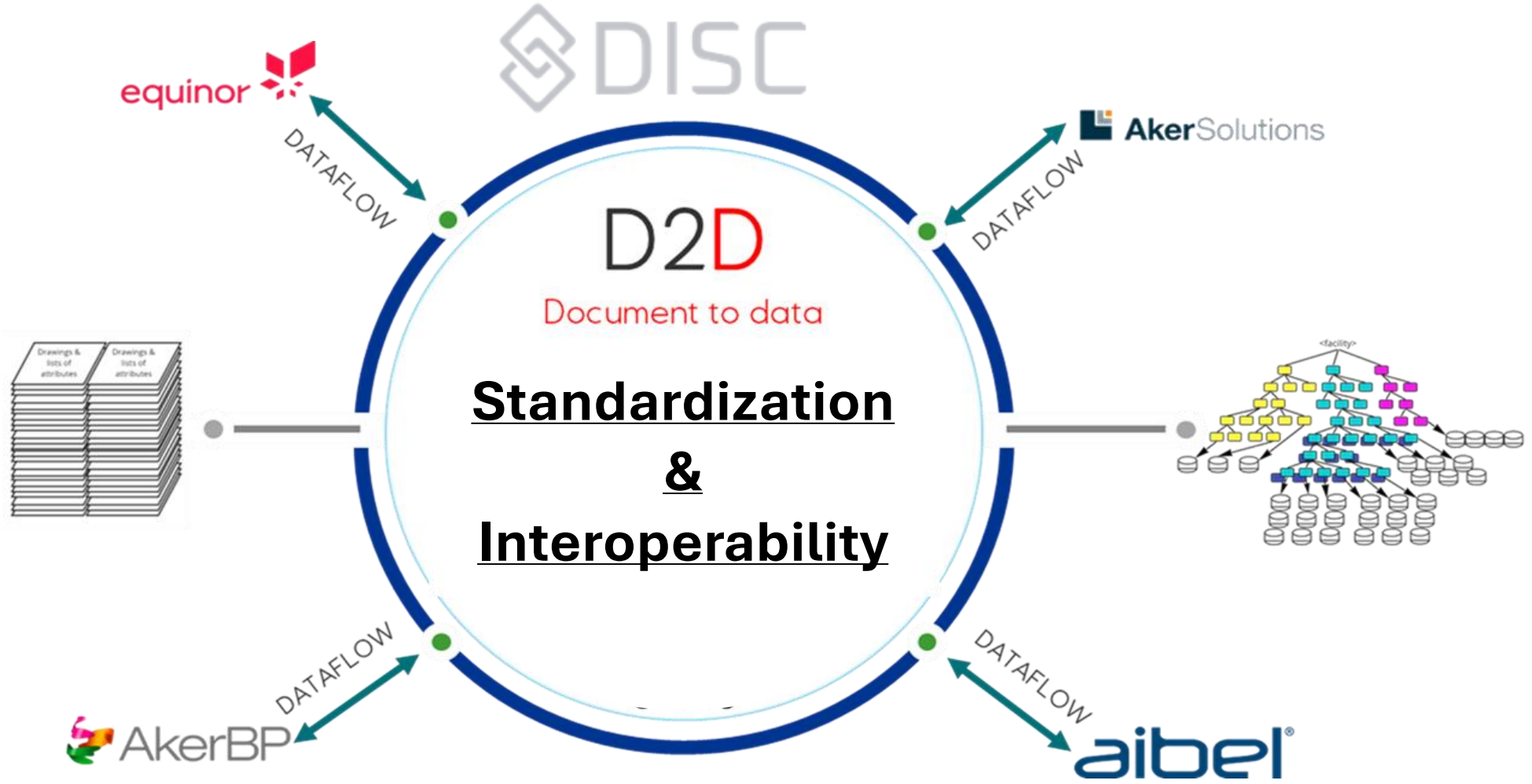
IMF for the THTH community

Trusted asset information models that is machine understandable in a lifecycle perspective



Agenda

- Introduction & background/drivers
- The Three Pillars of IMF validation
- Information Modelling Framework (IMF)
- Digital Assets – The Full Ecosystem and lifecycle perspective

The DISC objective is to achieve a

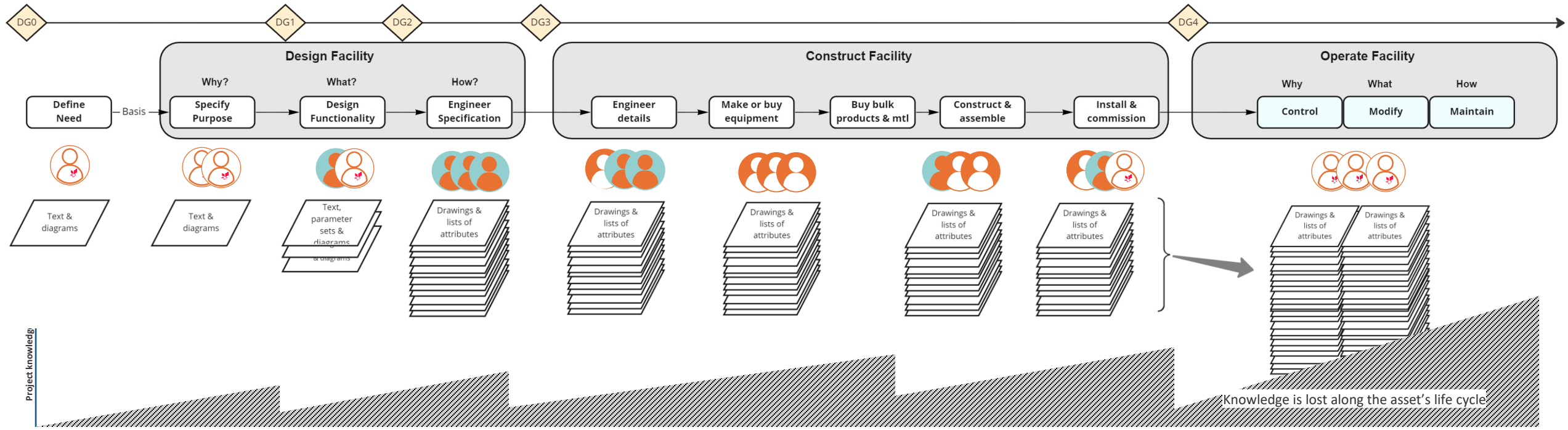
Seamless, Standardized, Secured and Verified Dataflow

to accelerate Project Execution and streamline

Operational Processes for greater efficiency

Introduction & Background/drivers

Technical information management in projects and operations today



Consequences:

- Automation of manual procedures is difficult
- Loss of information
- Labour-intensive document handling
- Risk of safety and quality breaches
- Lost business opportunities

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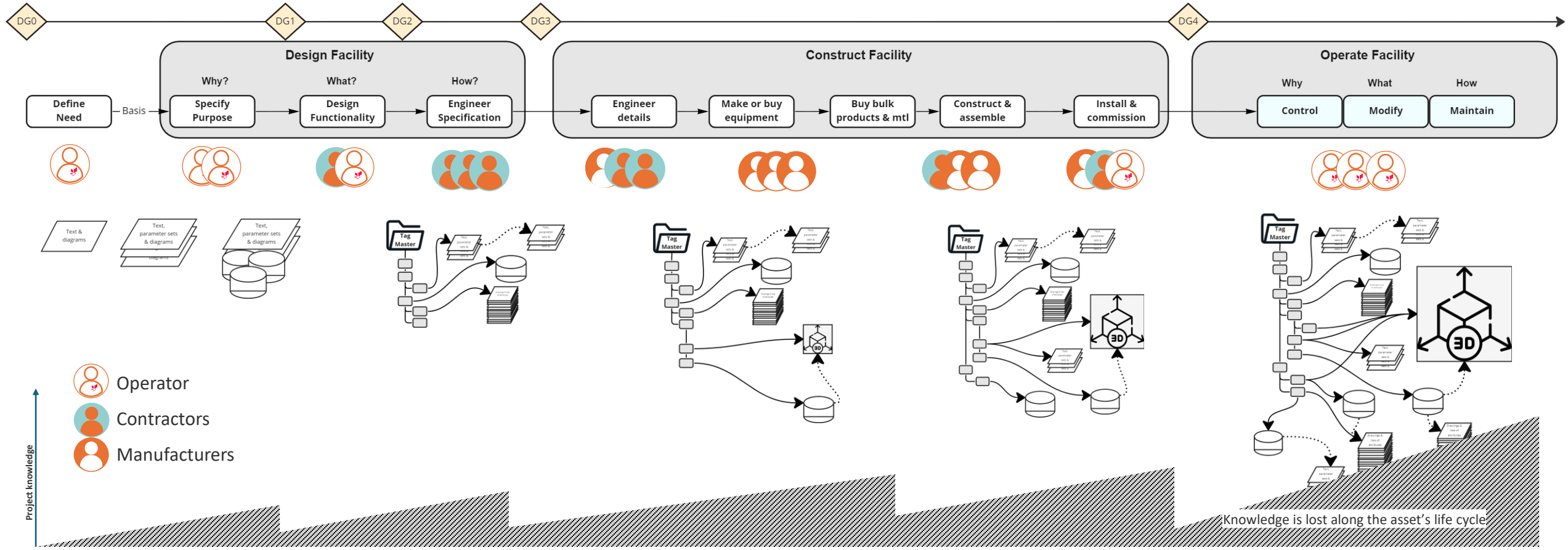
Technical information grows in fragments along the Valuechain



Consequences:

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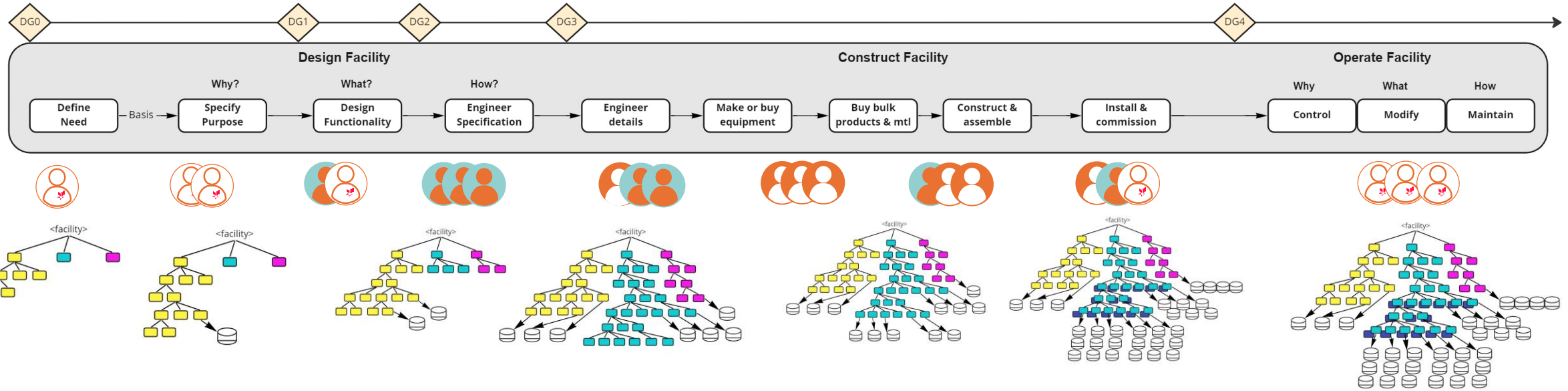
Achieving interoperability through a digital interoperable common language



Machine integrable IMF models

Interoperability through a common digital language, based on OBI/IDO

Automating work processes

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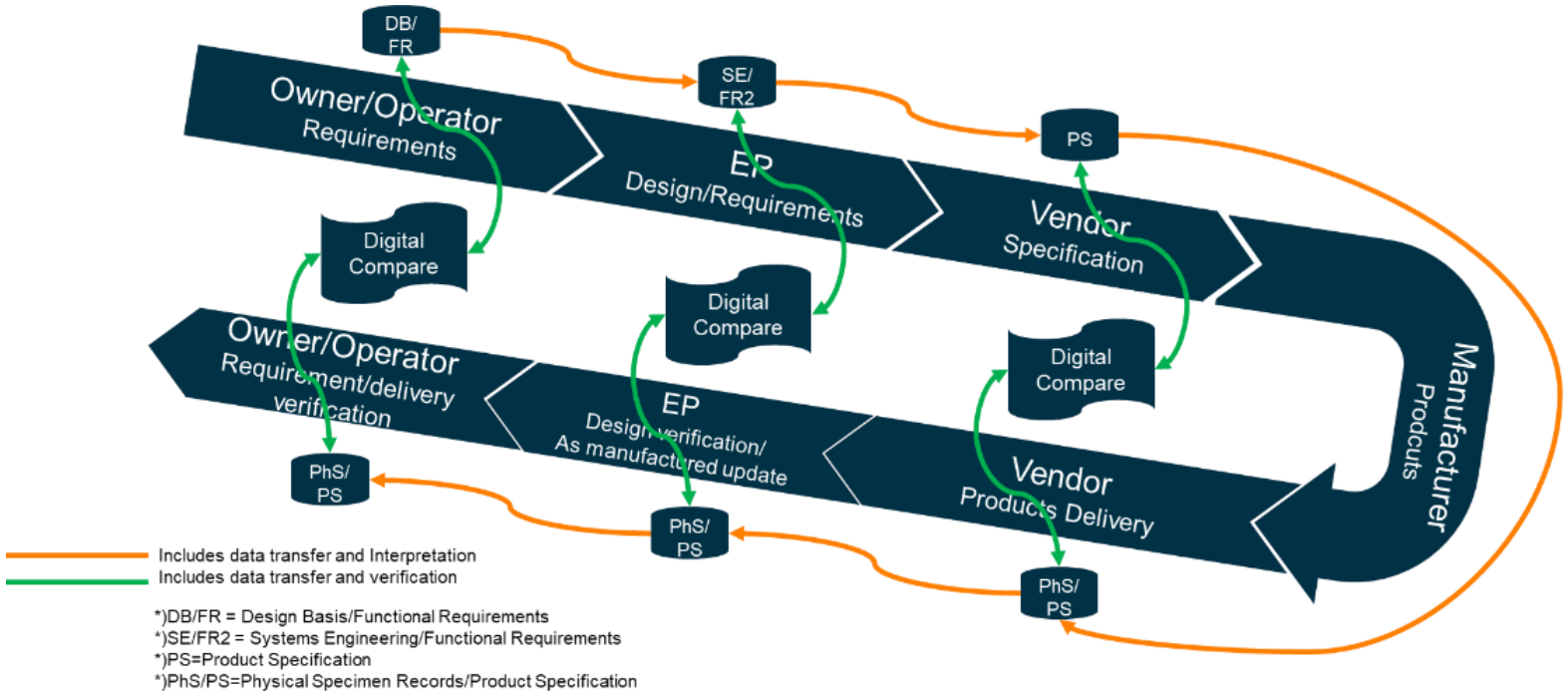
Getting trusted asset information will improve decision making

The **overall** process largely remains the same, but the **information flow** will be improved resulting in faster execution and **fewer process** steps.



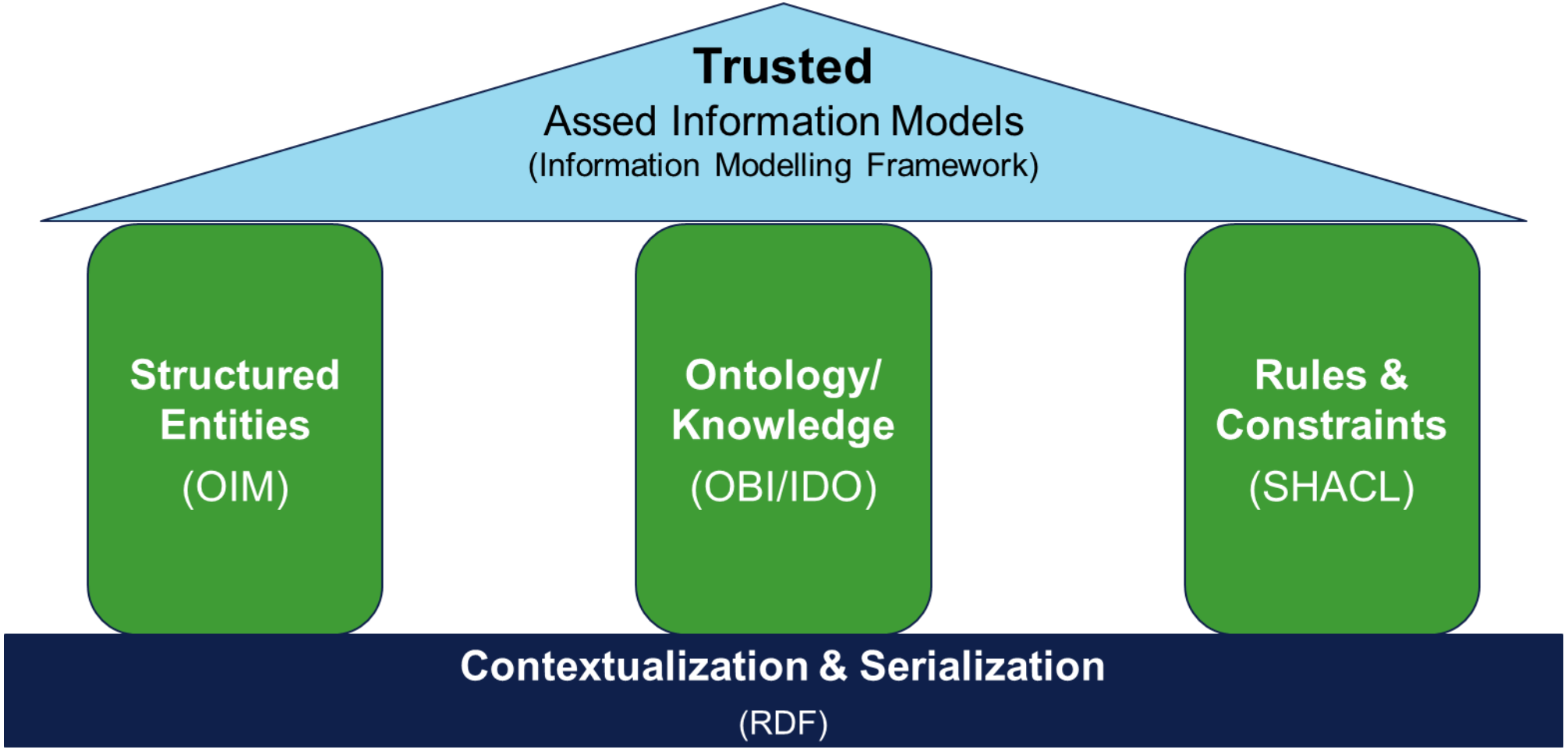
Requirement management and the V-Model from a digital validation point of view

- **Structured and standardized digital requirements** will ease both contractor's and supplier's engineering
- **Digital requirements expressed digitally** (as specified in e.g. READI TIRC) will ease requirements **verification** in datasets like IMF types (TAG data), systems engineering representations like DEXPI /Automation ML (SCD) on the digital information. The validation might be done by e.g. SHACL
- **This leads to early approval of main/key design and interface information (early** agreed and frozen)
- **Trusted information** handed over to Owner Operator to be used in combination with real time data and plant monitoring to manage preventive maintenance
- **Maintenance and modification** may be managed by SHACL, Machine Learning, AI (LLM's) leading to predictive maintenance

The Three Pillars of IMF validation

The Three Pillars of IMF validation

- Ensuring trust through structure, meaning and constraints



Information Modelling Framework (IMF)

WHAT IS THE IMF (Information Modelling Framework)

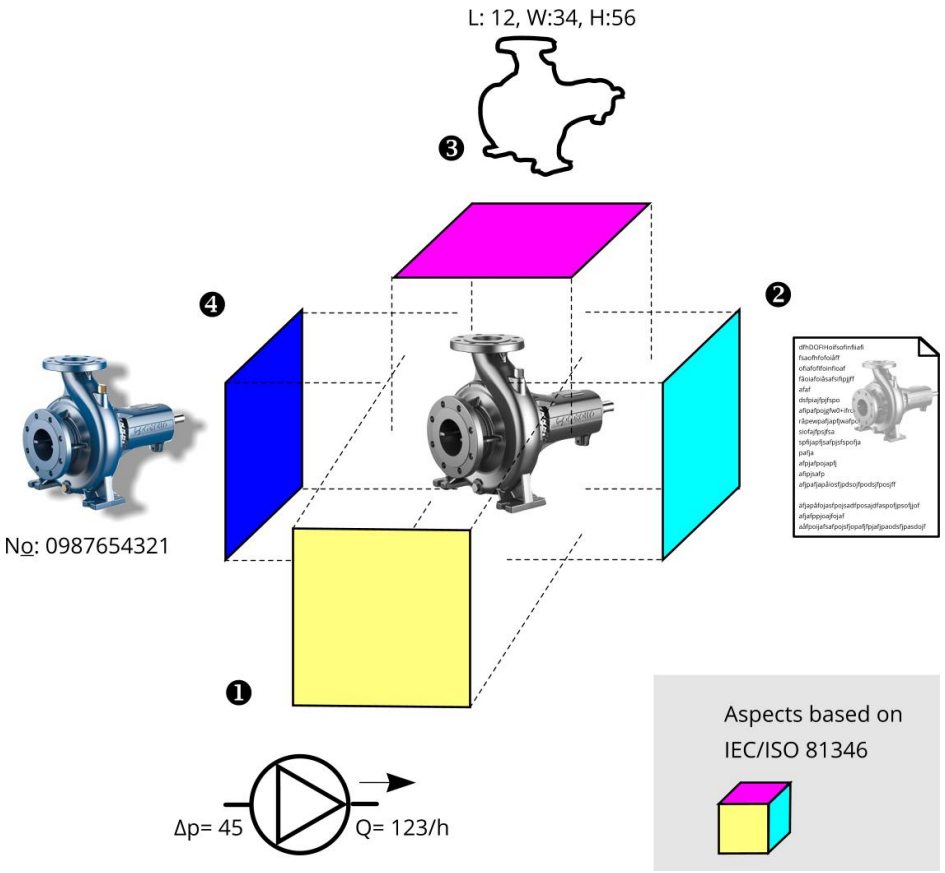
- The **IMF** is a method, a framework, and a language that allows creating **an engineering friendly description of a Facility Asset**, using graphical figures and common industry reference data libraries.

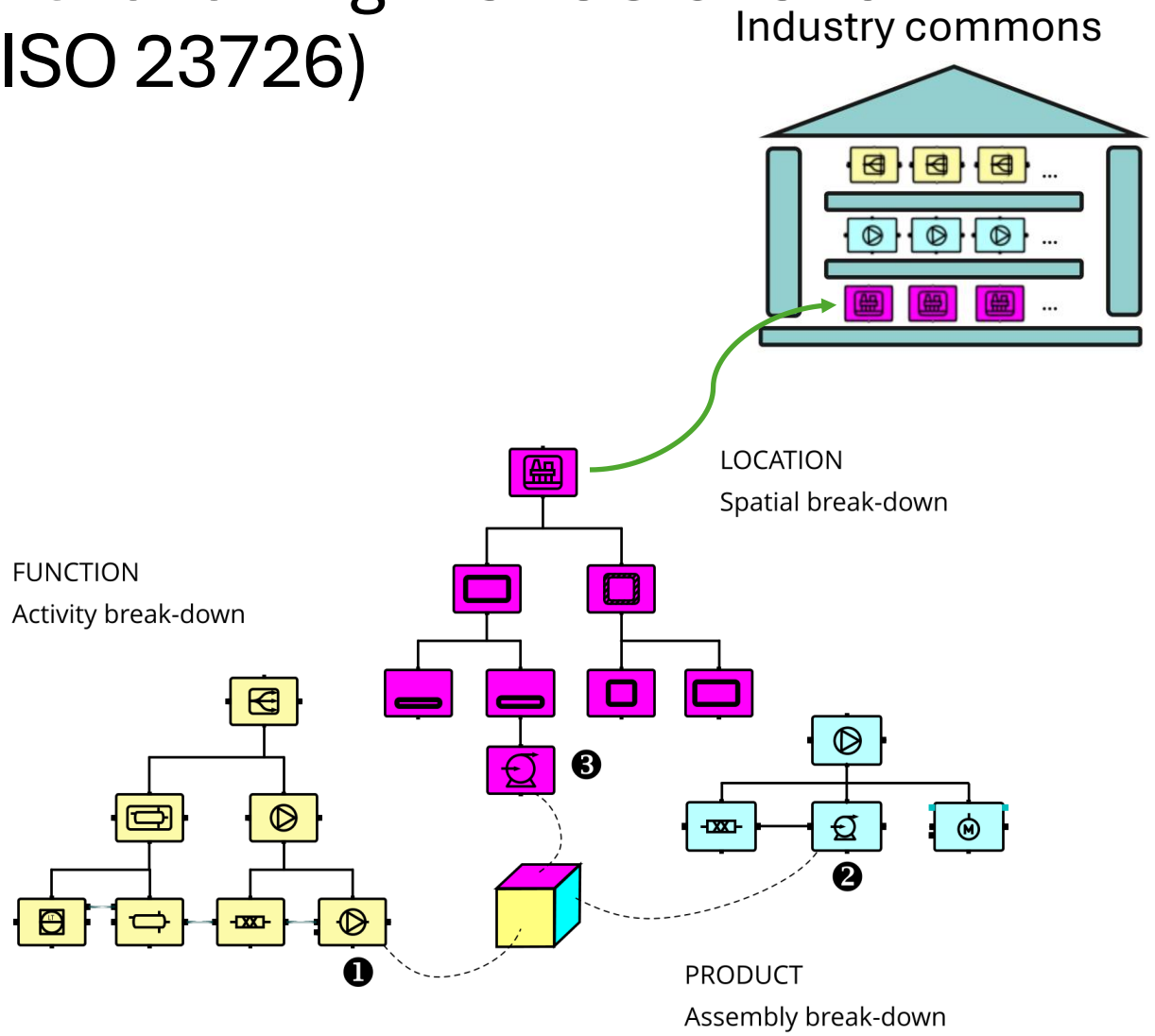
- The libraries contains definitions of elements (IMF Types) that are frequently re-used.

- The resulting Information Model of the Facility Asset contains information in a format which is **readable to humans as well as to computers**.

*) IMF Manual v.0.3: Information Modelling Framework (IMF)

The IMF framework term “Aspects” is following IEC/ISO 81346 principles, and based on OBI/IDO (ISO 23726)





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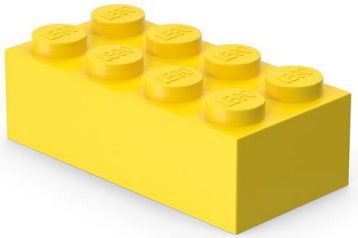
IMF Blocks for Temperature Transmitter

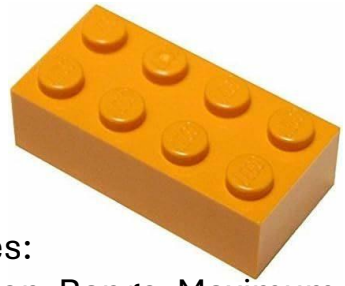
IMF block for **Functional** Aspect



Attributes:

Design_Temp_Min
Design_Temp_Max
Measurement_Range_Min
Measurement_Range_Max
....

IMF block for **Installed** Aspect

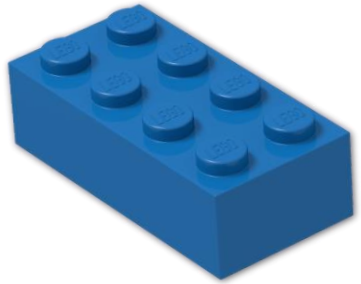


Attributes:
Calibration_Range_Maximum
Calibration_Range_Minimum
Fail_Safe_Direction
Serial_no .....

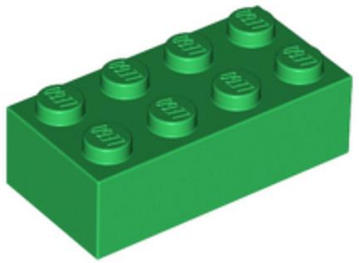
IMF block for **Product** Aspect

Attributes:

Manufacturer
Manufacturer_model_no
Rated_power_consumption
Safety_integrity_level
Supply_voltage_effect
Total_weight
....



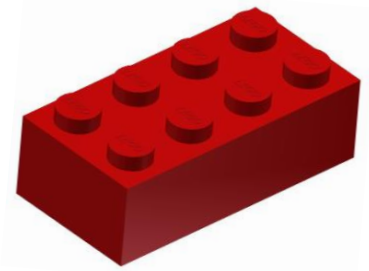
IMF block for **Plant** Aspect



Attributes:

Electrical_Surge_Protection_Required
Fail_Safe_Direction
Safety_Integrity_Level
Service_Description
Vibration
....

IMF block for **Location** Aspect



Attributes:

Safety Relevant Area
Height
Width
Length
X,Y,Z coordinates
....

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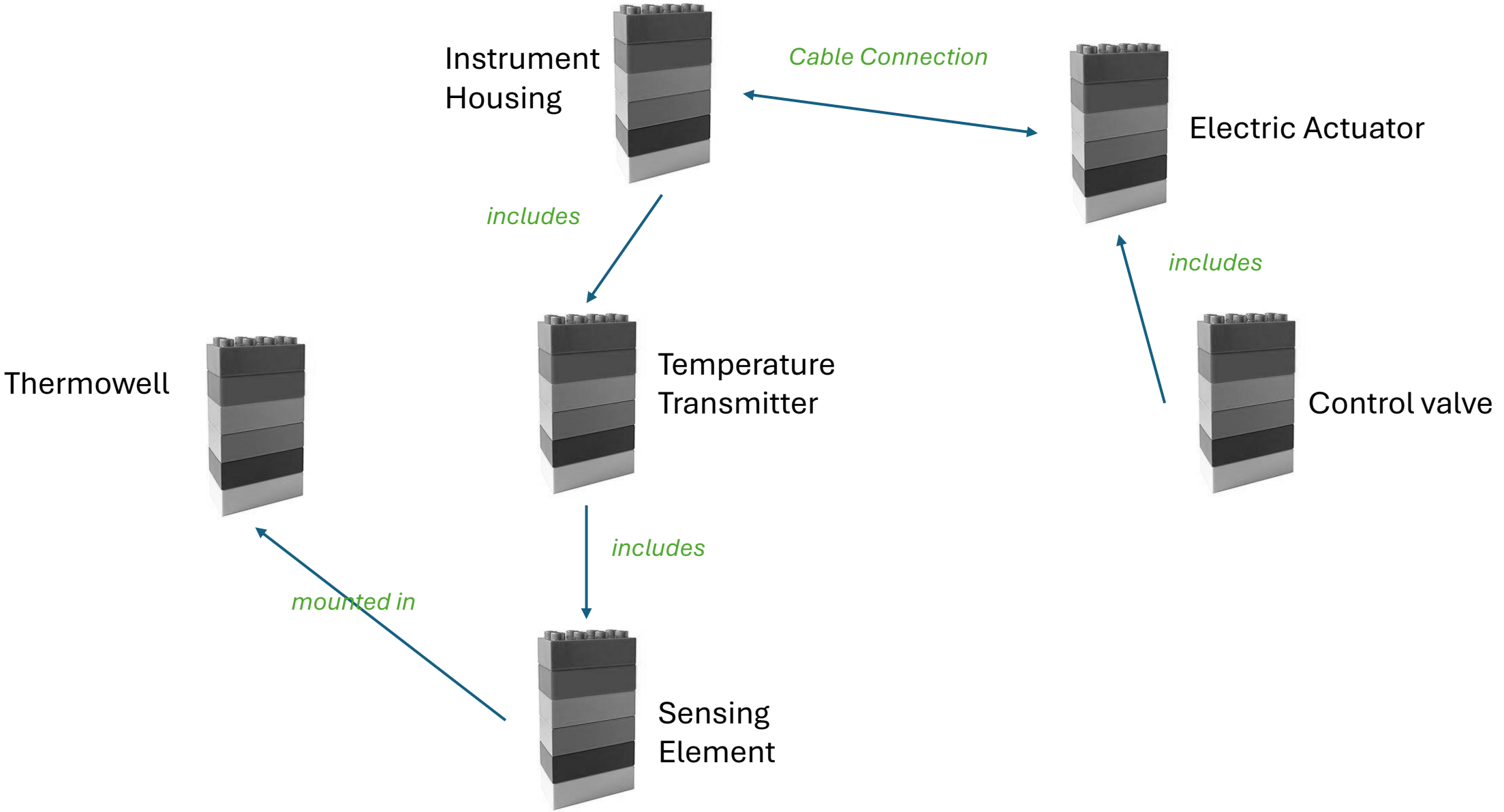
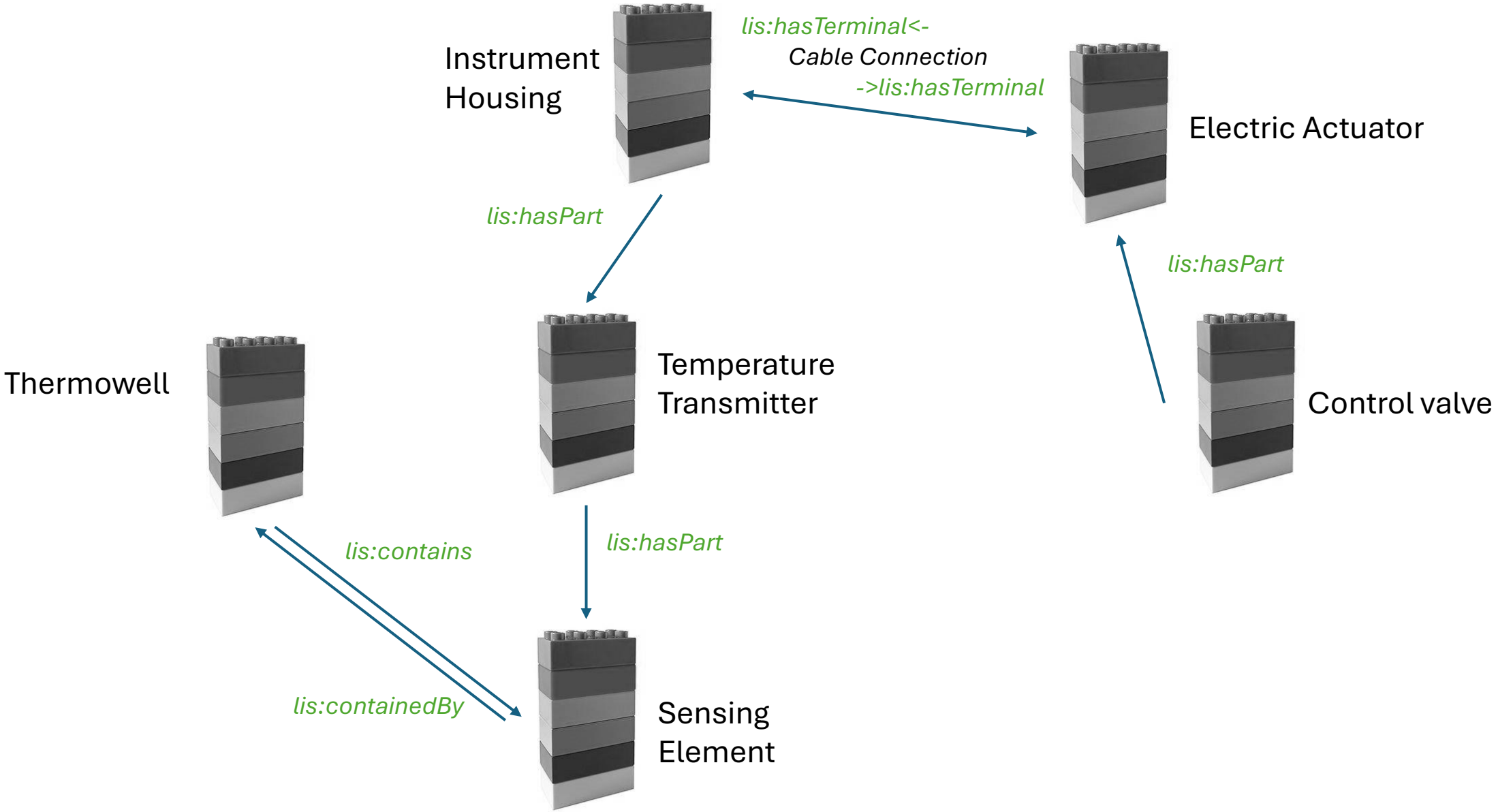
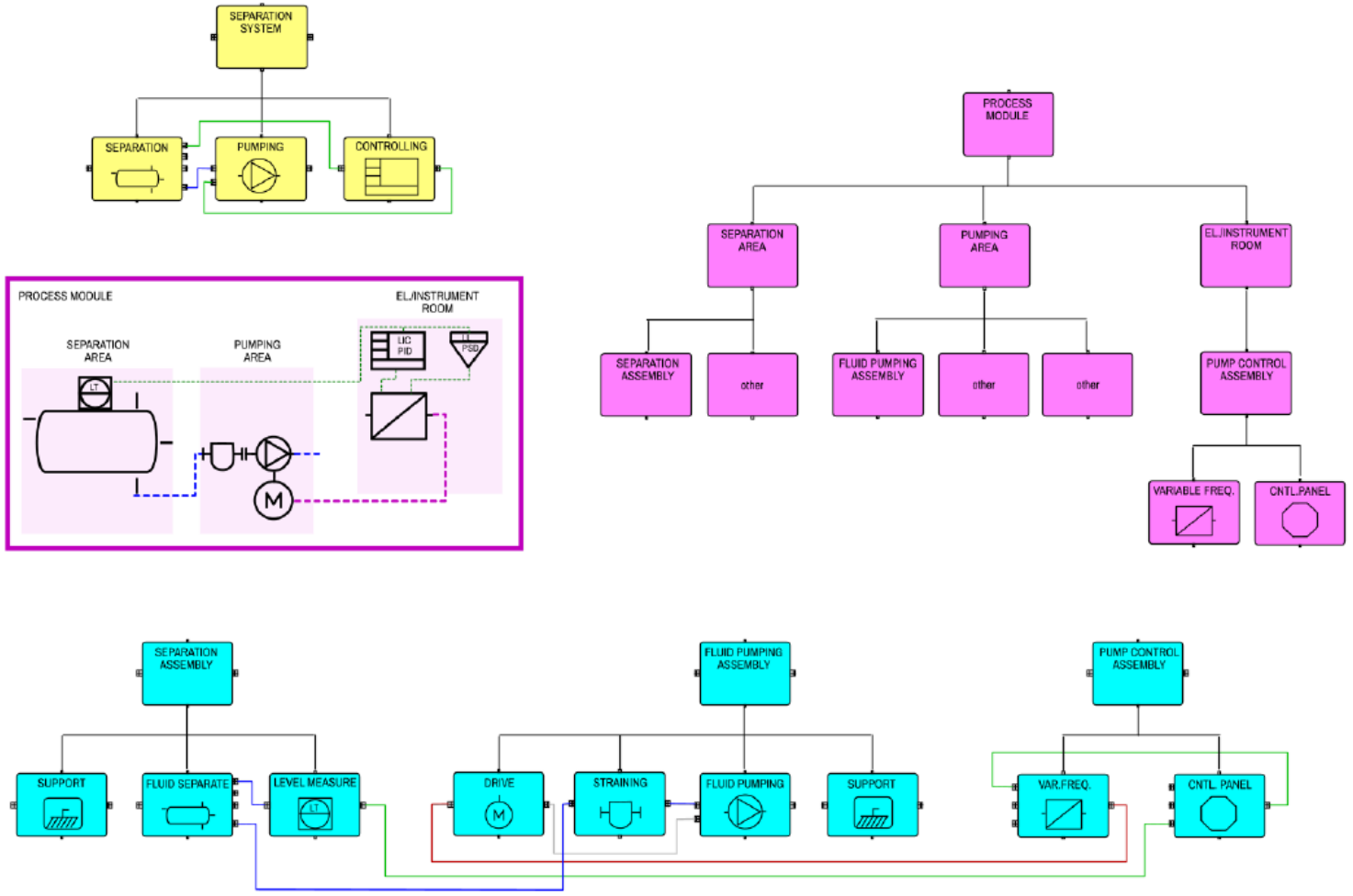

Instrument Housing
Cable Connection
Electric Actuator
includes
includes
Thermowell
Temperature Transmitter
Control valve
includes
mounted in
Sensing Element


Instrument Housing
lis:hasTerminal<-
Cable Connection
->lis:hasTerminal
Electric Actuator
lis:hasPart
lis:hasPart
Thermowell
Temperature Transmitter
Control valve
lis:contains
lis:hasPart
lis:containedBy
Sensing Element

A separation system represented as an IMF model with three aspects: Function, Location, Product, ...



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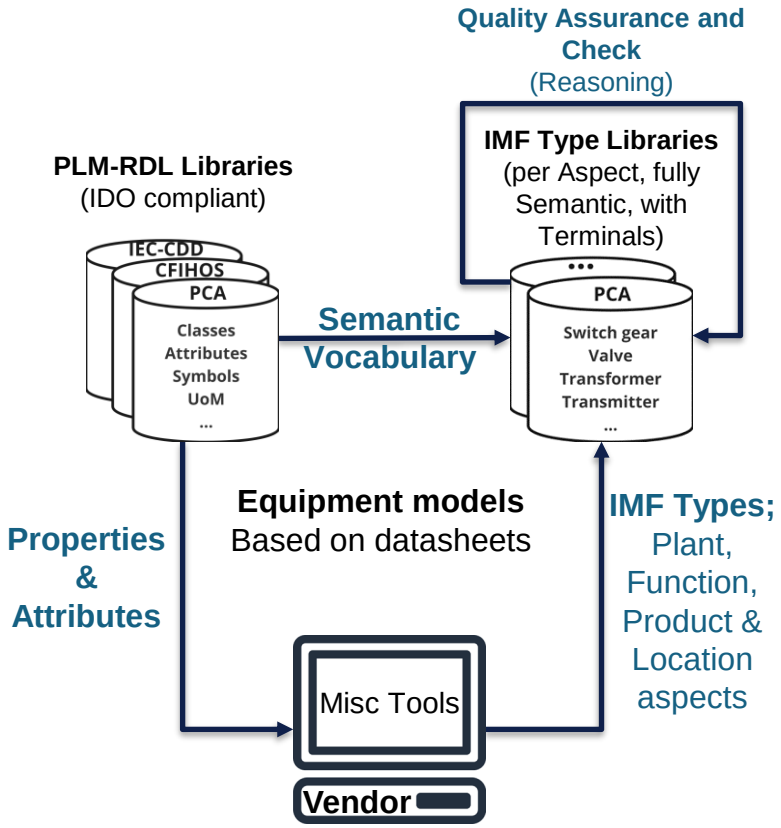
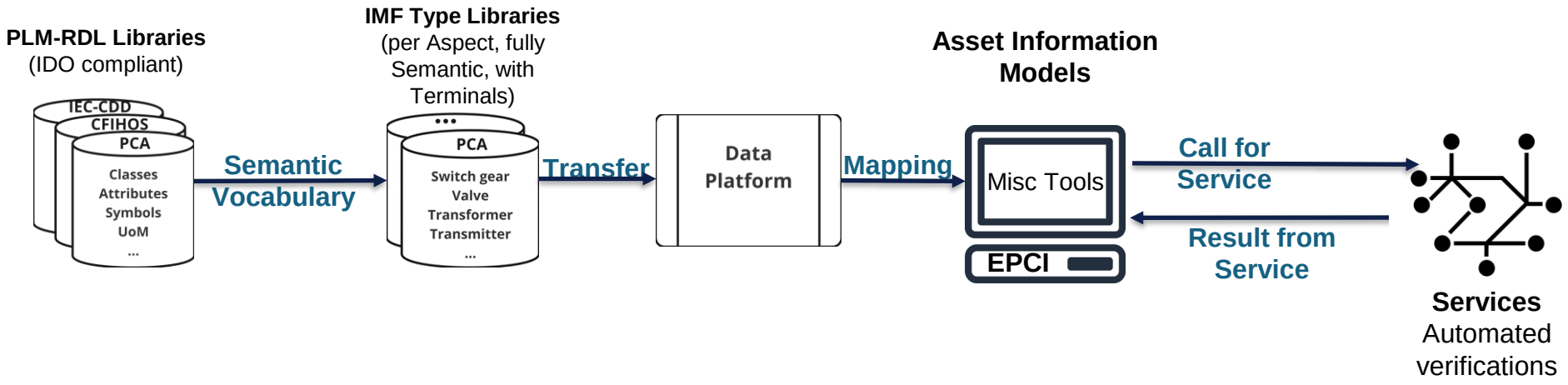
Digital Assets

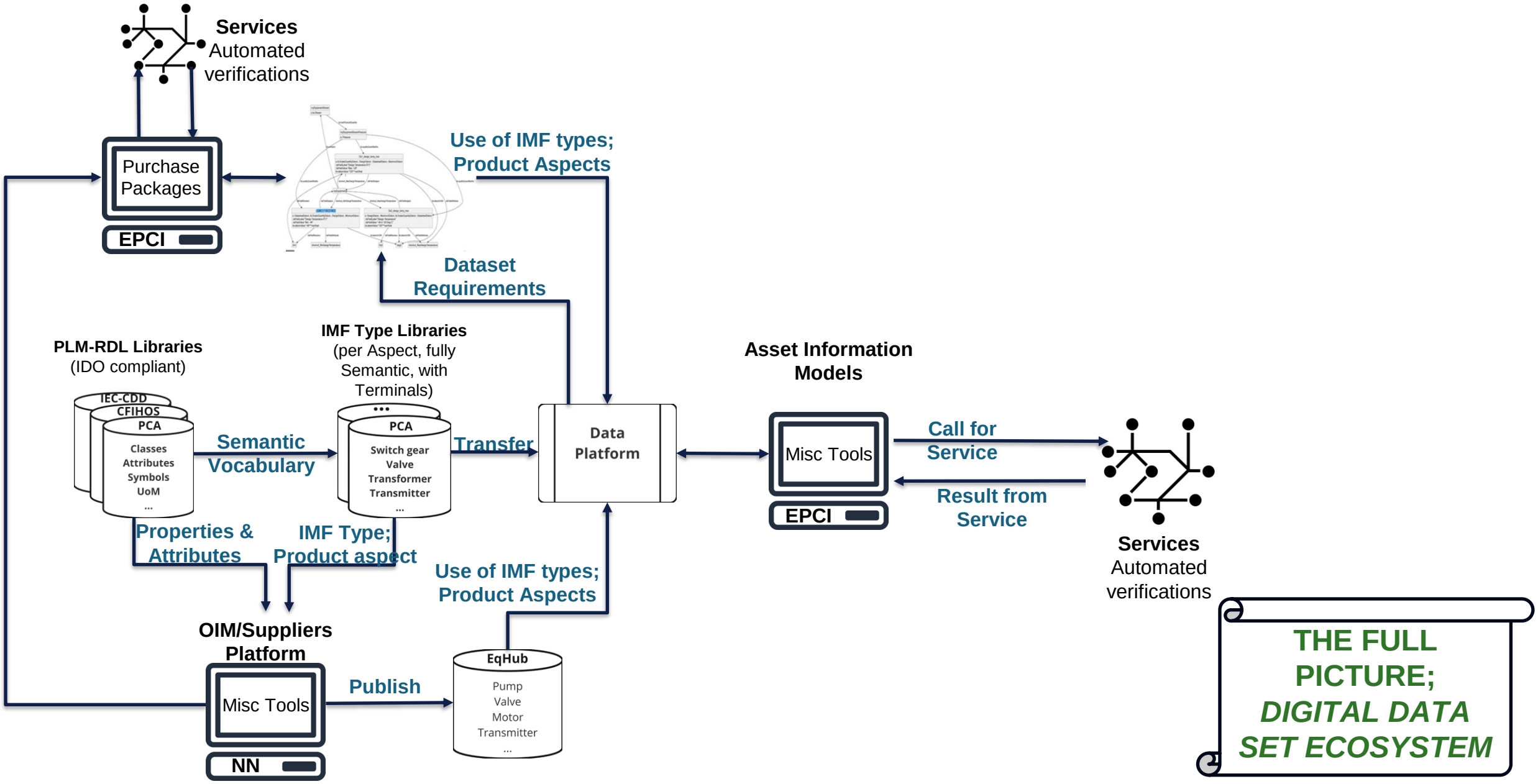
The Full Ecosystem and lifecycle perspective



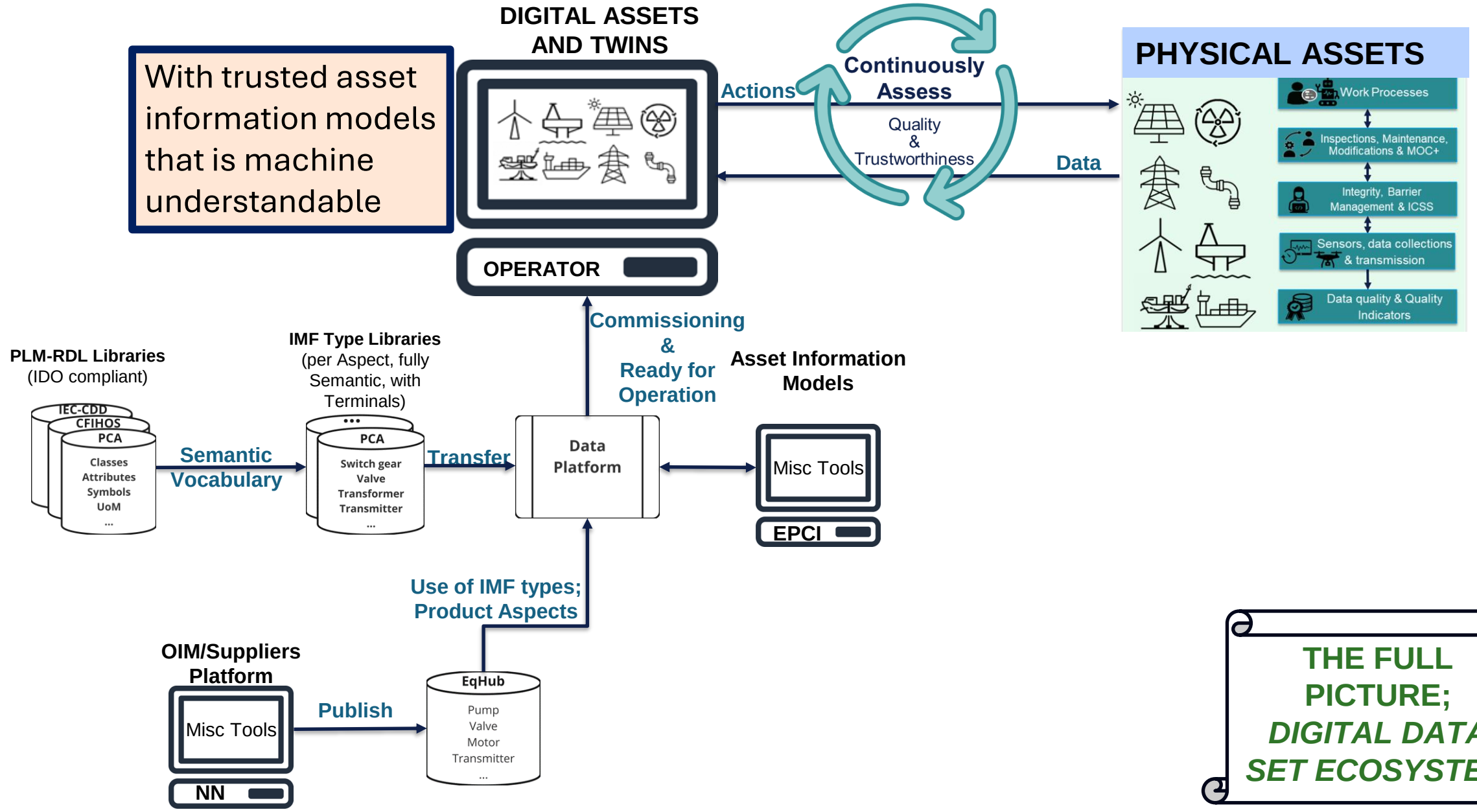
THE FULL PICTURE;
DIGITAL DATA SET ECOSYSTEM



THE FULL PICTURE;
DIGITAL DATA SET ECOSYSTEM


Services
Automated
verifications
Purchase
Packages
EPCI
Use of IMF types;
Product Aspects
Dataset
Requirements
PLM-RDL Libraries
(IDO compliant)
IEC-CDD
CFIHOS
PCA
Classes
Attributes
Symbols
UoM
...
Semantic
Vocabulary
IMF Type Libraries
(per Aspect, fully
Semantic, with
Terminals)
PCA
Switch gear
Valve
Transformer
Transmitter
...
Transfer
Data
Platform
Asset Information
Models
Misc Tools
EPCI
Call for
Service
Result from
Service
Services
Automated
verifications
Properties &
Attributes
IMF Type;
Product aspect
Use of IMF types;
Product Aspects
OIM/Suppliers
Platform
Misc Tools
NN
Publish
EqHub
Pump
Valve
Motor
Transmitter
...
THE FULL
PICTURE;
DIGITAL DATA
SET ECOSYSTEM

With trusted asset information models that is machine understandable



THE FULL PICTURE; *DIGITAL DATA SET ECOSYSTEM*

*) PCA IMF type "Temperature Transmitter" product aspect: Temperature Transmitter

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D2D

Document to data

Interoperability

Through an Information Modelling Framework (IMF), based on ISO 23726 (OBI/IDO), and principle from asset breakdown structure ISO/EIC 81346

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Useful links to this presentation

- PCA IMF library: https://www.posccaesar.org/libraries/pcardl
- PCA IMF type “Temperature Transmitter” product aspect: Temperature Transmitter
- IMF Manual: Information Modelling Framework (IMF)
- DNV recommended practice: Asset information modelling framework: Structuring digital assets | DNV-RP-0670
- PCA IMF OBI-IDO training (Youtube): 2024 12 05 DISC Yggdrasil User Forum