Asset Administration Shell and IEC 61987

Overview Presentation

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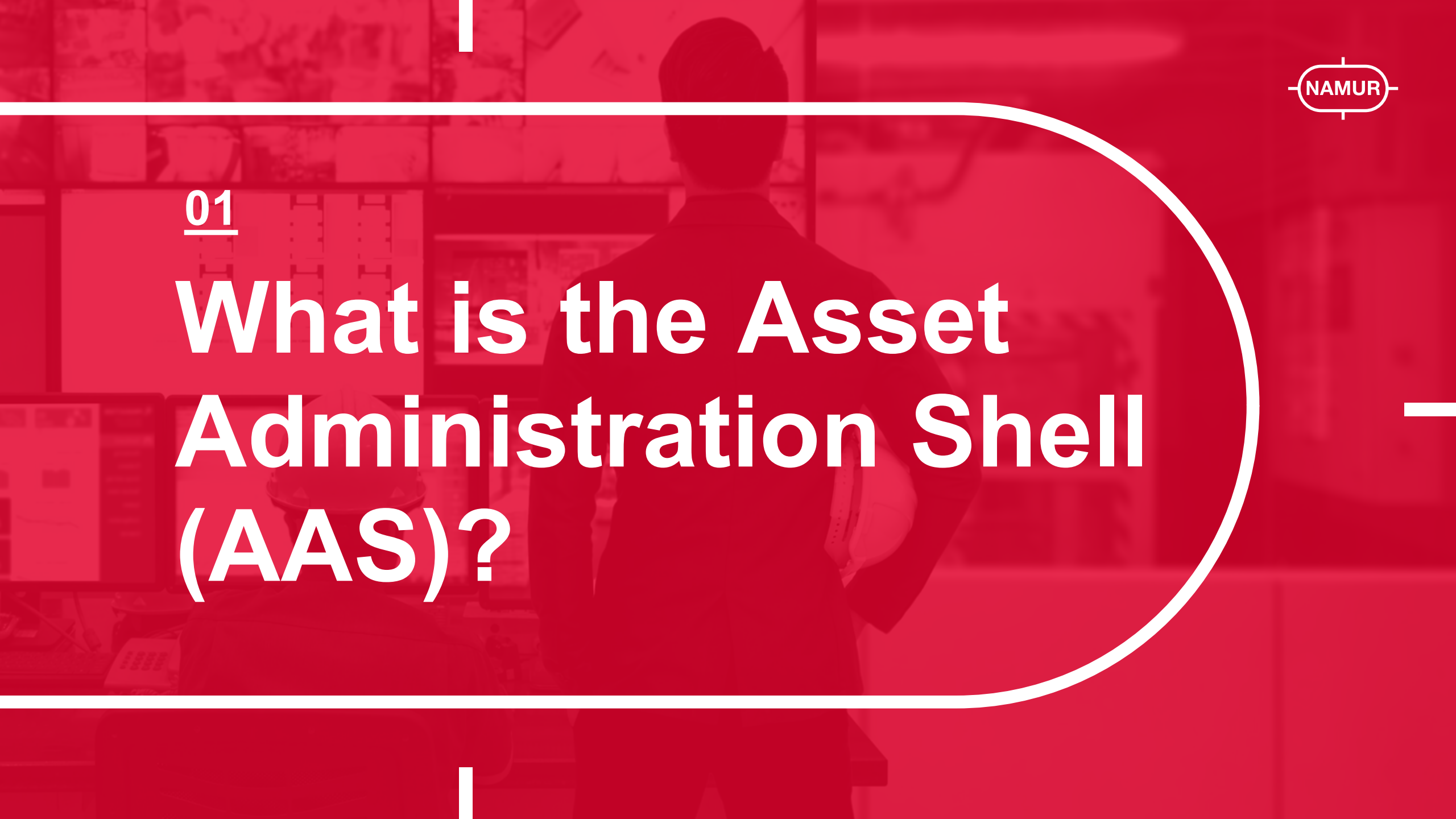
Online, 15. November 2023

Agenda

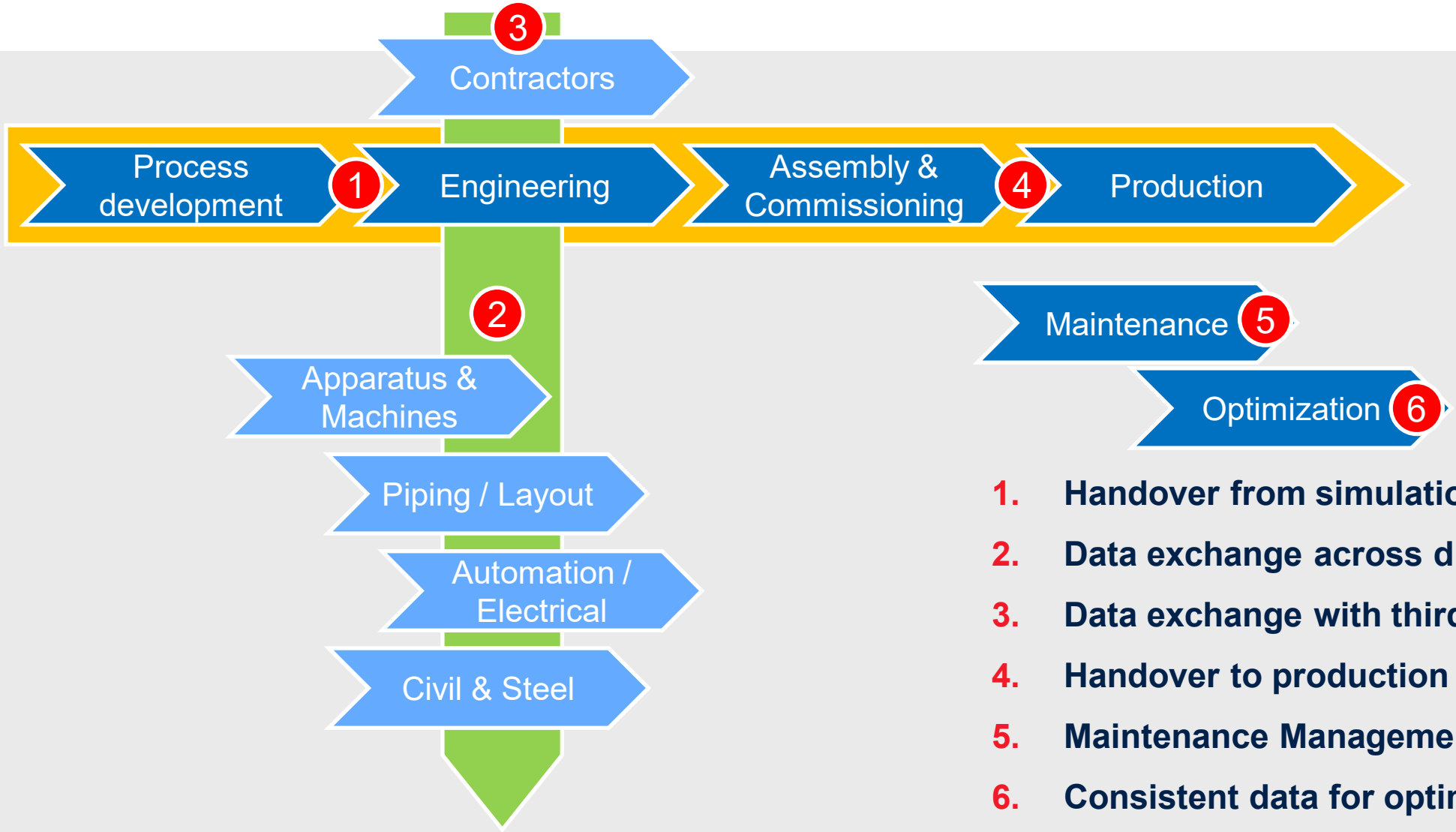
1. What is the Asset Administration Shell?
2. Why is the AAS alone insufficient?
3. IEC 61987
4. Platforms for Data Exchange



01

What is the Asset Administration Shell (AAS)?

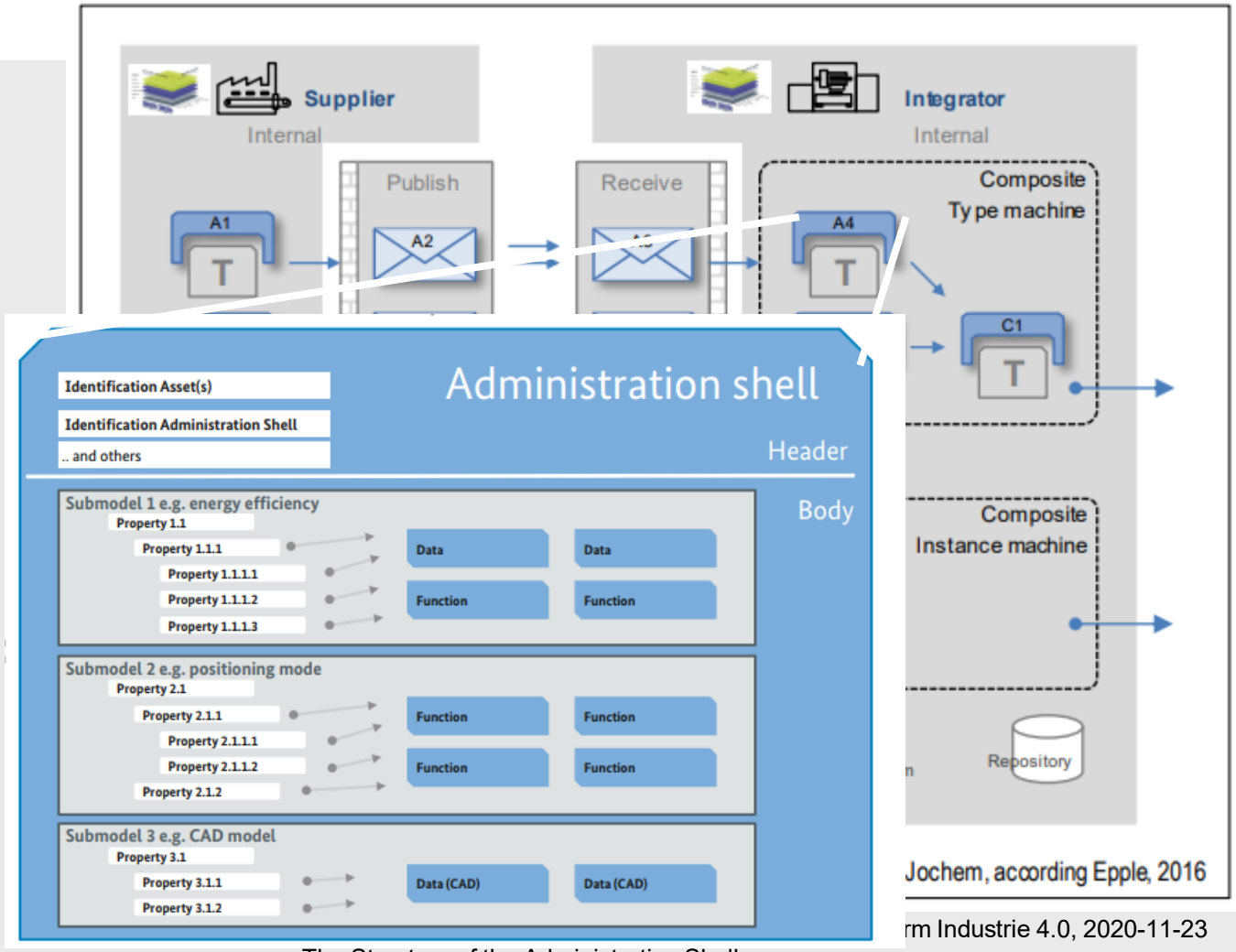
Interfaces and handover along the Asset Lifecycle



1. **Handover from simulation to CAE**
2. **Data exchange across disciplines**
3. **Data exchange with third parties**
4. **Handover to production**
5. **Maintenance Management**
6. **Consistent data for optimization**

[acc. Otten, Grüner]

Asset Adminsitration Shell – Solution?



The Structure of the Administration Shell

rm Industrie 4.0, 2020-11-23

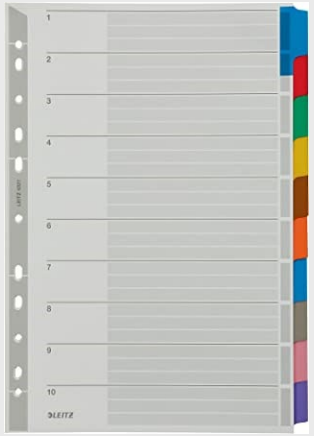
The Asset Administration Shell (AAS) is a meta model

It helps to create technical implementations of information models

Information is stored in submodels

These submodels have to be standardized

Analogies

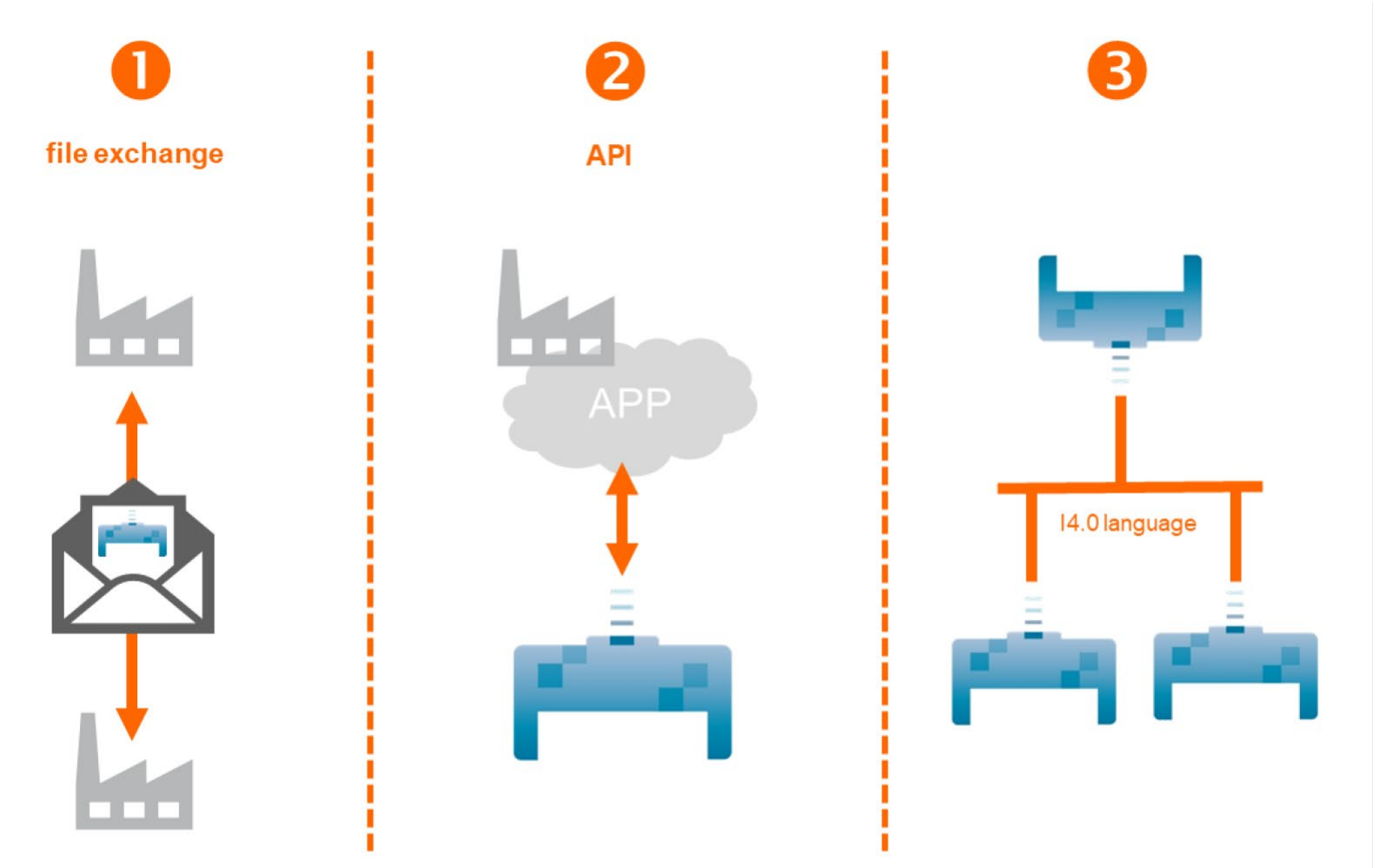


Attributes + Structure

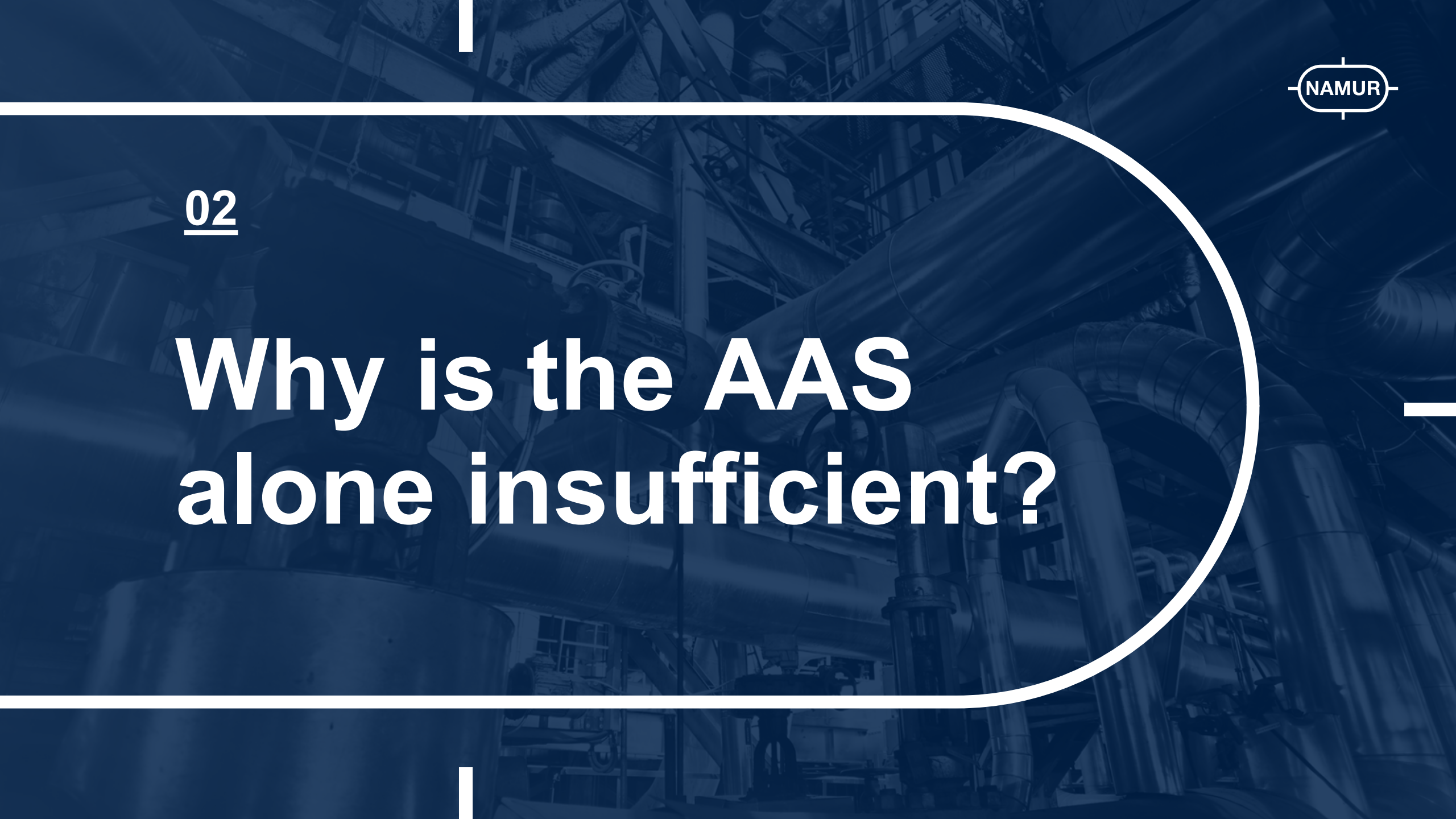
Submodel

Asset Administration Shell (AAS)

Types of AAS



Source: Plattform Industrie 4.0 – Details of the Asset Administration Shell Part 2



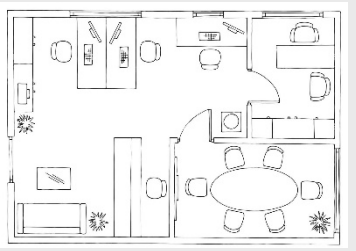
02

Why is the AAS alone insufficient?

What Problem is solved by the AAS?

The measures of the folder are known

The carpenter is able to produce the file cabinet

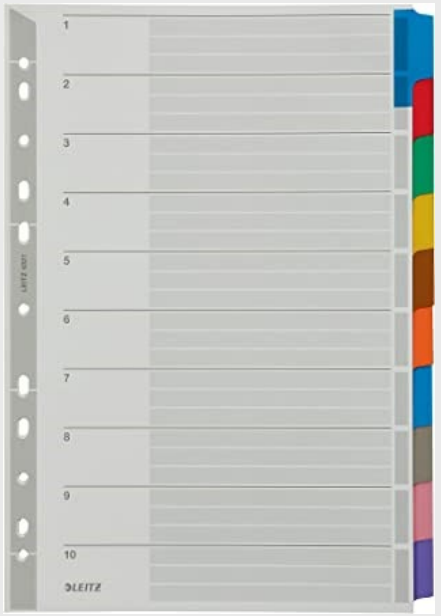


The Architect can set up the office

- **The Asset Administration Shell defines a Meta Model**
- **Using the Meta Model Software that supports the relevant interfaces can be developed**
- **The interface is reusable and there is no need to reconfigure**
- **The specification is publically available and usable**

Which Problems remain Open?

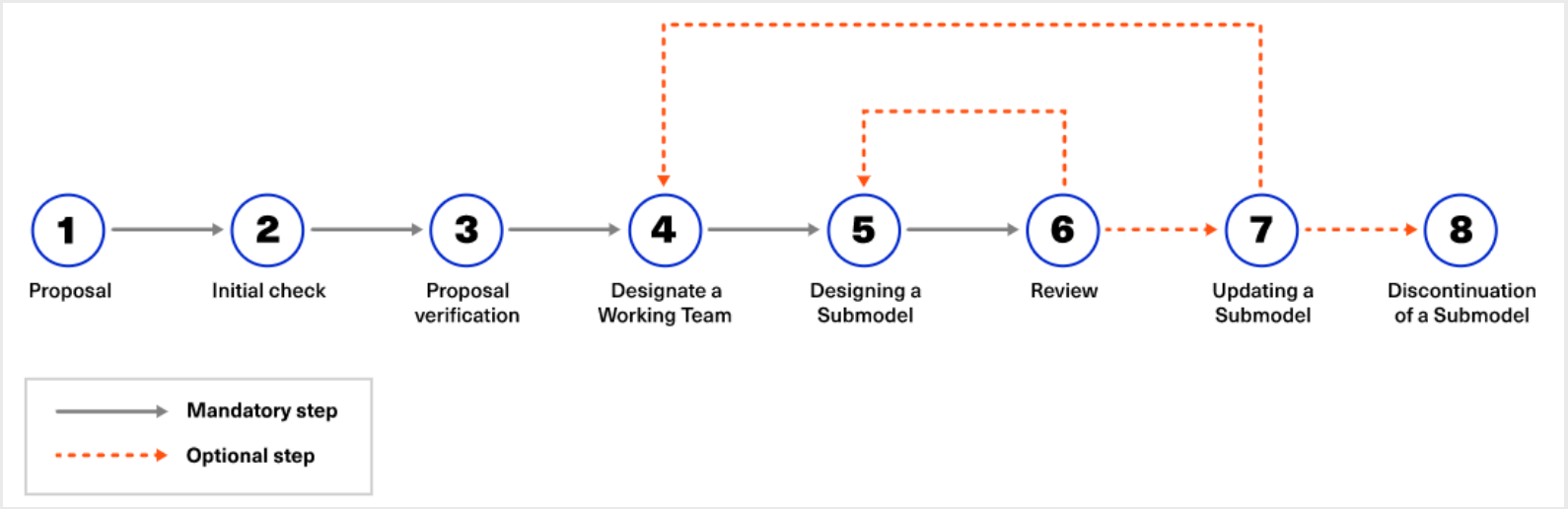
- What are the relevant folder types?
- What is the structure of folders?
- How can folders be standardized?



Industrial Digital Twin Association

„Als IDTA fungieren wir als zentraler Anlaufpunkt für alle Interessengruppen. Wir stellen die notwendigen Spezifikationen für die Asset Administration Shell bereit und erstellen und harmonisieren die Teilmodelle für den Industriellen Digitalen Zwilling in das Big Picture.“

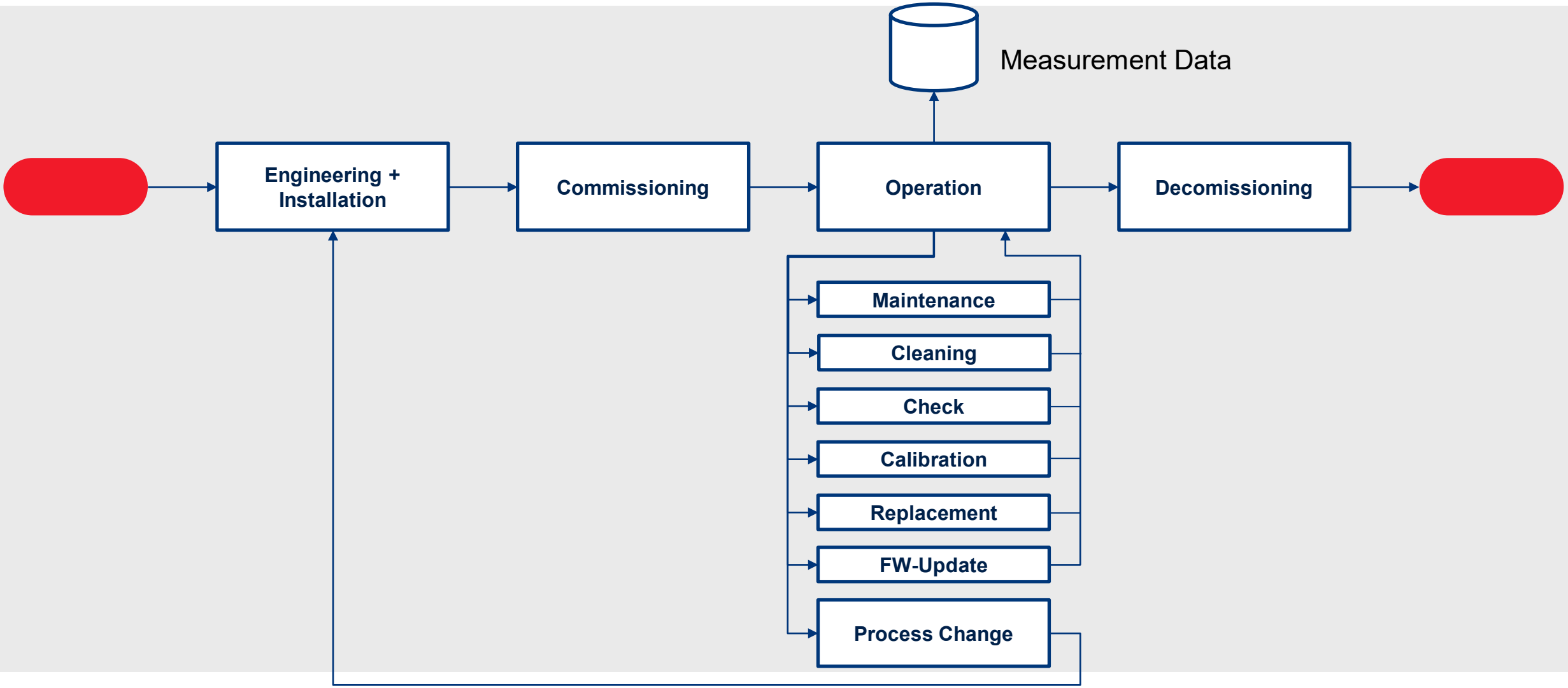
As IDTA, we act as a central point of contact for all stakeholders. We provide the necessary specifications for the Asset Administration Shell and create and harmonise the sub-models for the Industrial Digital Twin into the Big Picture.



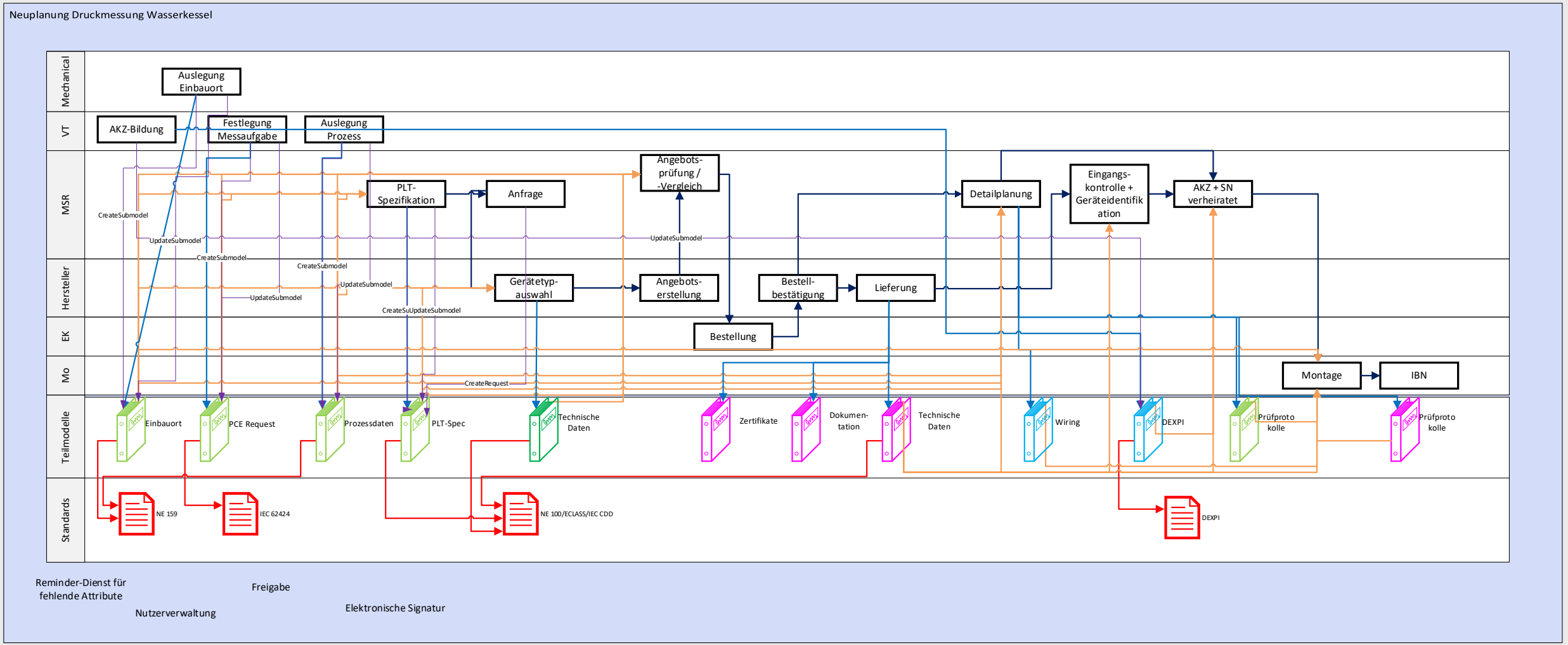
Stand: September 2022

https://industrialdigitaltwin.org/
https://industrialdigitaltwin.org/content-hub/teilmodelle
https://industrialdigitaltwin.org/wp-content/uploads/2022/01/2021-12-01_IDTA_Process-Submodels_V1.0.pdf

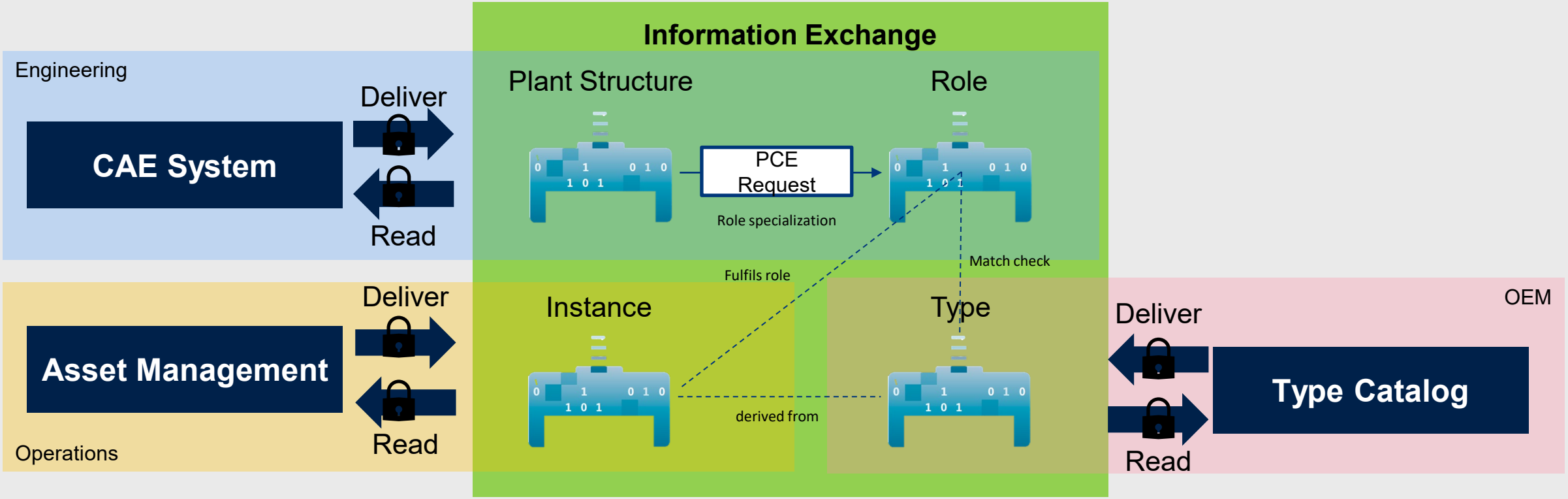
Life-Cycle of Measurement Device / Function



Use Case 1 – Engineering of a new Pressure Measurement



Possible Structure for Information Exchange

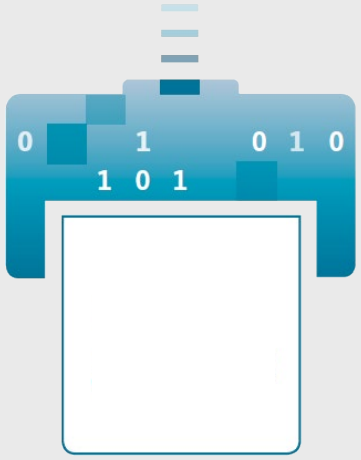


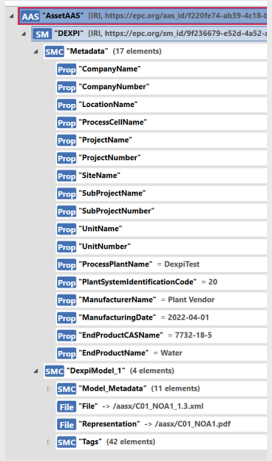
Based on Exchange with DEXPI (Wilhelm Otten and Sten Grüner)

DEXPI Submodel for Asset Administration Shell

Next step in Industry 4.0 for process industry

IDTA Submodel Working Group

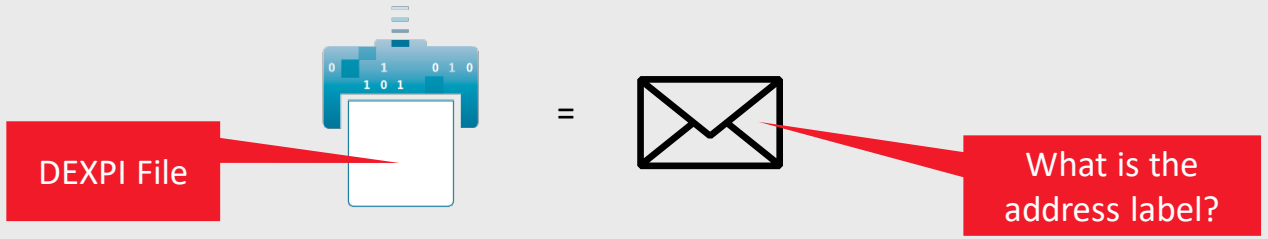




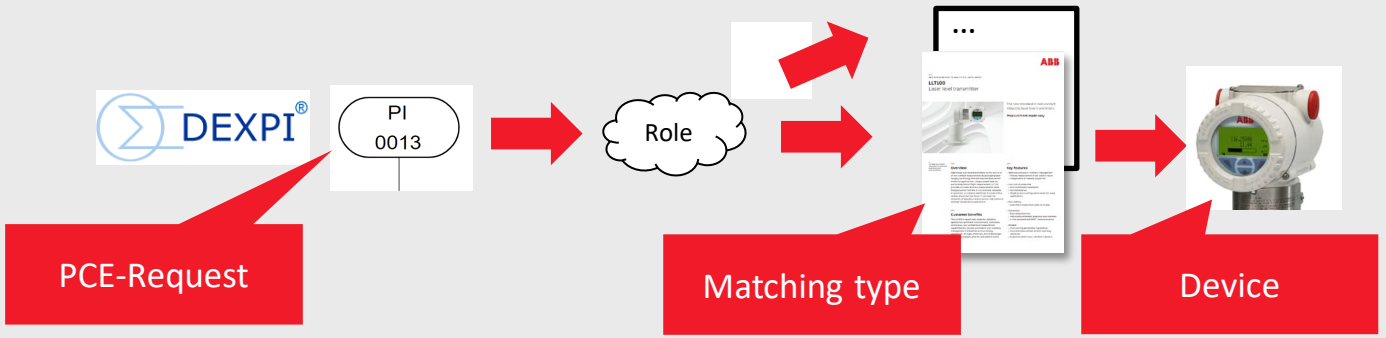
- **Kick-off: 3.3.2022**
- **Connection to DEXPI WGs: Wilhelm Otten**
- **Group members: ABB, Equinor, Aibel, Oslo University, Magdeburg University, FESTO**

Two initial use cases:

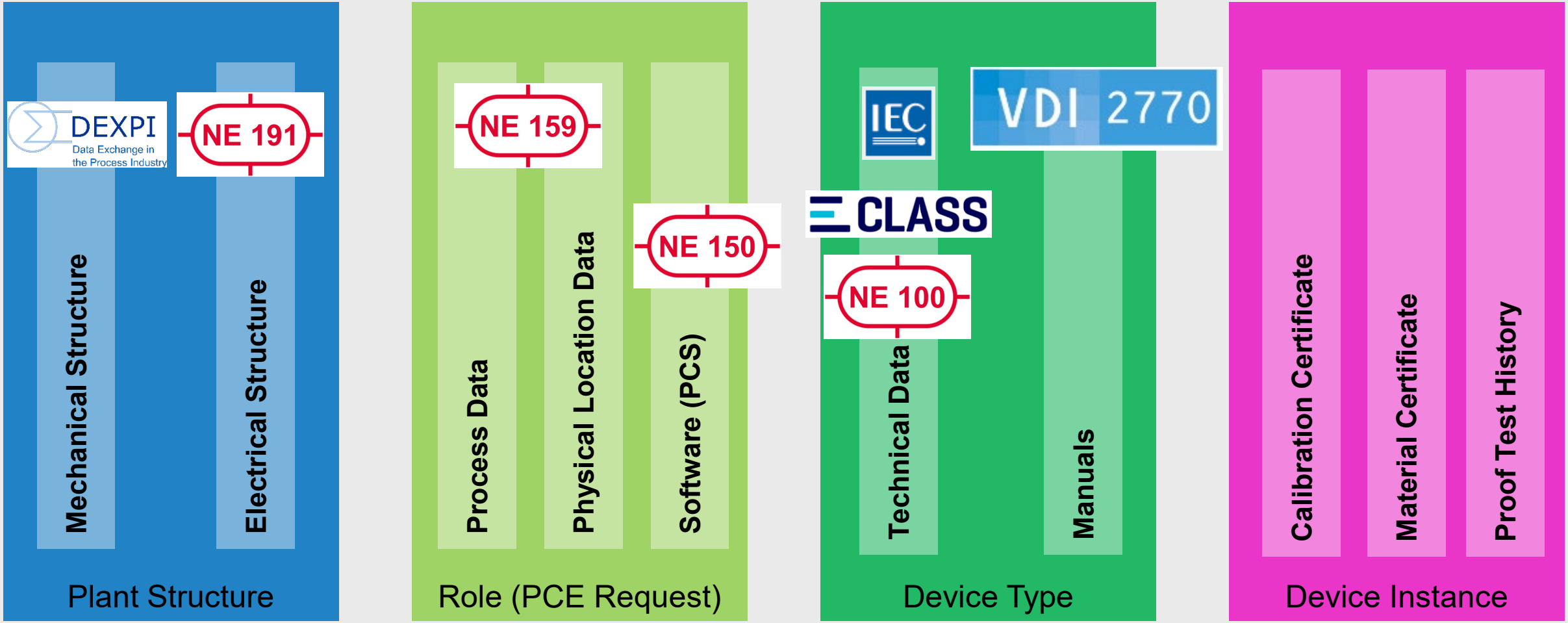
– Handover of DEXPI P&I Diagrams. Challenge: how to specify “P&ID” Identity



– Using P&I Diagrams for specifying Roles and Requirements in Asset Lifecycle



Content of the different types of AAS

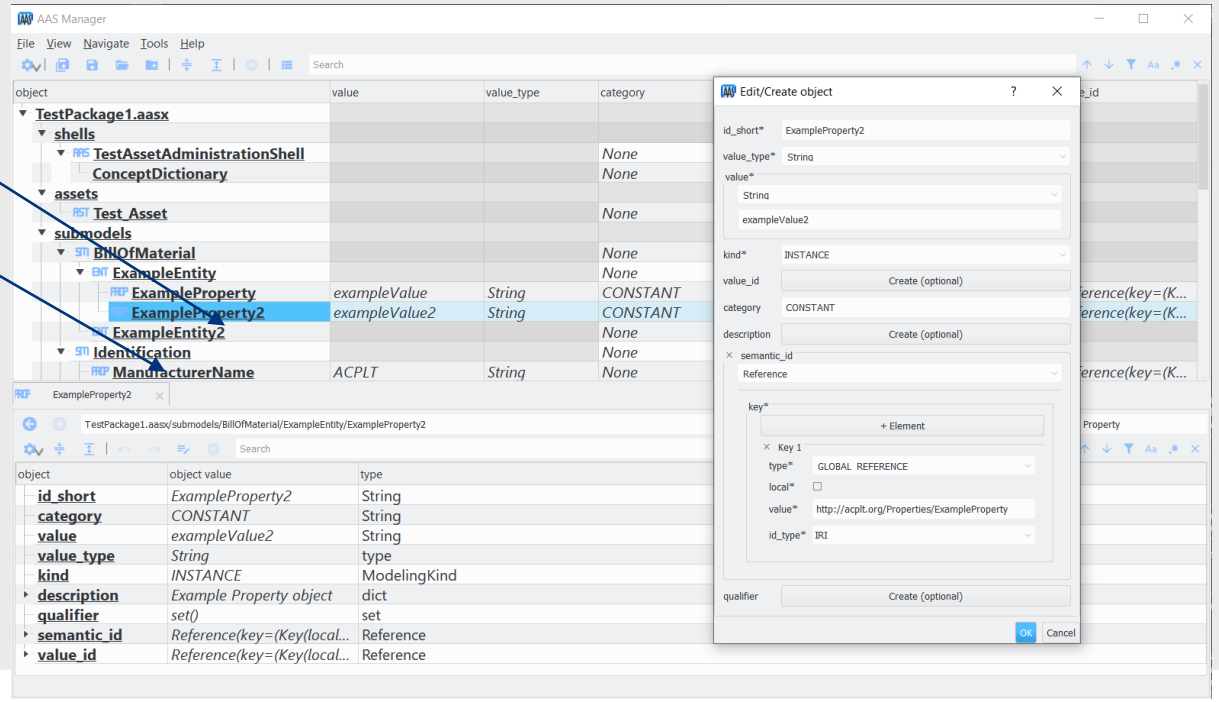


Migration of Existing Data

	A	B	C	D	E
1	Hersteller	HerstellerTyp	eClass_Geraetetyp	HerstellerSpez	SerienNr
2	ATB	CD 160	27-02-21-02	160 L2 Y3	563457001H
3	Hermetic	Spaltrohrmotor	27-02-27-05	65YA36562	559907003H
4	Siemens	1MJ6097	27-02-21-02	4CA36	409141001H

Cooperation between RWTH IAT+YNCORIS for extension of the AAS Managers

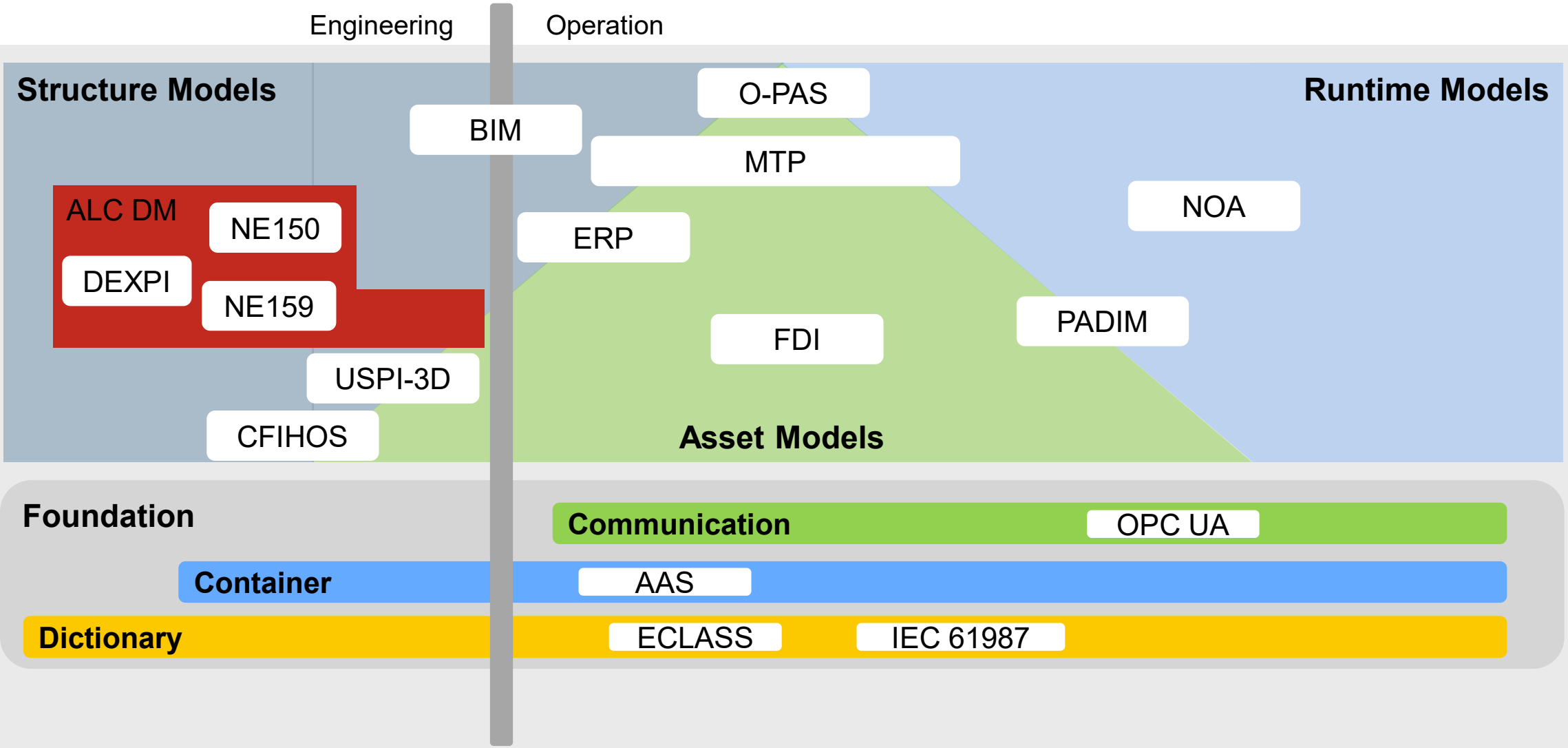
- **Supports Mapping of Tables to Submodels and Attributes of Asset Administration Shells**
- **Automatic Generation of Asset Administration Shells (AAS)**



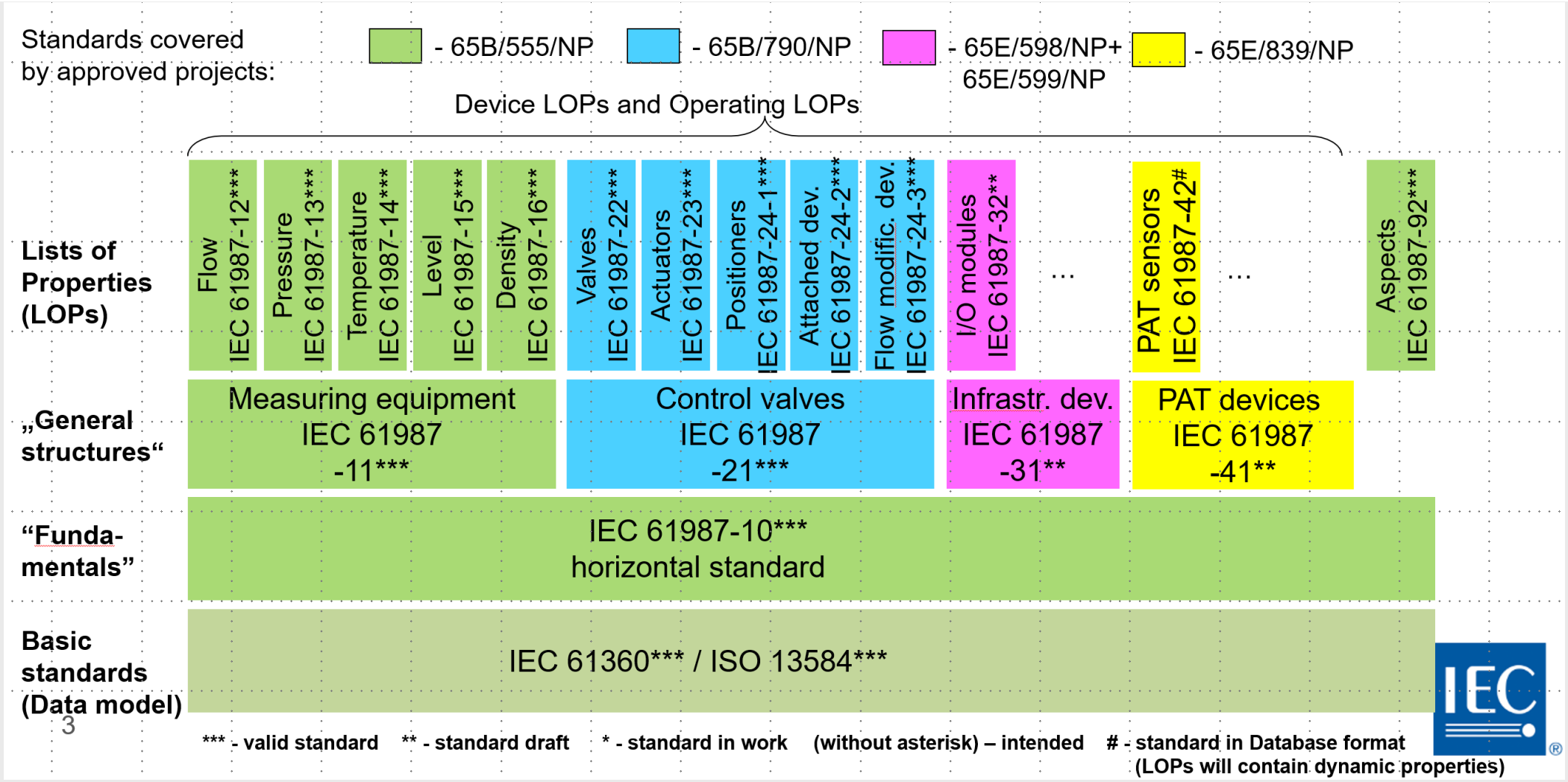
03

IEC 61987

Map “information models”

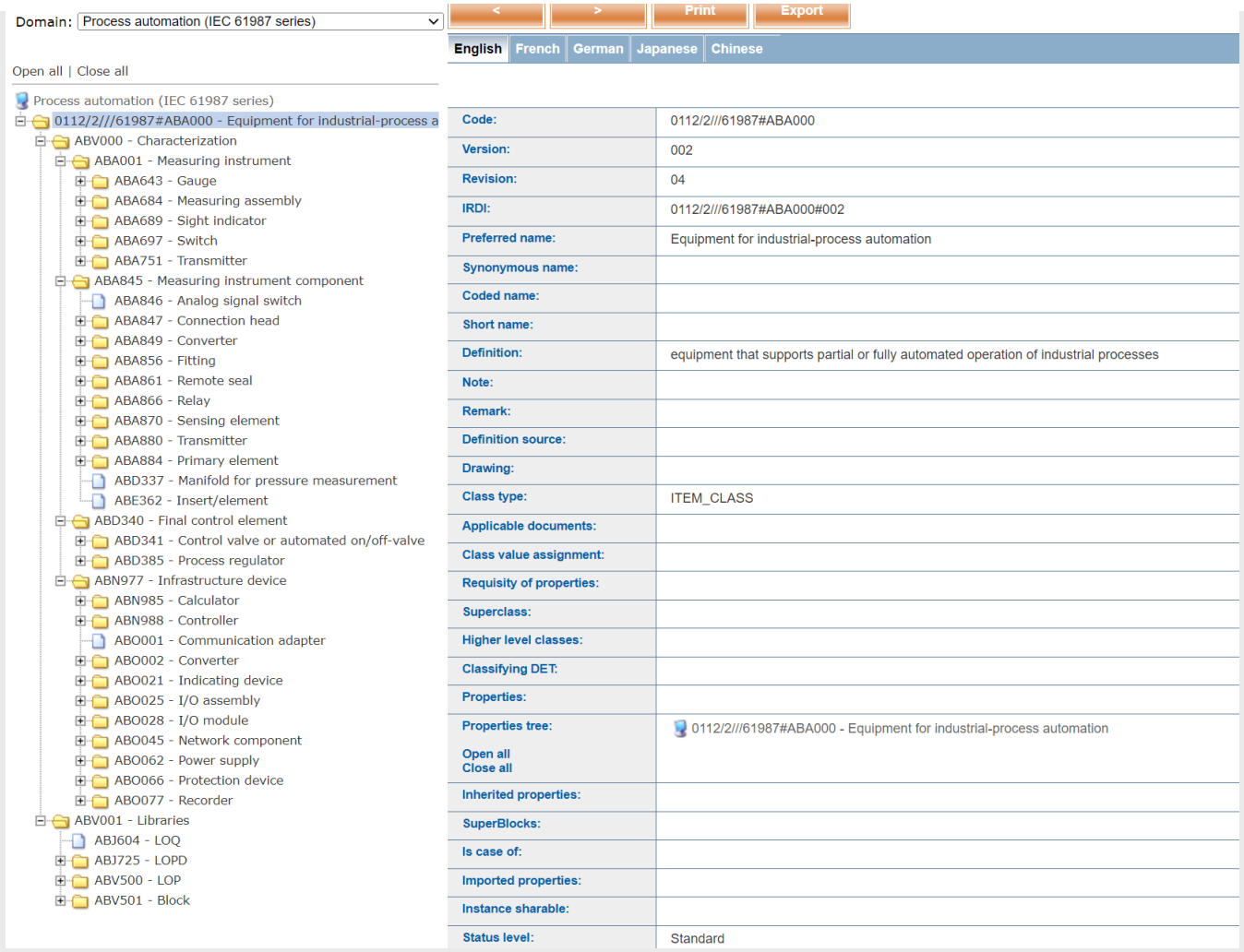


Current Landscape of the IEC61987 standard series (October 2021)



Source: IEC

Interactive Online Catalog

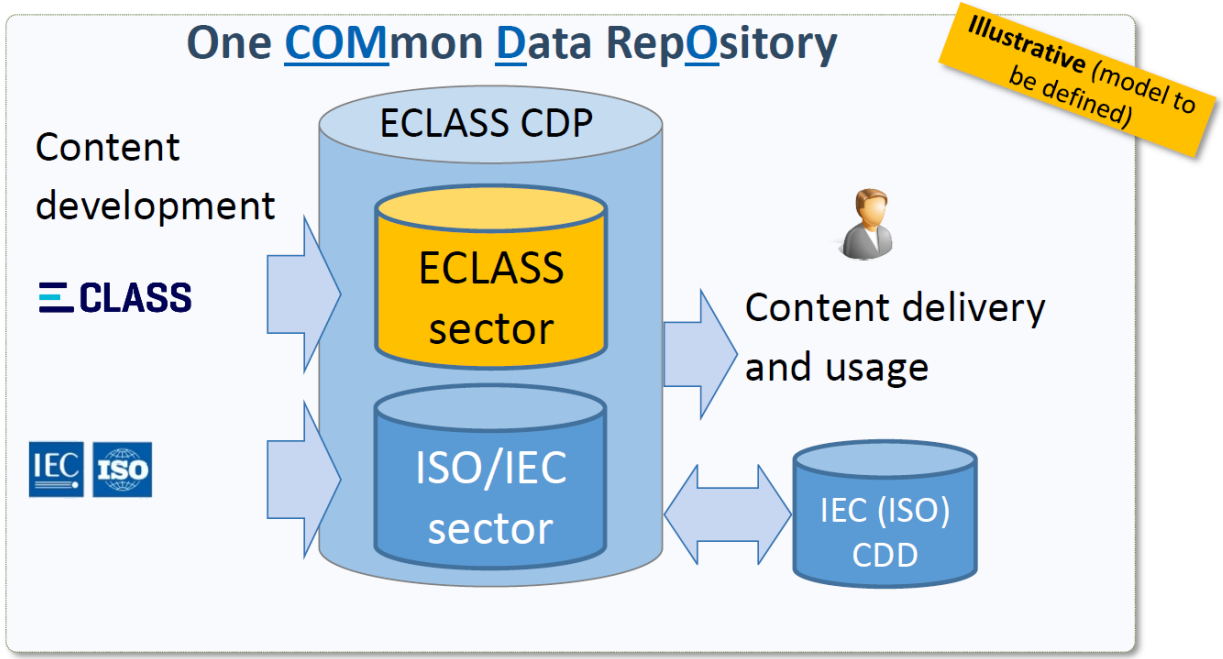


https://cdd.iec.ch/

Harmonization of ECLASS and IEC CDD

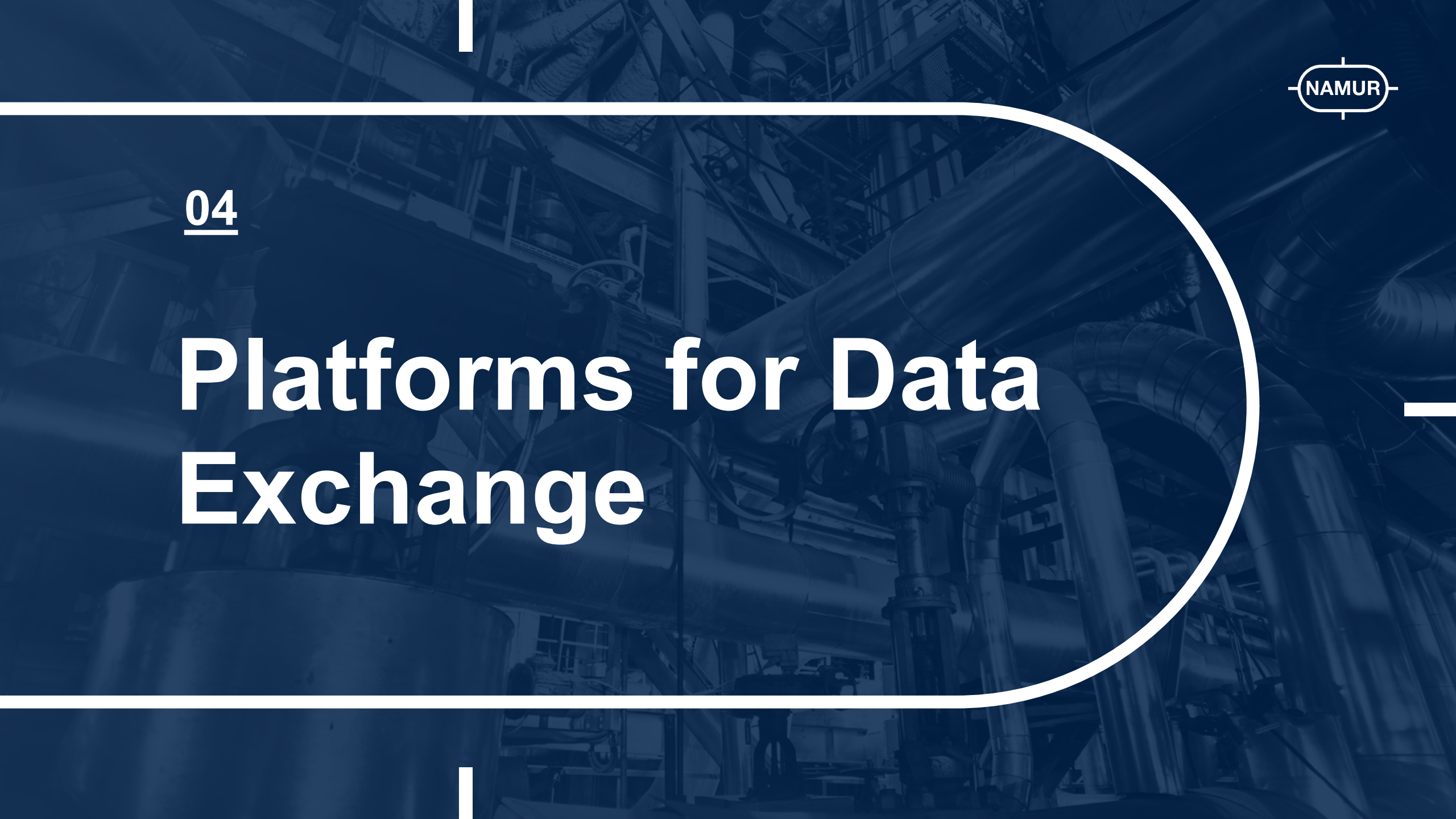
Projekt COMDO

"To meet user requirements, a single common data repository is strongly required"



"Joining the best of two worlds"

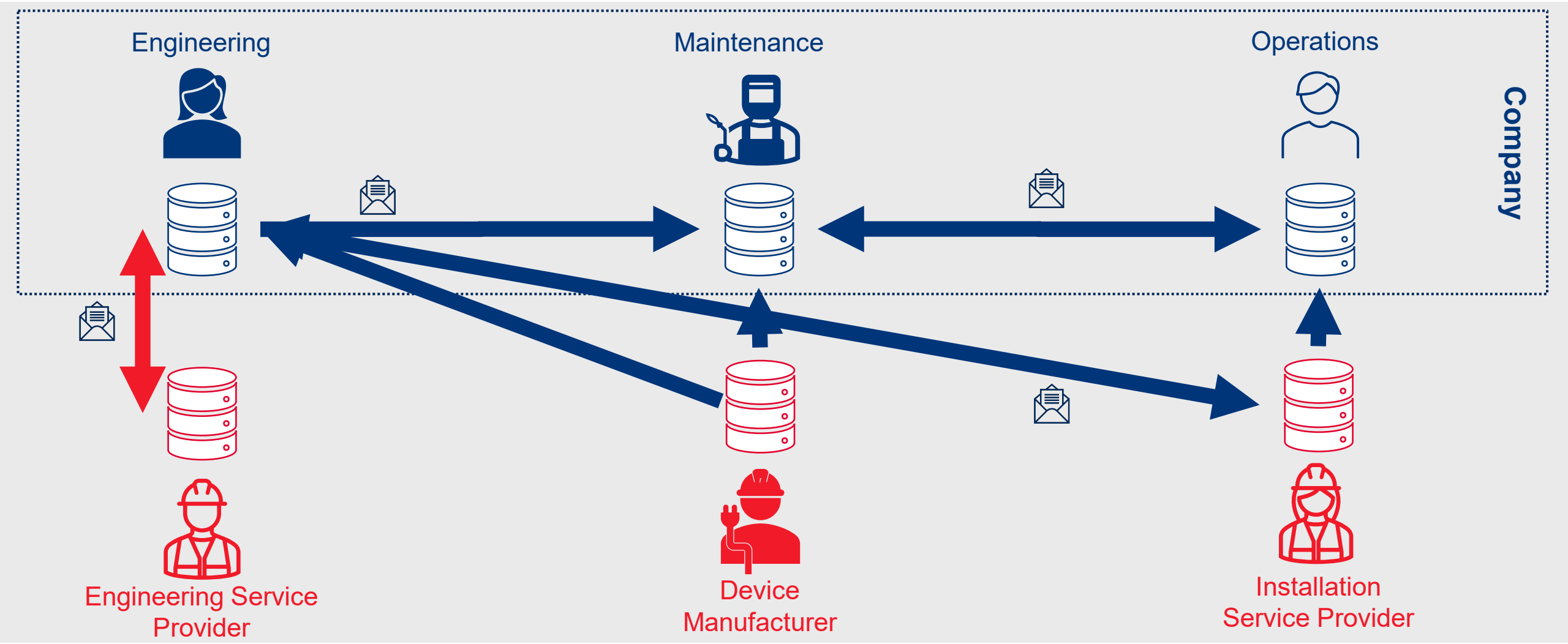
Source: IEC



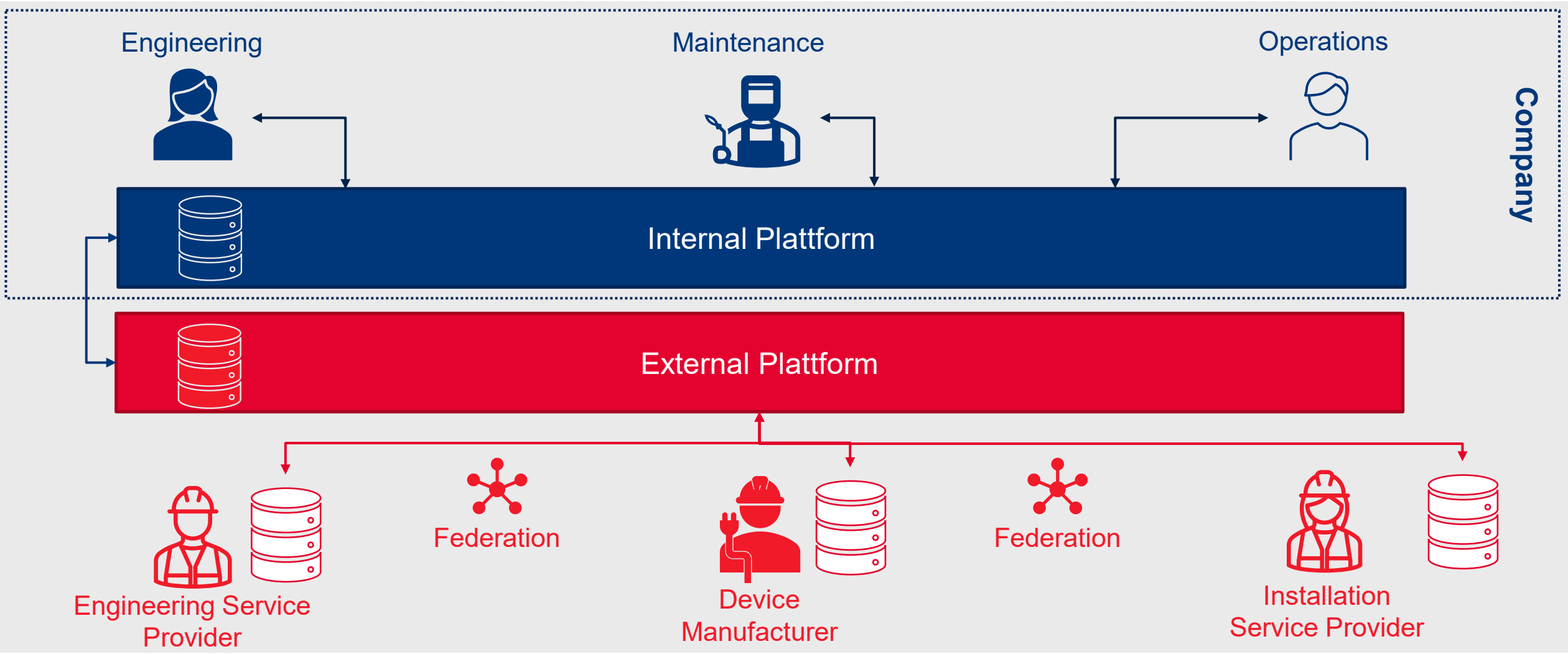
04

Platforms for Data Exchange

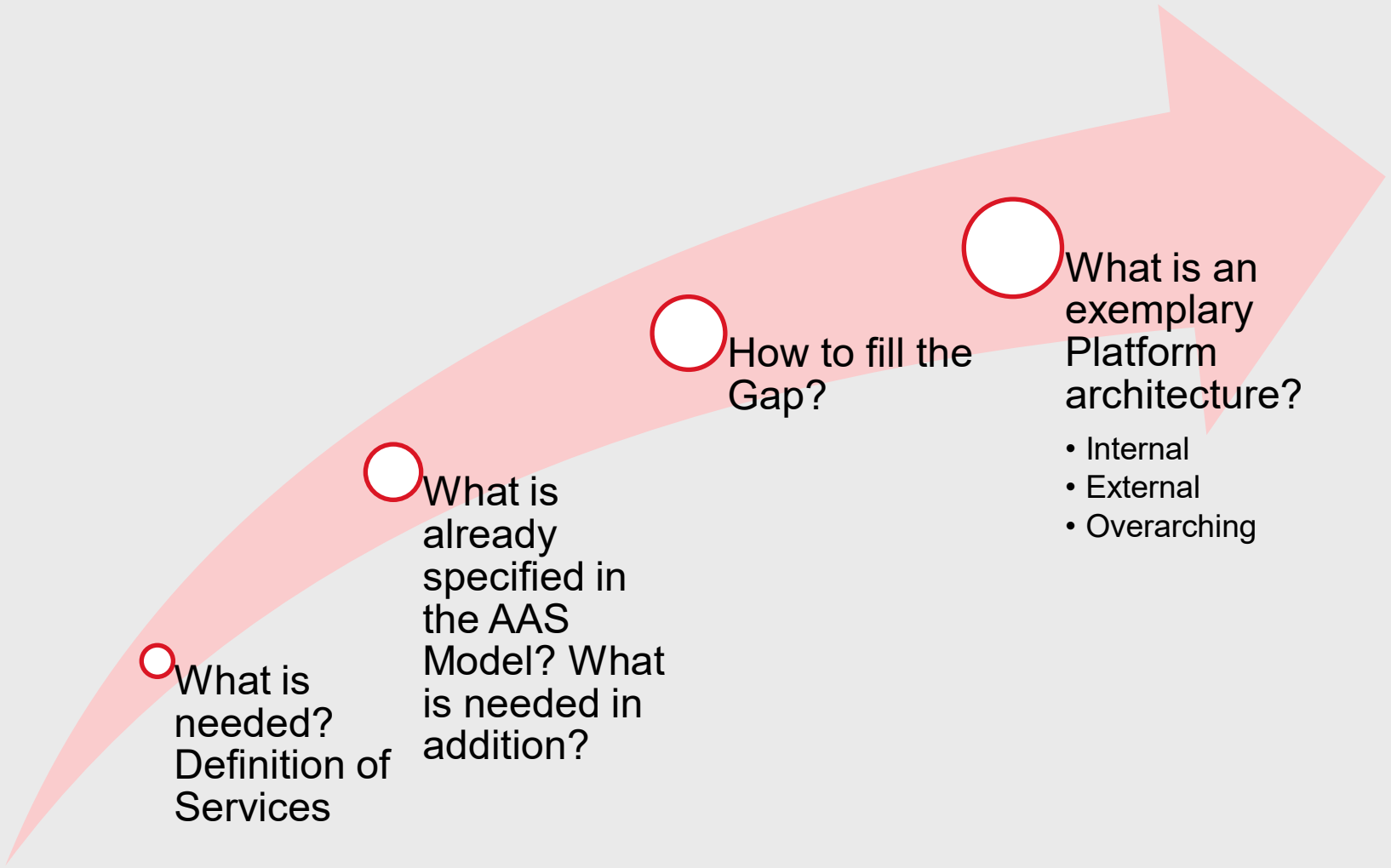
Why Plattforms?



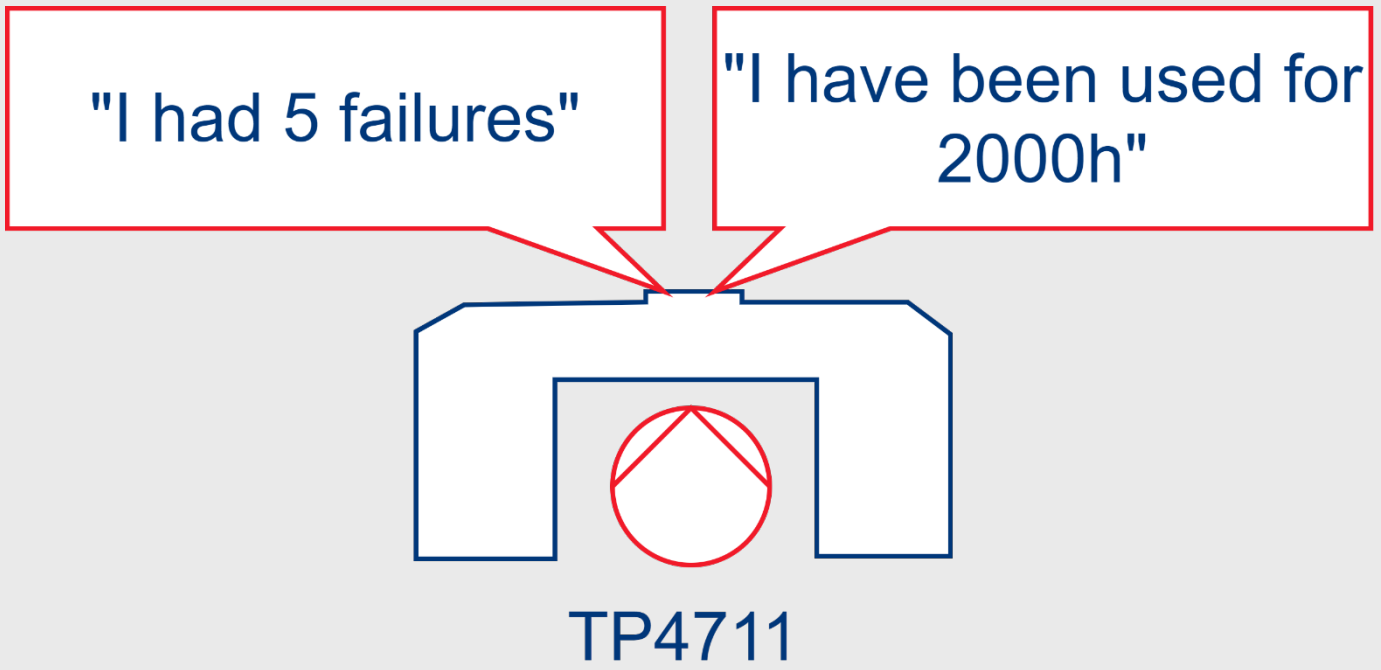
Why Plattforms?



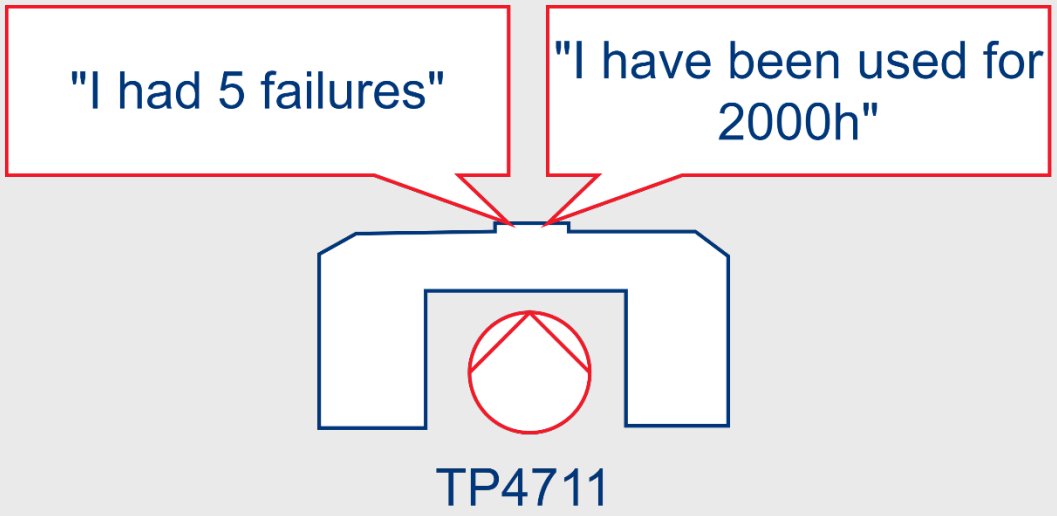
Vorgehen im Arbeitskreis

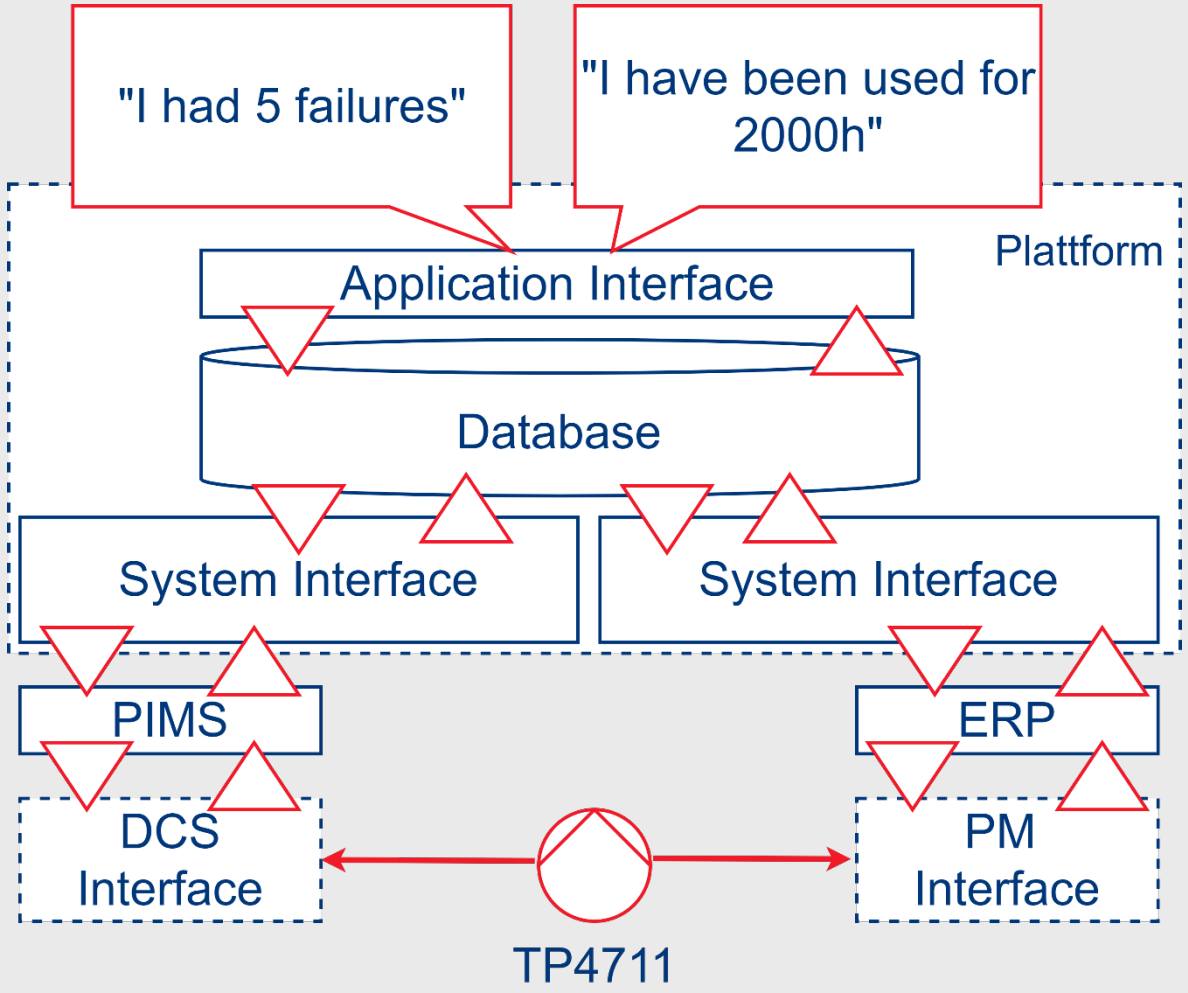


Abstraction of System Interfaces



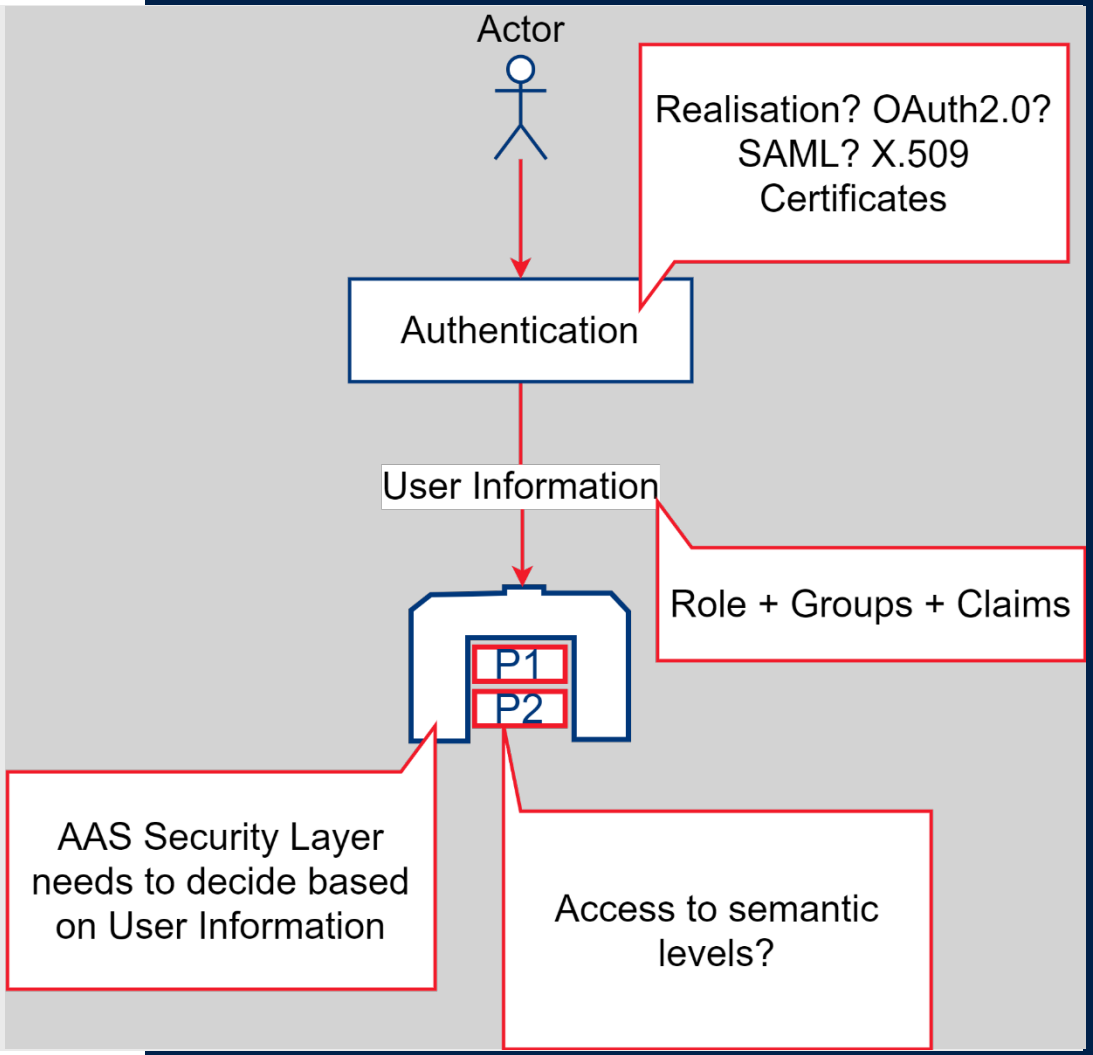
Abstraction of System Interfaces





Security and User Management

- We handle thousands of Assets in the platforms
- Managing Access Rights on the Level of independent Attributes and Asset Administration Shells is not possible
- Fluctuation of personell in the company and between different companies amplify the problem
- A platform must include intelligent mechanisms to manage the access to informations contained in it



Insights

Parallel to DEXPI a structure for the wiring is required

- Done by the NAMUR WG1.3 as NE191

Existing Standards need to be evolved to a submodel template in the IDTA

- DEXPI WIP, NE 150 und NE 159 pending

A large amount of submodel templates are pending standardization

- Tasks must be placed in Expert Working Groups

The work between different disciplines in the life cycle of plants must be coordinated

- Overarching negotiations between different disciplines neccessary

For the platform based information exchange in the process industry additional abstractions are needed

- NAMUR wants to play a role in defining the requirements

Thank You!

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November 2023