EDCar – Automotive Data Exchange

Pain Points in Automotive Value Chains in the Daily Life of

I want to save costs by virtually designing my component!

What is the rheology of my PA66-GF30?

I must consider sustainability in my product development!

...

an Engineer

a Dismantler

I want to know, which components can be reused!

Which components and materials are in this car?

What is the remaining lifetime of this system?

...

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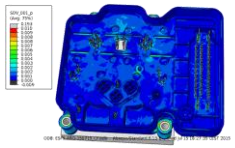
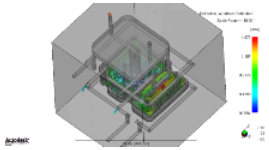
I want to save costs by virtually designing my component!



Run a structural simulation

What is the rheology of my PA66-GF30?

an Engineer



Run a manufacturing simulation

I must consider sustainability in my product development!

Create a Digital Product Passport

...

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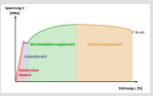
Pain Points in Automotive Value Chains in the Daily Life of

External Sources

- Regulatory Data
- Database Rheological Properties
-  Database Mechanical Properties
- Requirements

an Engineer

Challenges:

- Heterogeneous Data Sources
- Heterogeneous Data Models
- Data Ownership / Data Sovereignty
- Communication along value chain

a Dismantler

Internal Sources

- Specifications
- Expert Knowledge
- Tests / Simulations
- Internal Database

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Solution Approach for Pain Points

- Combine Platform Material Digital (PMD) and Catena-X ecosystems
- **Knowledge Graph as internal Single-Source-of-Truth**
- **PMD contribution:**
  - Ontology Development
  - Triple Store Development
  - Data Pipeline Development

- **Catena-X contribution:**
  - Federated Data-Exchange in Dataspace
  - Semantic Aspect Meta Models (Data Models)
  - Data Ownership / Data Sovereignty

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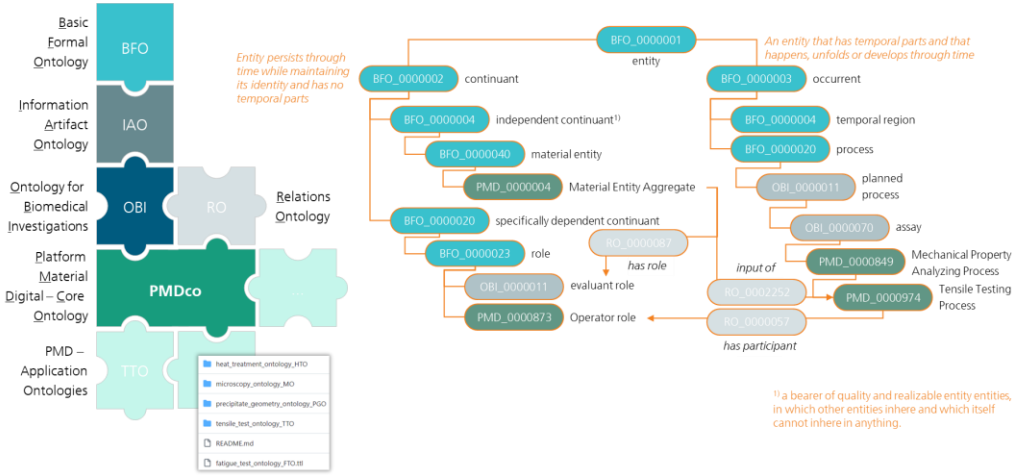
Step 1: Development of an application ontology



- OS ontology

> Ontology:
>
> A structured representation of knowledge within a specific domain

Ontologies by providing **common semantics** are like a shared **dictionary** or **rulebook** that makes sure **everyone** uses the **same words** with the **same meaning** when describing **materials**, **components**, or **processes**.

Ontologies make data **interoperable** - meaning “what you send” is **exactly** “what I receive.”

Ontologies create **structured, machine-readable** data so that different systems can talk to each other.

Ontologies provide a **semantic framework** that enables **flexible** and **context-aware reasoning**. As a result, they can address **new or unforeseen user queries** that were **not** explicitly defined in the original data, ensuring **long-term** adaptability and relevance.

OS: Open Source

KG: Knowledge Graph

DT: Digital Twin

EDC: Eclipse Data Space Connector

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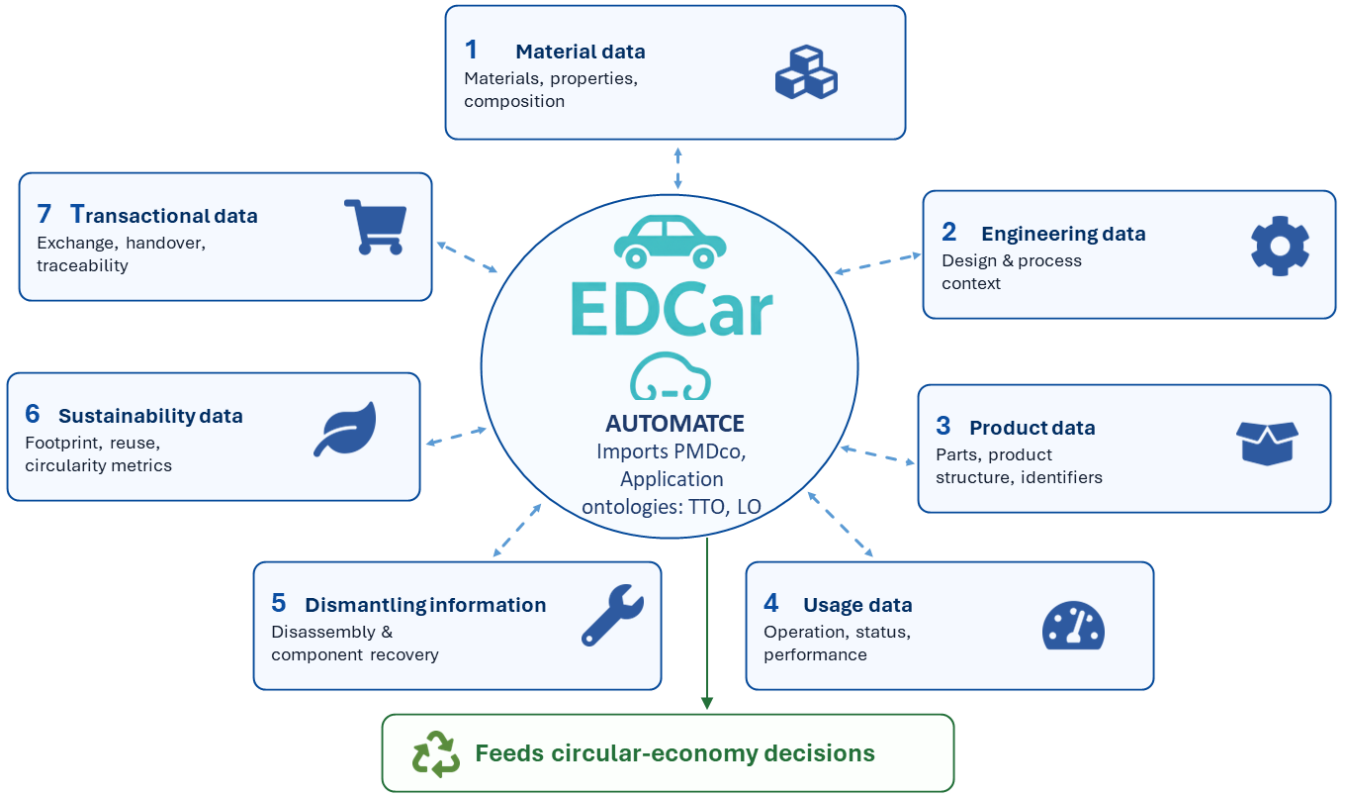
Step 1: Development of an application ontology

- OS ontology



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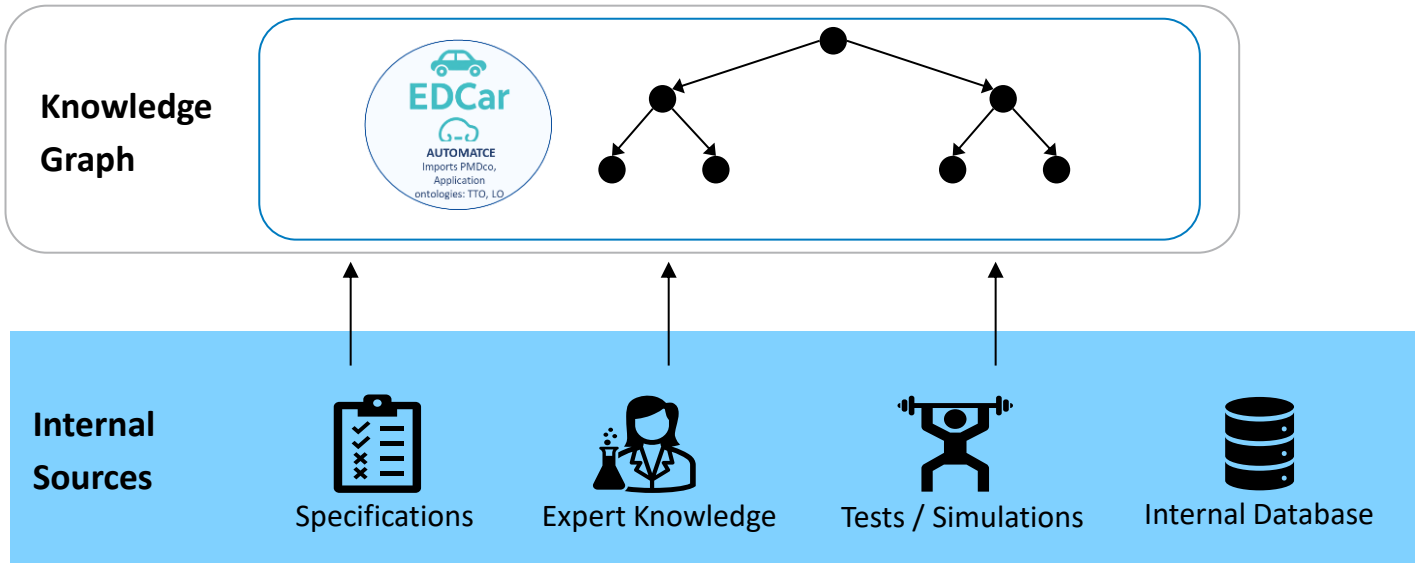
Step 2: Mapping internal data to KG

- OS triple store OntoDocker
- OS Mapping Tools



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BOSCH

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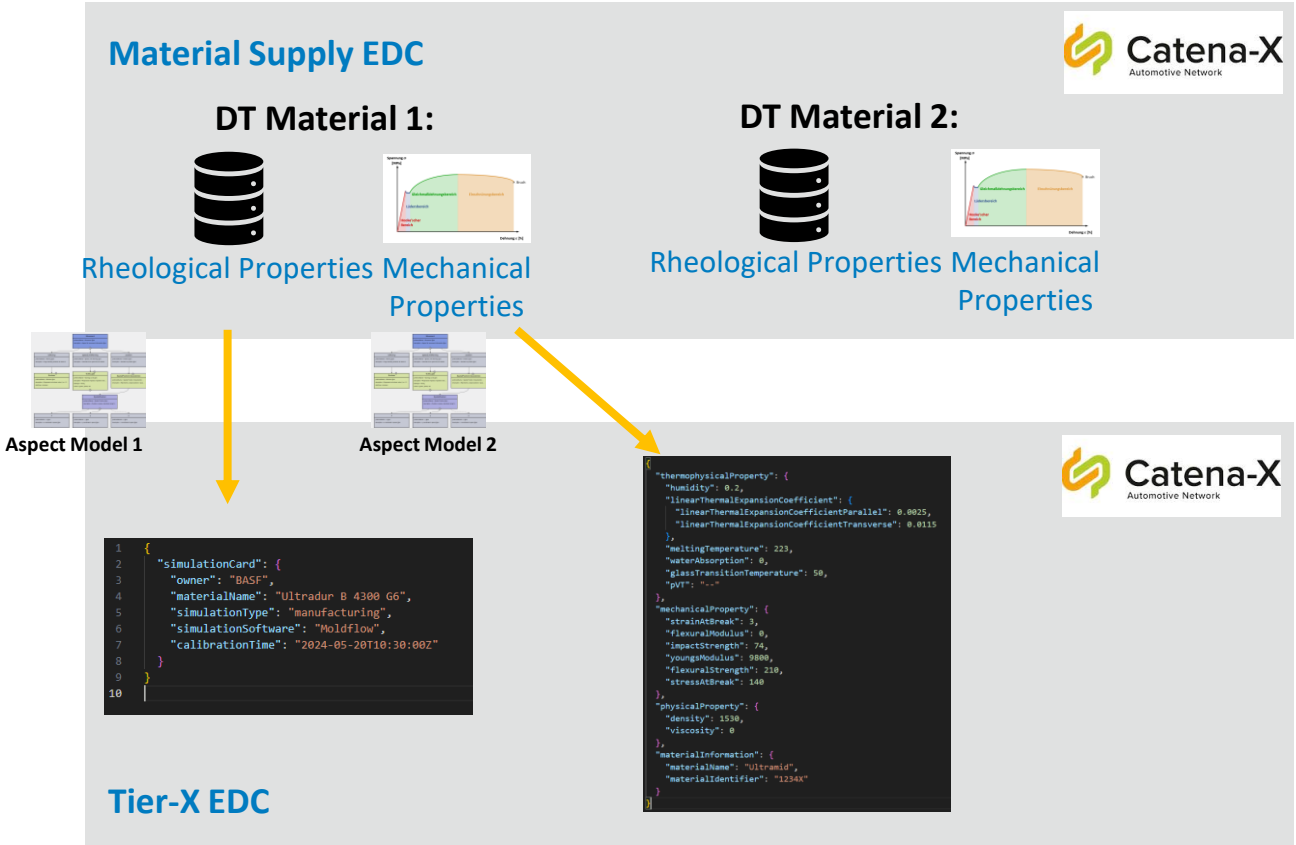
Step 3: Mapping external data to KG



- OS Aspect Models for Material Properties (non standardized!)
- PreProd Environment of Catena-X used

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BOSCH

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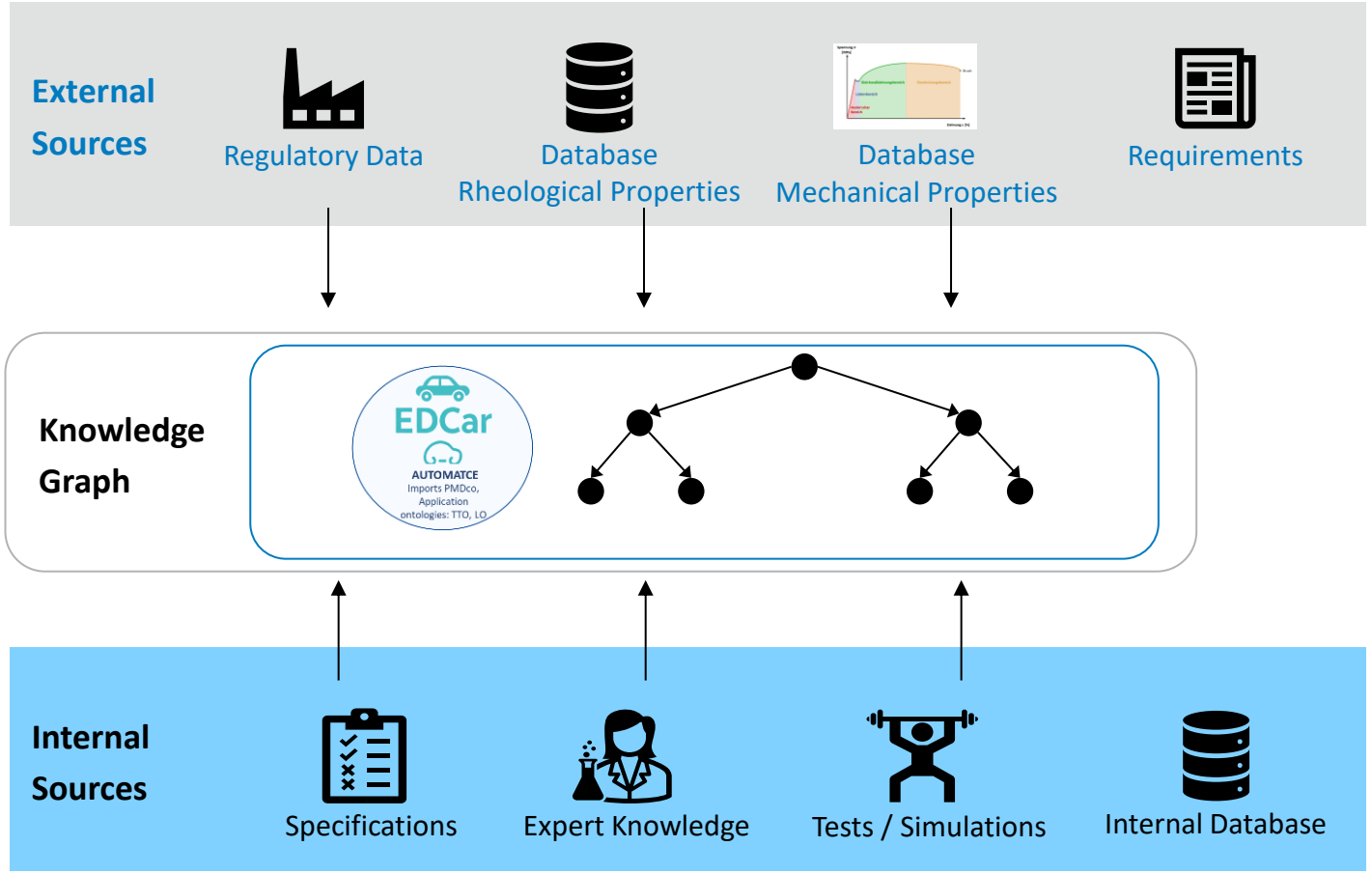
Step 3: Mapping external data to KG



- OS Mapping tools
- Relying on YARRML and SPARQL insert queries

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Step 4: Extracting Data from KG (internal)

I have to design a new component using virtual methods!

an Engineer

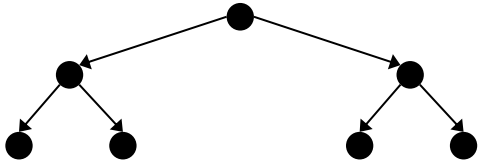
What is the rheology of my PA66-GF30?

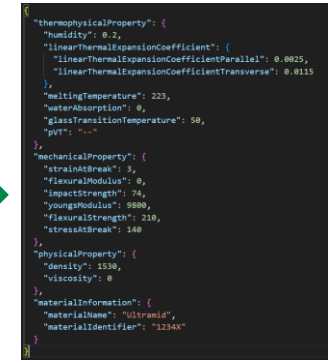
SPARQL query

EDCar

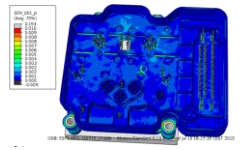
AUTOMATCE

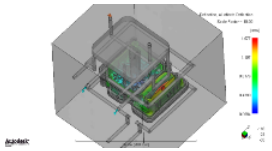
Imports PMDco, Application ontologies: TTO, LO





Run a structural simulation





Run a manufacturing simulation

BOSCH

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Step 5: Extracting Data from KG (external)

- OS Mapping tools
- Relying on SPARQL insert queries

Which hazardous materials are in my product?

an Engineer

What is the PCF of my product?

Demonstration later today in Market Place

Tier-X EDC

Catena-X Automotive Network

Create a Digital Product Passport

BOSCH

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Summary

- Project duration: 12 months (01.07.2025 – 30.06.2026)
- Funded by BMFTR
- **PMD contribution:**
  - Automated mapping of CX Data to PMD knowledge graph and vice versa (OS)
  - Application ontology AUTOMATCE (OS)
- **Catena-X contribution:**
  - Successful Data Exchange via in-house EDC in PreProd environment (all partners!)
  - Aspect Models (non standardized!) for:
    - Material Data
    - Injection Molding Simulation Cards
    - Load collectives
    - Remaining Lifetime
  - Circular Economy Assistant (Marketplace later today)

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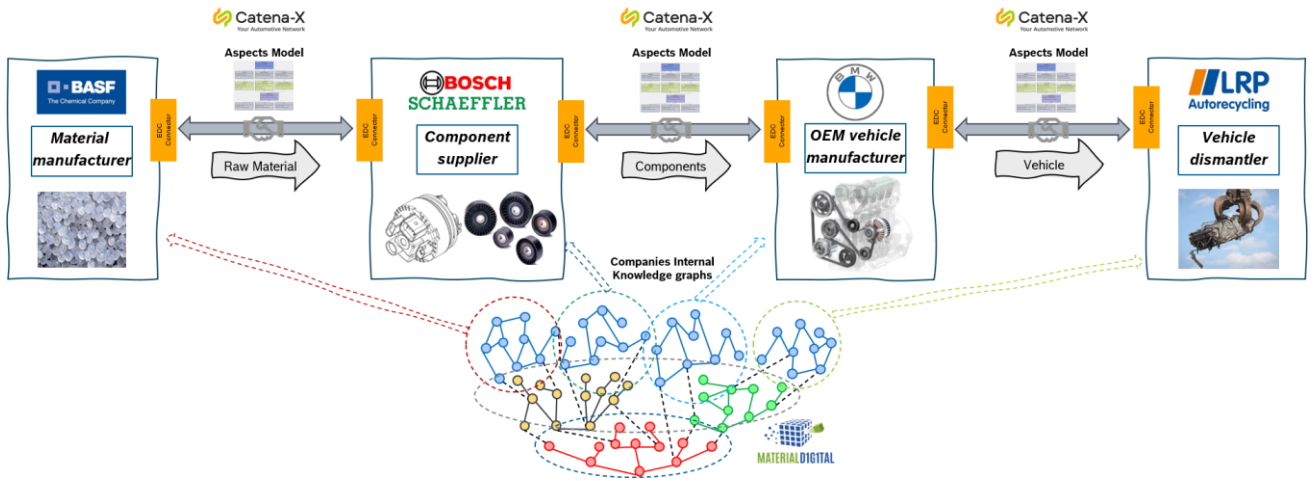
Who we are and Outlook

BASF	SCHAEFFLER	BOSCH	BMW	LRP Autorecycling	light DIGITAL SOLUTIONS	tec4U Compliance Solutions	Fraunhofer
Material Supply	*Tier 1/2 component supply*	*Tier 1 component supply*	*OEM*	*Dismantler*	*Software developer*	*Compliance solutions*	*CX and PMD adoption*

Outlook

- Market Place with demonstration of CE assistant
- Data exchange across Dataspaces (talk by Dr. Johannes Moeller)



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