# Semantic Interoperability Challenge in Industry

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**Semantic interoperability** is the ability of computer systems to exchange data with **unambiguous, shared meaning**

This is accomplished by linking data elements to a **controlled, shared vocabulary**

**But what vocabulary to take for industry?**

Different industry standards / tools have different:

- terminologies
- classification systems
- granularities
- target groups
- applications





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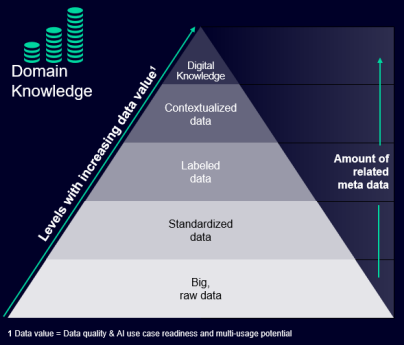
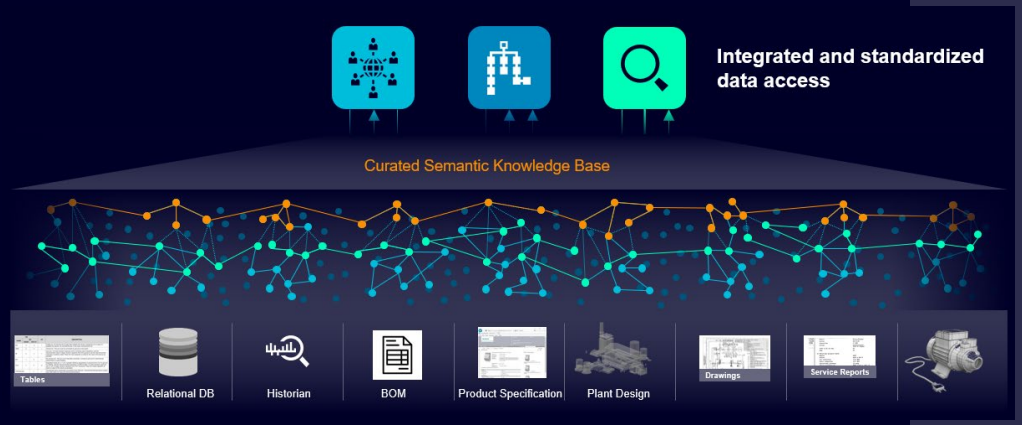
## Industrial AI Challenge

Industrial AI solutions are highly specialized and require extensive **contextual knowledge and high data quality**




## Semantic Interoperability Challenge

Shared Domain Vocabulary and Knowledge

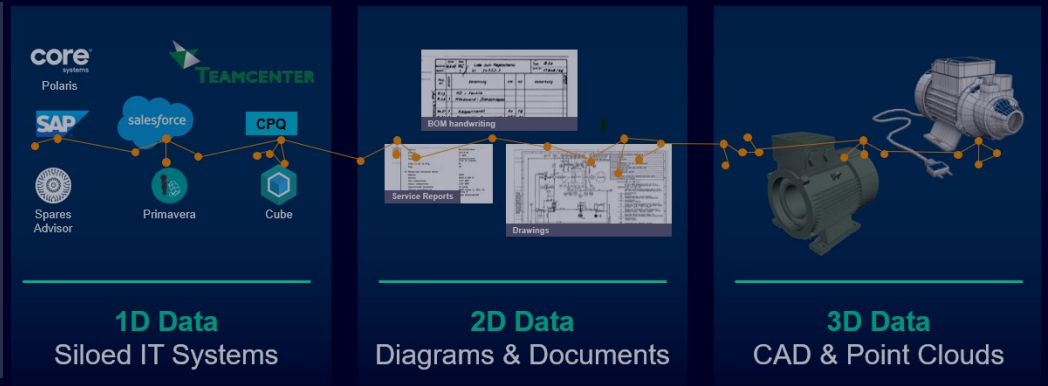
Contextualization / Mapping of Data

Standardized Data Exchange

Easy Human Access of Contextualized Data

## Industrial Data Challenge

Often our datasets are incomplete, **unlabelled, uncontextualized**, imbalanced, corrupted or simply non-existent





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# To achieve Semantic Interoperability we must adopt a Knowledge Centric Approach

**Data Centric**
Application-dependent

Semantic Interoperability

**Knowledge Centric**
Application-agnostic

*Data Structures*

***Data Model***
***defines data structures***

*Enterprise Application*

*Payloads* *APIs* *Attributes*

*captures meaning of terms for*

**brings different worlds and viewpoints together**

*Vocabulary*

*Enterprise Domain Knowledge*

***Ontology***
***organizes domain vocabulary and knowledge***

*Classes* *Relations*

OPC UA
AAS
WEB OF THINGS
IEC CDD
CLASS
CFIHOS
TEAMCENTER
SAP
COMOS Platform
OWL
Semantic Web
RDF





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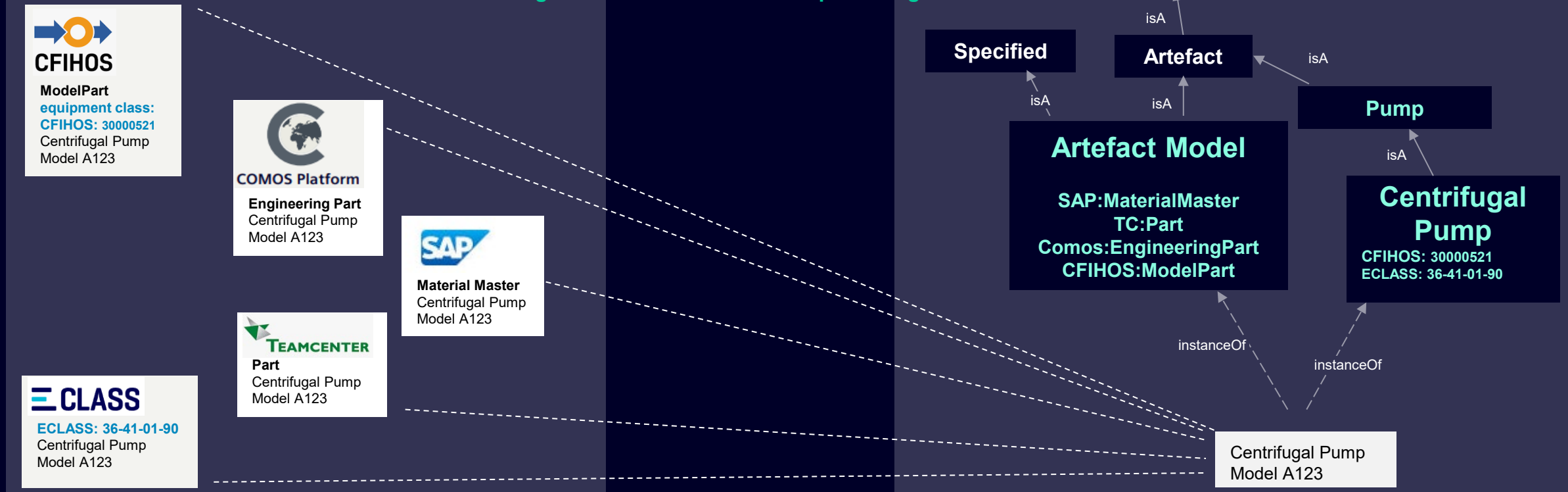






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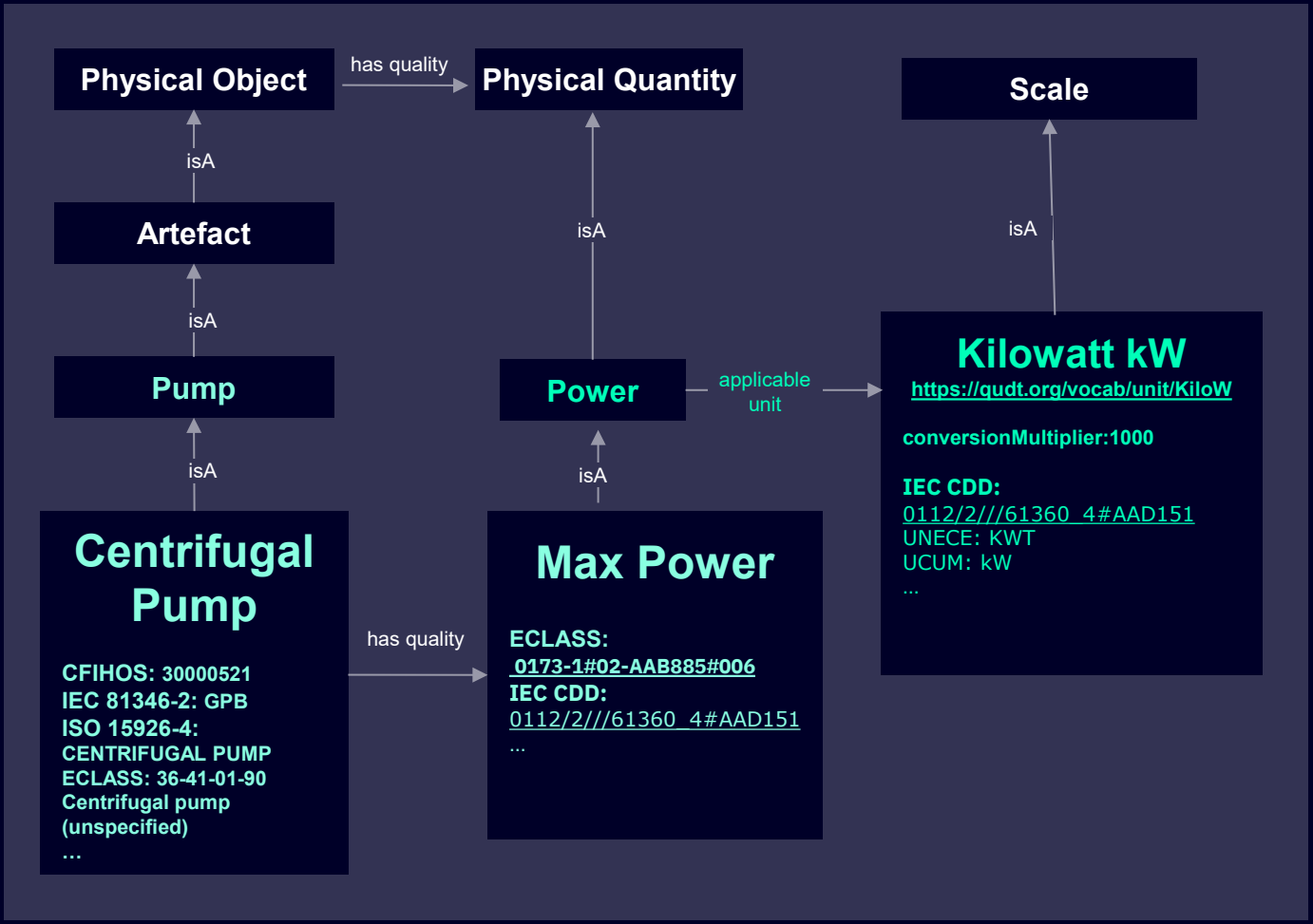
# Standardized Ontologies define Modeling Patterns for Reference Data Libraries and provide Foundation for Interoperability and Re-Use




**Industrial Data Ontology – IDO**
is an industry-domain-agnostic ontology that defines top-level classes, relationships and modeling patterns for **industry reference data libraries**.

**IDO** is being standardized as a part of the new standard ISO 23736 – Ontology-Based Interoperability under ISO/ TC 184/ SC 4.

Final Remarks

- Standards mapping is laborious but leads to a better data quality!
- NLP tools and LLMs can help!
- We need people with the right skills and an ecosystem-wide cooperation!



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# Contact

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