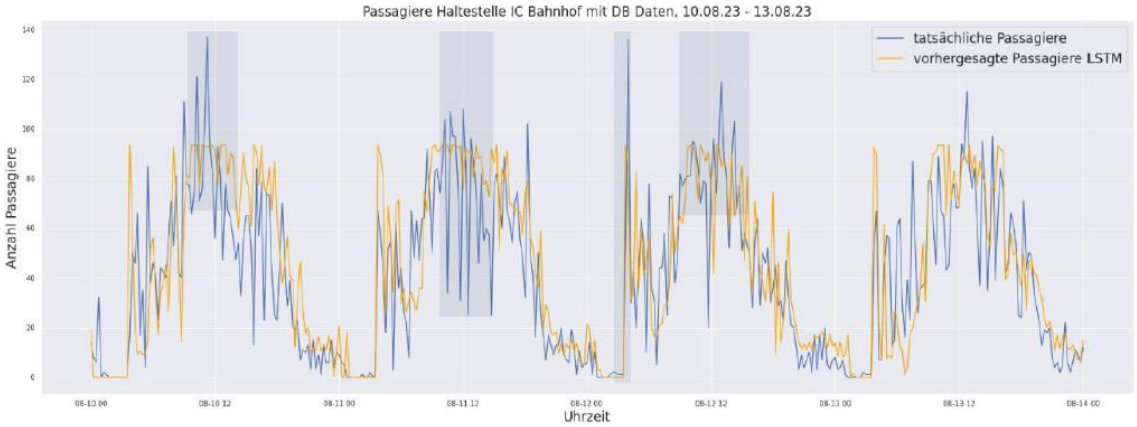
Source: XOVIS

Daten	Status	Nutzen	Bemerkung
SkyTrain Ein-/Aussteiger	Im Model	Zielvariable	Bereits im Modell
Fluggäste Ankunft/Abflug	Im Model	Direkter Einfluss auf die Anzahl Passagiere	Bereits im Modell
(Live) Betriebsprotokolle SkyTrain mit Ankunfts-/Abfahrtssignal	in Arbeit	Zuordnung Passagiere zu spezifischem SkyTrain-Zug	Auslastungsberechnung je Zug
Soll- und (Live-) Ist-Fahrpläne Schienenverkehr	verprobt	Direkter Einfluss auf die Anzahl Passagiere	Vorhersage von Peaks
Wetter	vorhanden	Einfluss des Wetters auf das Nutzerverhalten	DWD-Daten sind angebunden
Preise/Preisänderungen	vorhanden	Wirkung von Preisänderungen Ausl.	49 Euro Ticket
Auslastung Parkhäuser 4/5	vorhanden	Vorhersage Fahrgastanteil im Streckenabschnitt	Auswirkung auf Auslastung
Ferien, Feiertage, Veranstaltungen	Im Model	Passagiere ohne Flugticket (Messe, Stadion)	Auswirkung auf Auslastung
Passagiere Beschäftigte DUS	in Diskussion	Schichtwechsel	Auswirkung auf Peaks
(Live) Wartezeit und Anzahl Wartende Haltestellen SkyTrain	in Arbeit	Bemessungsgröße für den SkyTrain-Einsatz	Xovis-Sensorik

SkyTrain Data Space

- Fluctuating passenger numbers (peaks) complicate the forecast.
- By taking into account the trains arriving at the IC station (Deutsche Bahn, long-distance traffic), the model can better predict the peaks that occur.
- As a result, the accuracy of the prediction model is significantly improved.
- The error decreases by an average of~10% from 16 to 14.4 passengers per 15 minute interval.

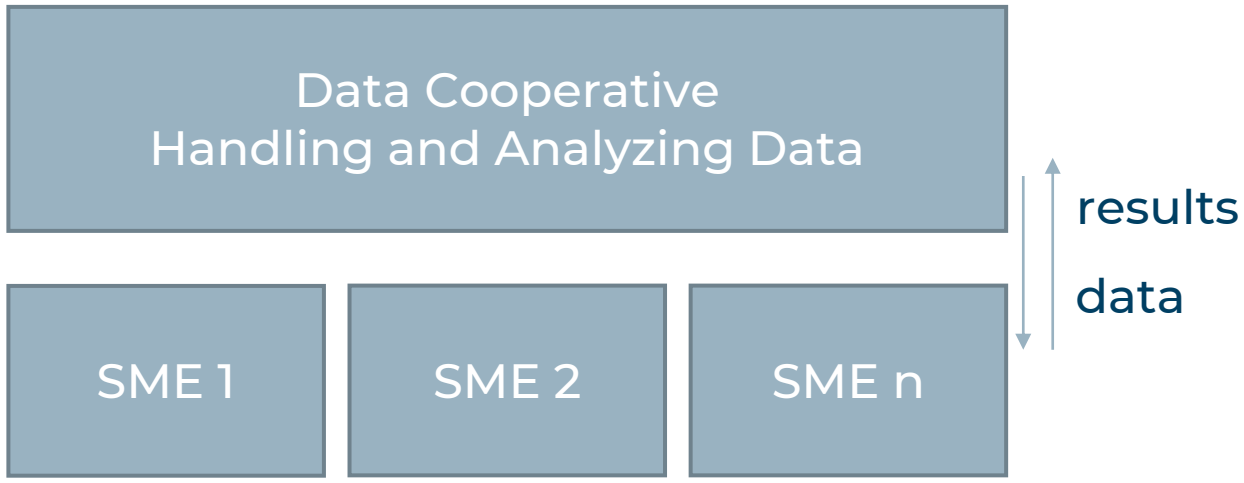


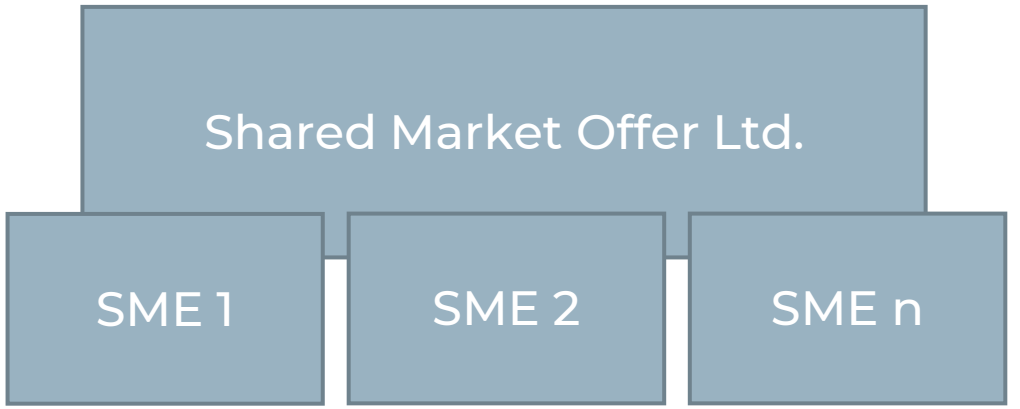


Legal Aspects of data sharing

- Who owns the data?
- Who is liable in case of incorrect data?
- Who is running the data space?

1. Idea: Data Cooperatives
2. Idea: Company that represents the business ecosystem





Levering capabilities and ressources of existing SMEs

Data Security

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- Sharing data instead of information

ID	Xyz987	Nmo456	Spq111	Abc123
12	1,8	40	17	1
14	2,3	250	0	1
21	0,3	1250	0,50	0
5	0,4	823	180	1
17	0,4	1499	60	1

- No context, no semantics, no meta data
- Still possible to identify patterns
- Context and meta data can be sold seperatly

Comparison of IDTA AAS with FSTI DT

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	IDTA AAS	FSTI DT
Focus	Standardization Complete Lifecycle	Solving business problems
Scale	Providing submodels for everyone	Adressing specific small ecosystems
Tools	Specialized Tools to manage AAS	Tools depening on hyperscaler
Content of Digital Twin	Focus on asset master data (few examples that have live data)	Focus on live data (few examples that have detailled master data)
Link to data sharing	Submodels can also be used for data sharing	Digital Twin data is shared

Comparison of Catena-X with FSTI DS

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	Catena-X	FSTI DS
Basis	Information concerning the Supply chain	Information about Assets
Focus	Adressing regulatory needs (e.g. CO2 reporting)	Adressing the information needs of businesses, supporting collaboration
Data Sharing direction	Peer to peer	Central Data Storage with access for all partners
Data Sources	mostly internal IS (at the moment)	Mostly digital twins, some internal IS
Scale	All suppliers	Small ecosystems
Security	Ensured by eclipse data connector and infrastructure provider (access control)	Access control and separation of data and context

digital.industry – Digital Twins and Data Sharing for industry applications - Goals

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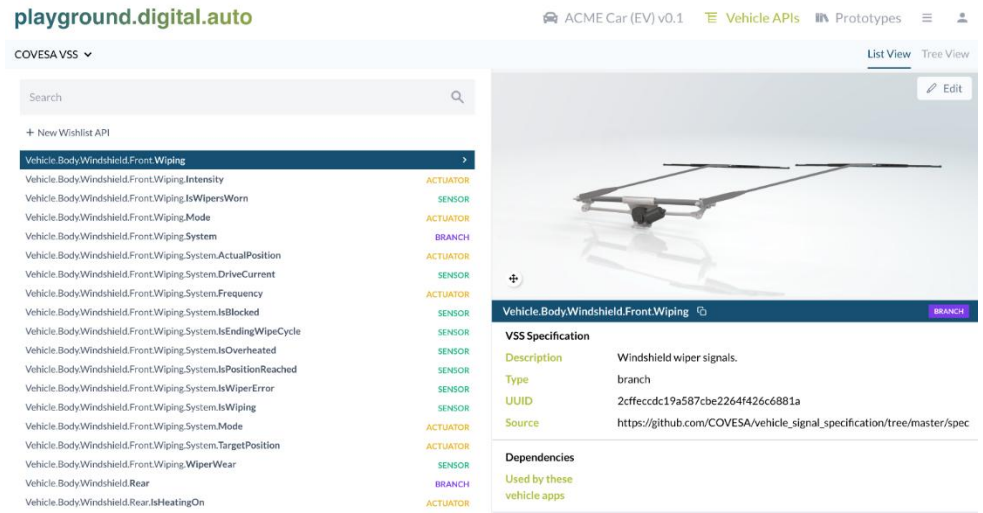
- The digital.industry initiative is inspired by digital.auto
- It has the goal to
  - Establish a description of industrial machinery
  - Provide means to access / handle digital twins representing the current state of the machines
  - Provide Means to build applications
  - Advance #digitalfirst and software-driven development
  - … based on digital twins and data sharing – based on win-win-win-scenarios
- Contact us and join the initiative



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