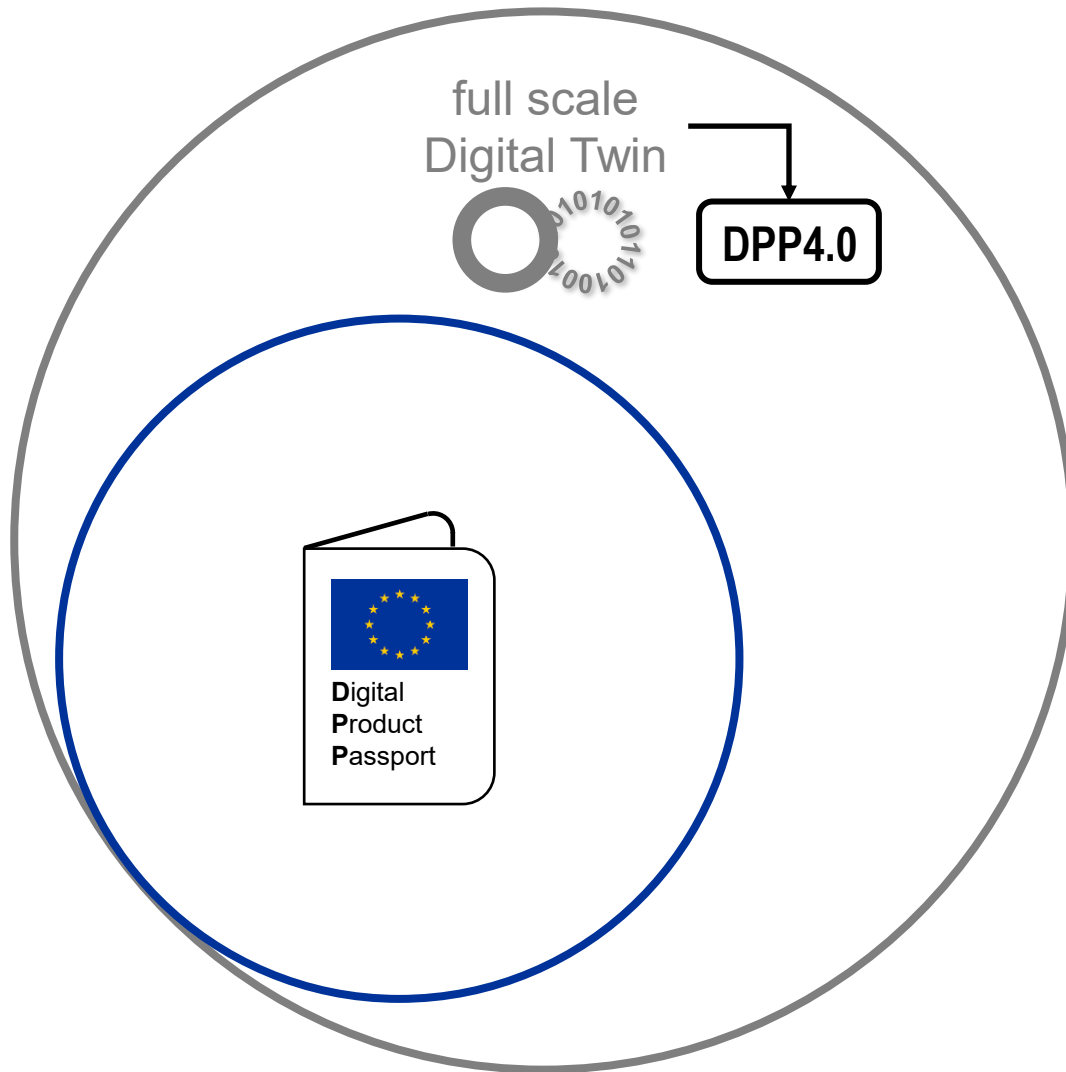


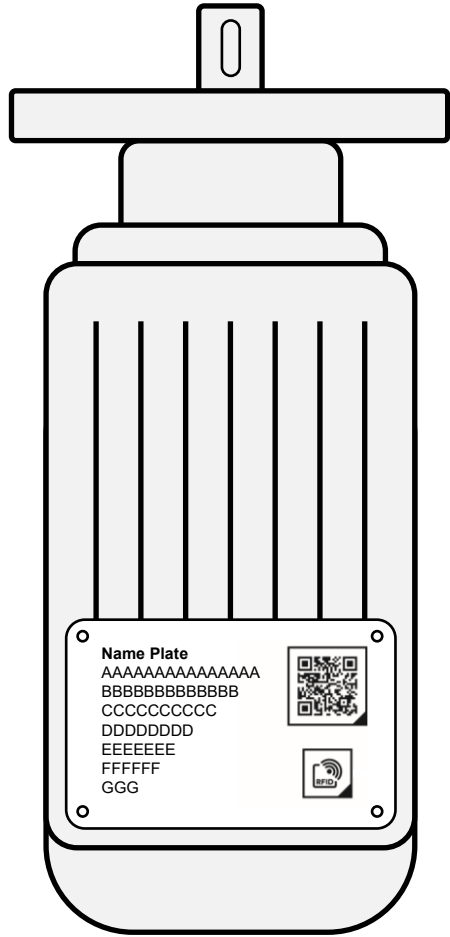
Implementing the EU Digital Product Passport with Digital Data Chain and Asset Administration Shell - Overview

Christoph Attila Kun (BASF)

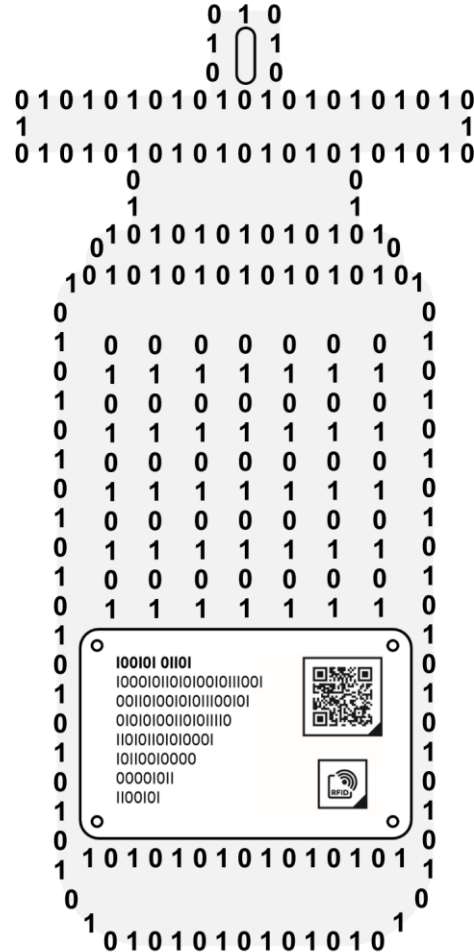


- EU Digital Product Passport is part of EU strategy to digitalize the economy.
- The requirements for the DPP are described in the Ecodesign for Sustainable Product Regulation (ESPR Article 8.).
- DPP will be compulsory for all products put into EU market - except food.
- DPP must provide all information relevant for EU authorities e.g. carbon footprint, energy efficiency
- Furthermore, DPP should provide info necessary for the R-strategies of circularity (... , repair, refurbish, reuse, recycle, ...).
- A back-up copy of the DPP is stored by a (certified) third party DPP service provider.

Simplified data model of a Digital Twin



physical object



digital twin
digital representation of the physical object

functional model

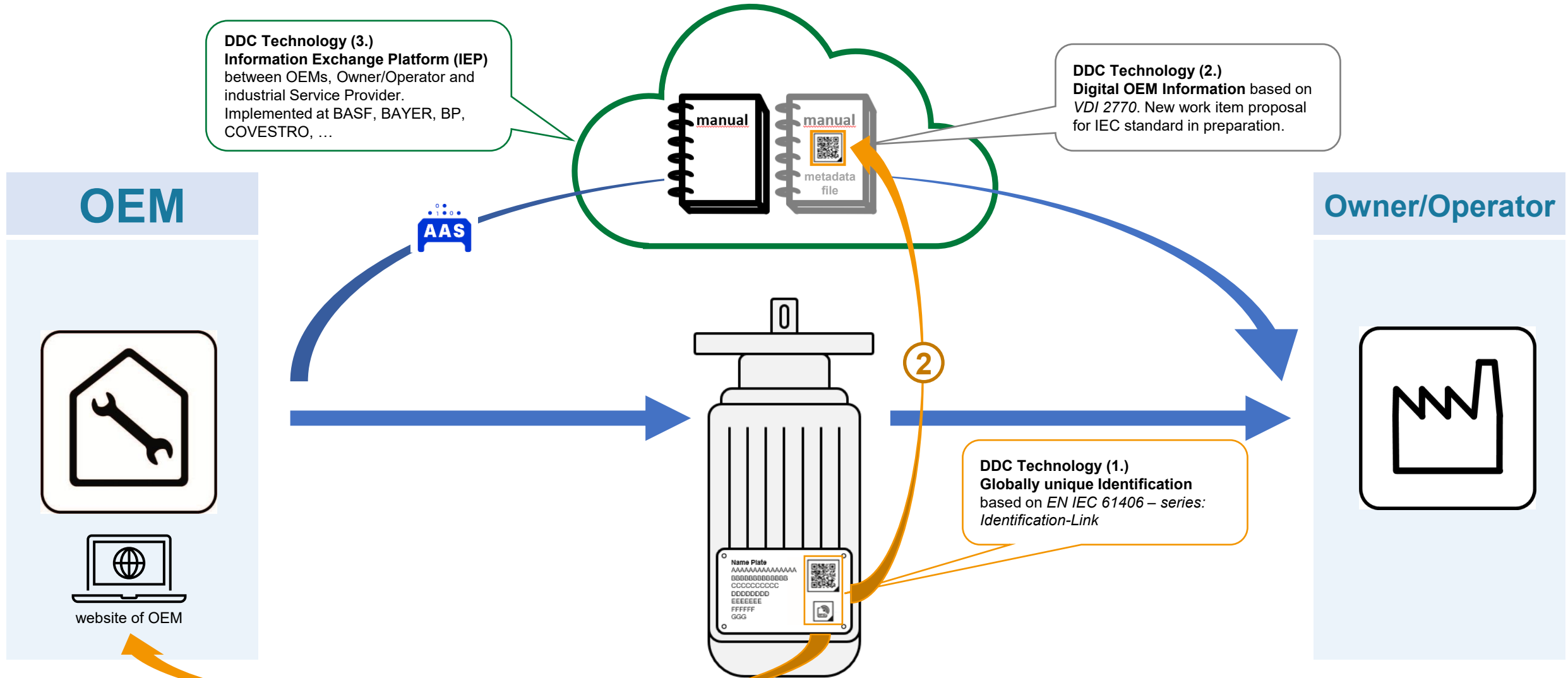
- simulation
- prediction
- condition monitoring
- ...

information model

- tech specs
- documentation
- life cycle information
- ...



The DIGITAL DATA CHAIN → Combining the technologies





The Digital Data Chain Consortium



Mission & Vision

- foster the spread of the 3 DDC technologies,
- achieve international standardization at ISO/IEC, as *must* for global acceptance by operators, suppliers and engineering contractors,
- have the critical mass to create the momentum for growth of the digital ecosystem.

Within 30 months **more than 55 companies** have joined the Consortium*



* BASF is the elected Consortium Leader of the Digital Data Chain Consortium (DDCC)
→ www.digitaldatachain.com

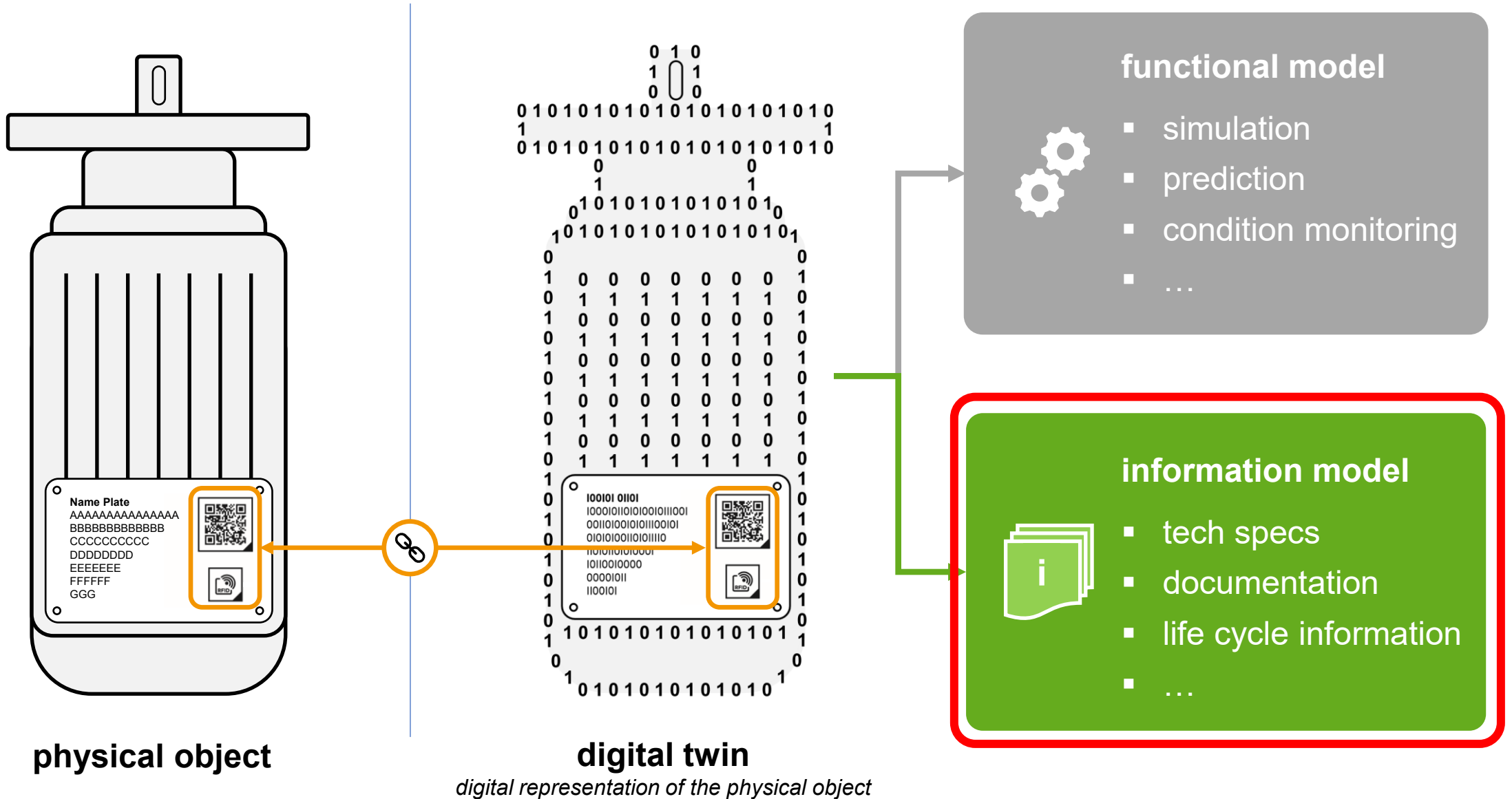
Starting point: multiple legacy ID systems and various requirements



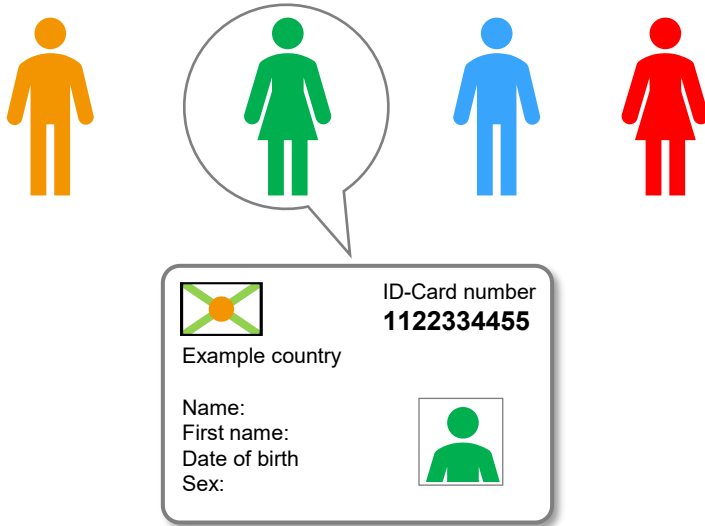
Company name	Company web-domain*	Company type	Industry / branch	Legacy ID system in use	IDs	Interoperable, globally unique object / product identifier	2D-Code / RFID
AAA	aaa-steel.com	medium enterprise	raw materials & commodities	Internationally standardized material name + batch number	H320B 24-04-15-1	?	?
BBB	bbb-parts.de	small enterprise	special turned & milled parts	Purchase order number	PO-240307-232	?	?
CC Company	cc-comp.eu	large company	factory outfitter	Product name + serial number	Coriolis-maX Cm96-232	?	?
DD Company	dd-comp.eu	major corporation	automotive parts	DUNS number + article number + batch number	123456789 BR55 242131-F	?	?
EE Company	ee-comp.com	large company	consumer goods / food	Global trade item number (GTIN)	9520123456788	?	?

How can all these different legacy ID systems become interoperable, without changing them and all at low or zero cost?

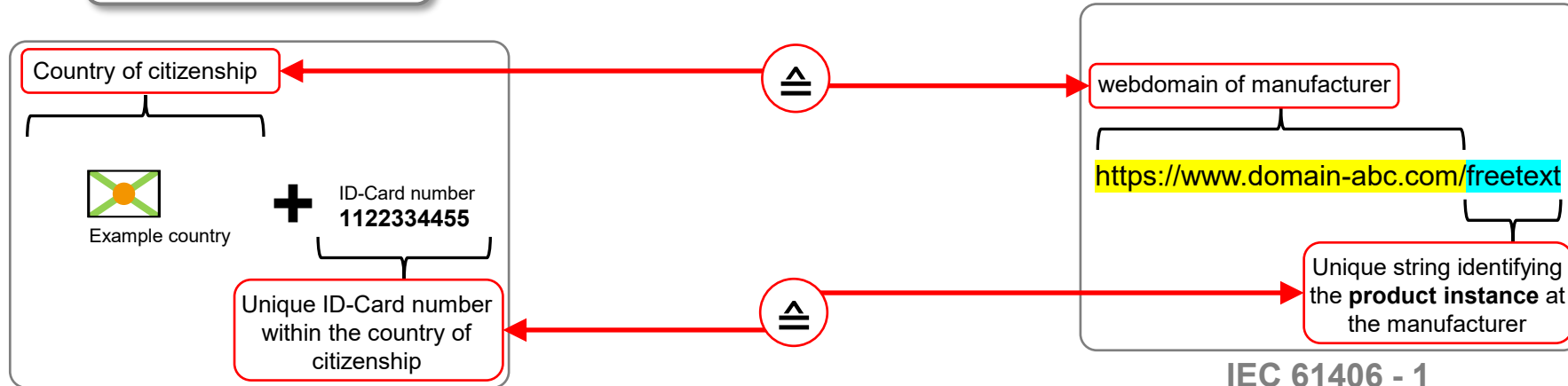
EN IEC 61406 – Identification Link → connecting the physical product to its Digital Twin



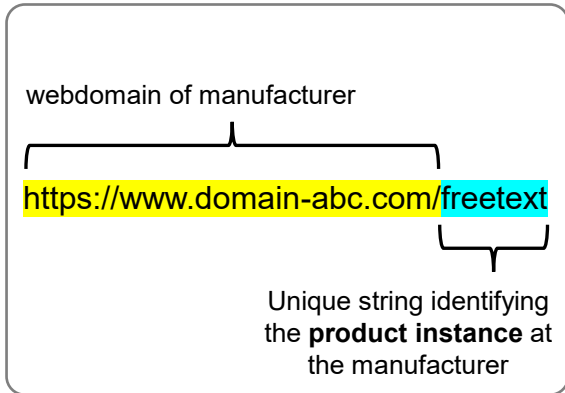
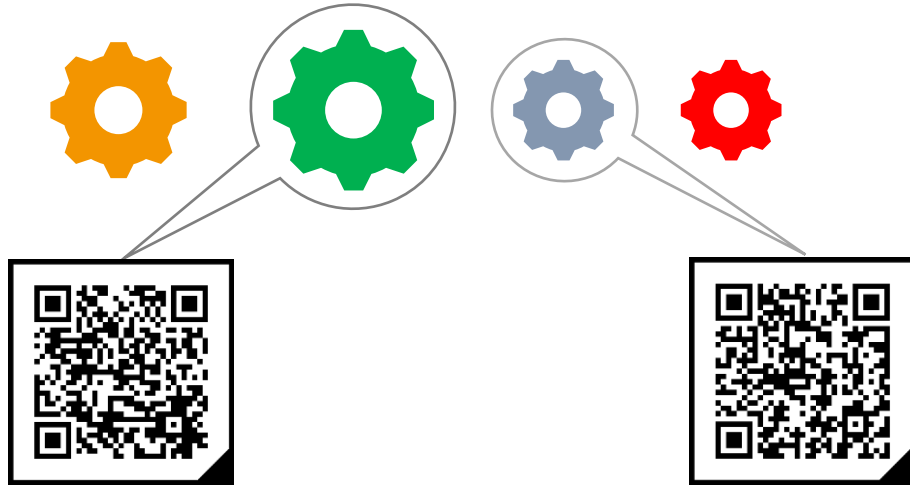
Identification of an individual



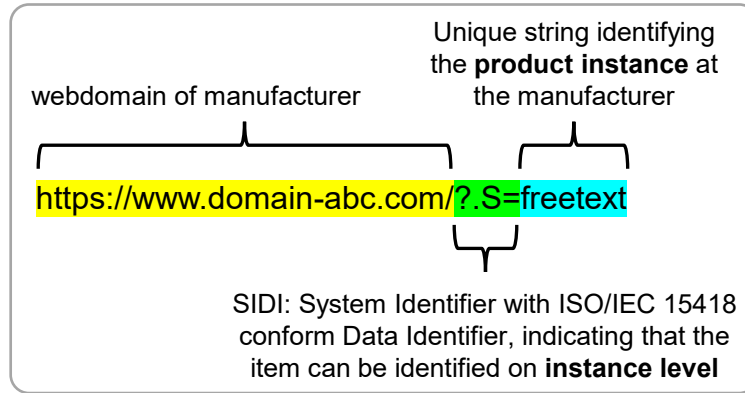
Identification of an individual



Identification of an individuum

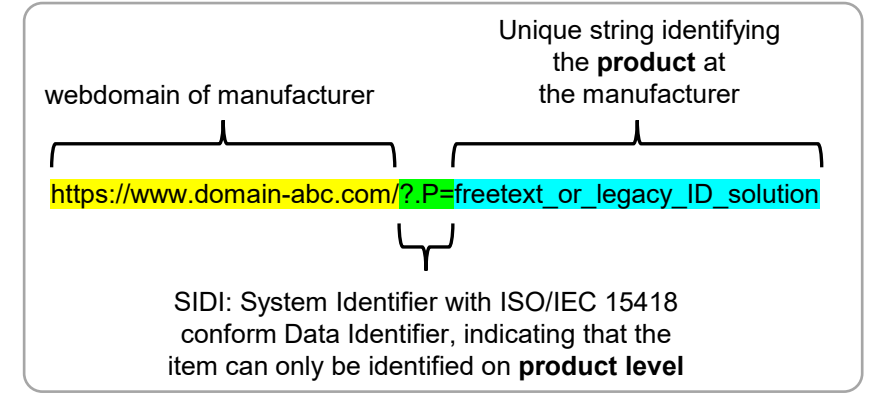
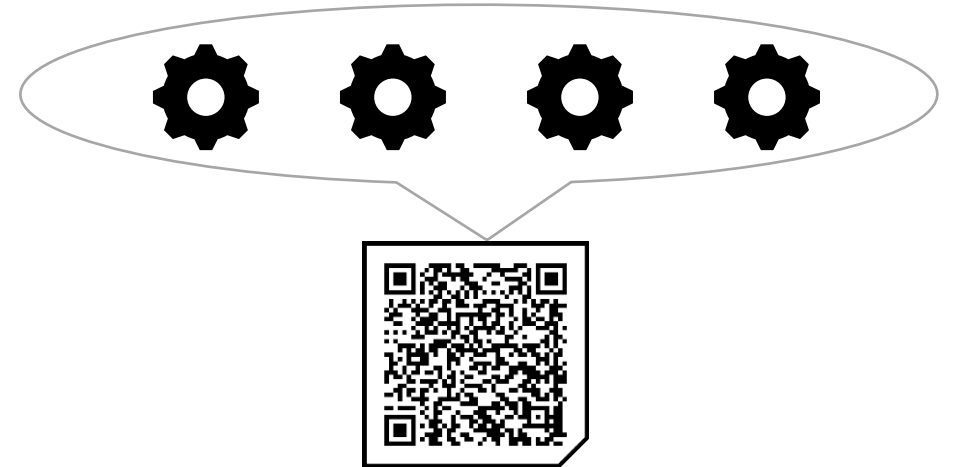


IEC 61406 - 1



IEC 61406 - 2






Identification of an identic group



IEC 61406 - 2

Starting point: multiple legacy ID systems and various requirements

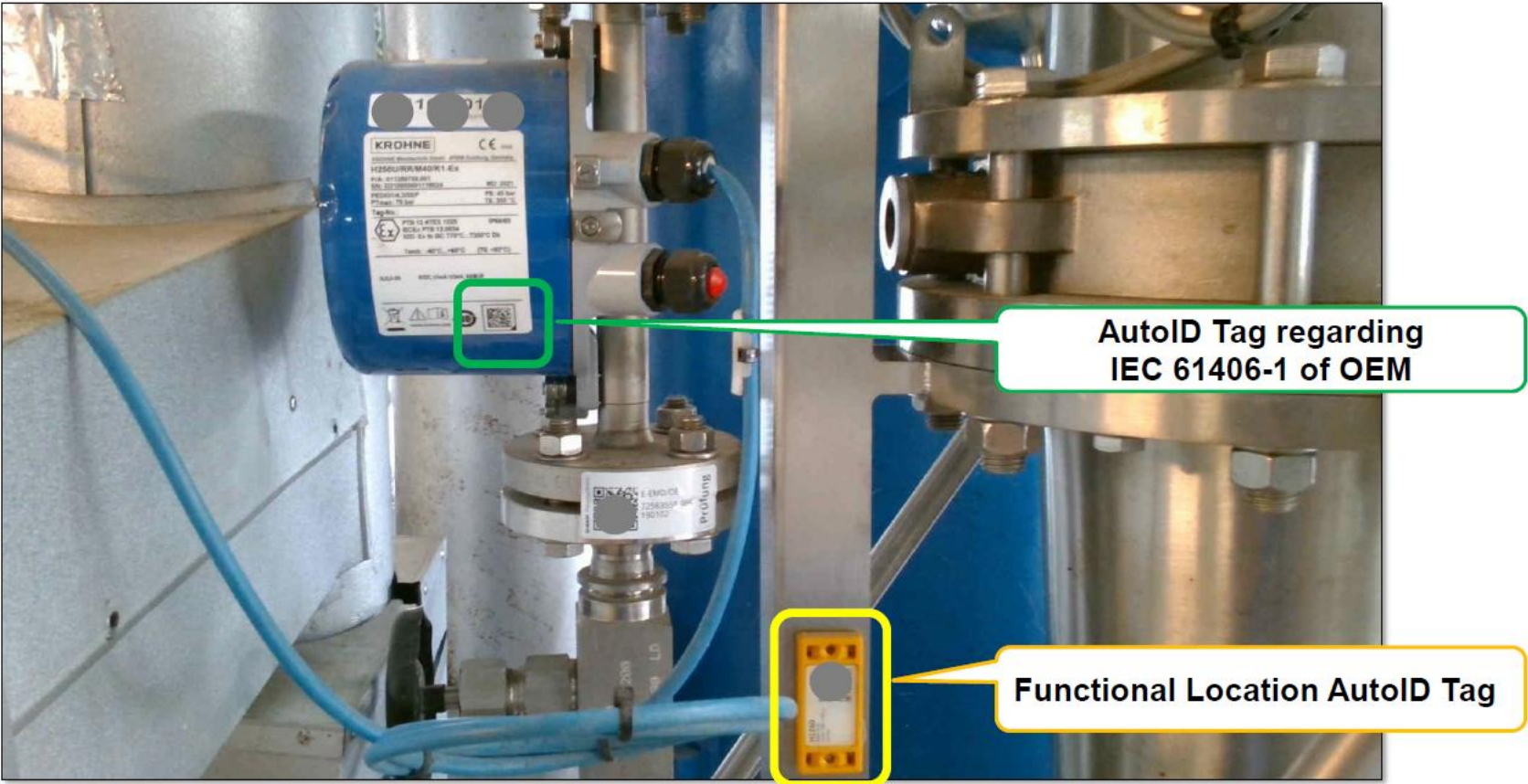


Company name	Company web-domain*	Company type	Industry / branch	Legacy ID system in use	IDs	Interoperable, globally unique object / product identifier created according EN IEC 61406-series – Identification Link	2D-Code / RFID
AAA Steel	aaa-steel.com	medium enterprise	raw materials & commodities	Internationally standardized material name as product code + batch number	H320B 24-04-15-1	aaa-steel.com/? .1P=H320B&.1T=24-04-15-1	
BBB parts	bbb-parts.de	small enterprise	special turned & milled parts	Purchase order number of custom item	PO-240307-232	bbb-parts.de/PO240307-232	
CC Company	cc-comp.eu	large company	factory outfitter	Product code + serial number	Coriolis-maX Cm96-232	cc-comp.eu/? .1P=Coriolis-maX&.S=Cm96-232	
DD Company	dd-comp.eu	major corporation	automotive parts	DUNS number + product code + serial number	123456789 BR55 242131-F	dd-comp.eu/? .18V=UN123456789&.1P=BR55&.S=242131-F	
EE Company	ee-comp.com	large company	consumer goods / food	Global trade item number (GTIN)	9520123456788	ee-comp.com/? .8P=9520123456788	

The EN IEC 61406-series Identification Link is the internationally standardized interoperability solution for globally unique object / product identification.

And it is truly low or no cost, as you can use your existing legacy ID system and just combine it with your company web-domain!

Implementation of IEC 61406 ID-Link in the plant



(*) Fictitious, not registered web domains, for illustration purposes only

Implementation of IEC 61406 ID-Link in SAP R3 (customization)



The screenshot shows the SAP R3 'Equipment anzeigen : Beschreibung' (Equipment Display: Description) screen. The equipment number '33000853' is highlighted with a green box. The description is 'vessel PU 1'. The status is 'EEGB'. The validity dates are 'Gültig ab 23.12.2022' and 'Gültig bis 31.12.9999'. The 'Langtext' (Long Text) field is empty. The 'User-Daten' (User Data) section includes a 'BOM' (Bill of Materials) section with a 'Components of iBOM' button. The 'AutoID' section contains an 'IEC 61406 ID' field with the value 'https://www.z...com/de-en/systems/contact?serr...13', which is also highlighted with a green box.

(*) Fictitious, not registered web domains, for illustration purposes only



classical, „non intelligent“
documentation provisioning

Customer Project ID	LDPE/2021/NA/34-56
Purchase Order nr.	PO-9876-5432
Purchase Order item nr.	32
Engineering Tag nr.	B123-4564-6543
Equi ID or Material nr.	81726354

Filename

AM-6kvum.pdf

AM-6kvac.pdf

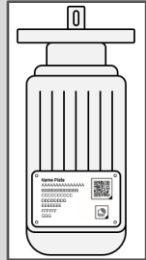
AM-6kvmm.pdf

AM-6kvsp.pdf
AM-6kvsp.xlsx

AM-6kvss.pdf
AM-6kvss.xlsx



VDI 2770 conform „intelligent“ documentation provisioning

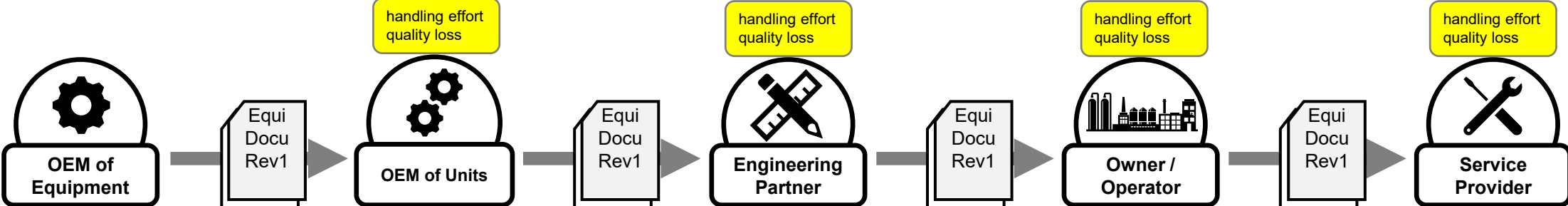


Manufacturer	Test Company AG
Producttype	Asynchron motor
Order Code	AM-6kv-4321
Serialnumber	5678-F
IEC 61406 ID	Test-company.ch/AM-6kv-4321/5678-F

Customer Project ID	LDPE/2021/NA/34-56
Purchase Order nr.	PO-9876-5432
Purchase Order item nr.	32
Engineering Tag nr.	B123-4564-6543
Equi ID or Material nr.	81726354

Filename	Title	description	keywords	document ID	VDI 2770 classification	IEC 61355 classification	language
AM-6kvum.pdf	manual	user manual	operation, use, start up,	Um-AM-6kv-4321-2021-FA	03-02 Operation	DC	EN
AM-6kvac.pdf	Ex-certificate	ATEX-certificate	explosion prevention	Ac-AM-6kv-4321-2021-FA	02-04 Certificates	QC	EN, DE, FR
AM-6kvmm.pdf	maintenance manual	Inspection & maintenance manual	inspection, maintenance,	Ac-AM-6kv-4321-2021-FA	03-04 Inspection, maintenance	DC	EN
AM-6kvsp.pdf AM-6kvsp.xlsx	spare parts	spare part list	casing, fan, shaft, bearing	Ac-AM-6kv-4321-2021-FA	03-06 Spare parts	PB	EN
AM-6kvss.pdf AM-6kvss.xlsx	spec-sheet	technical specification sheet	power, torque	Ss-AM-6kv-4321-2021-FA	02-01 Technical specification	EC	EN

Digital Data Chain (DDC) technologies → the Information Exchange Platform (IEP)



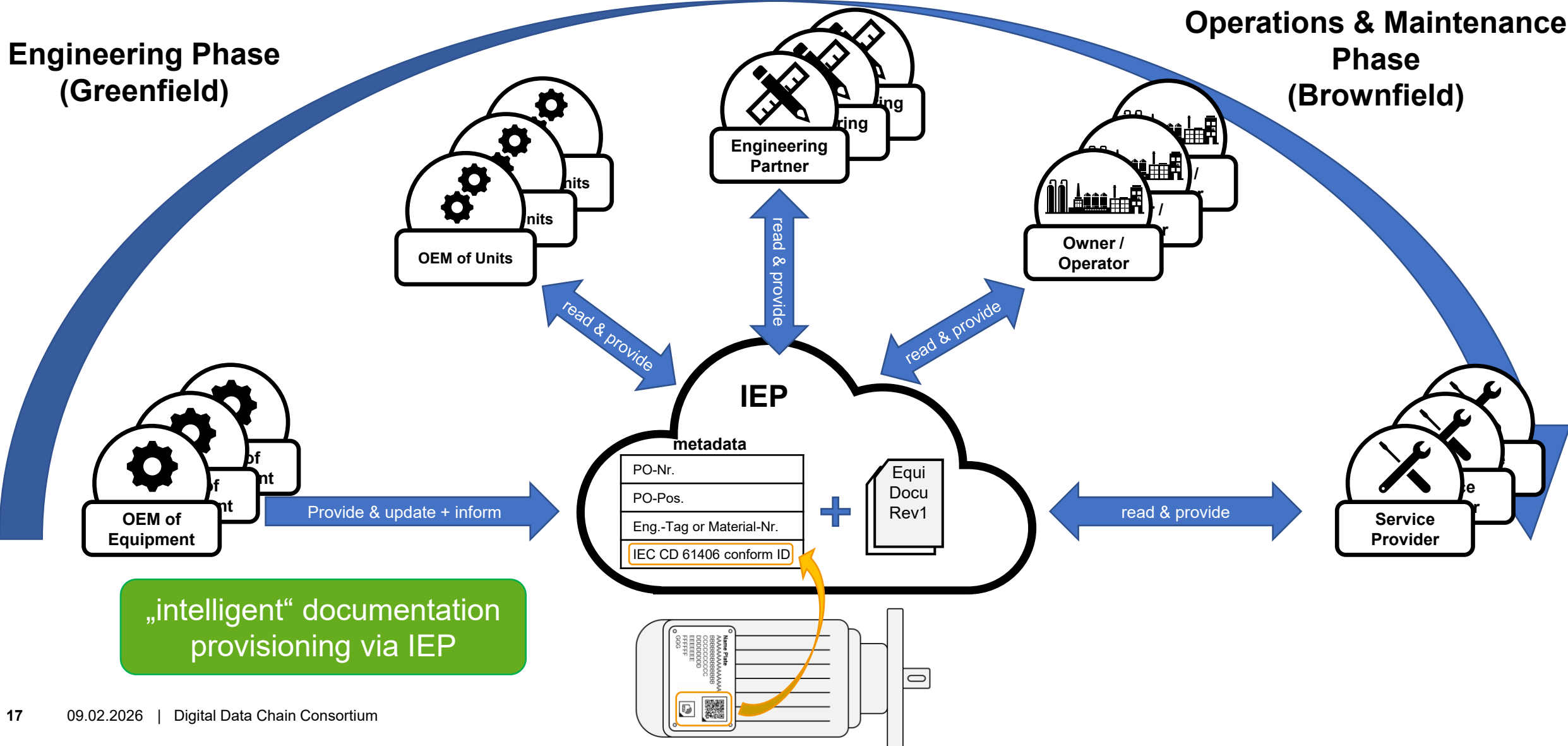
classical, „non intelligent“
documentation provisioning

Digital Data Chain (DDC) technologies → the Information Exchange Platform (IEP)

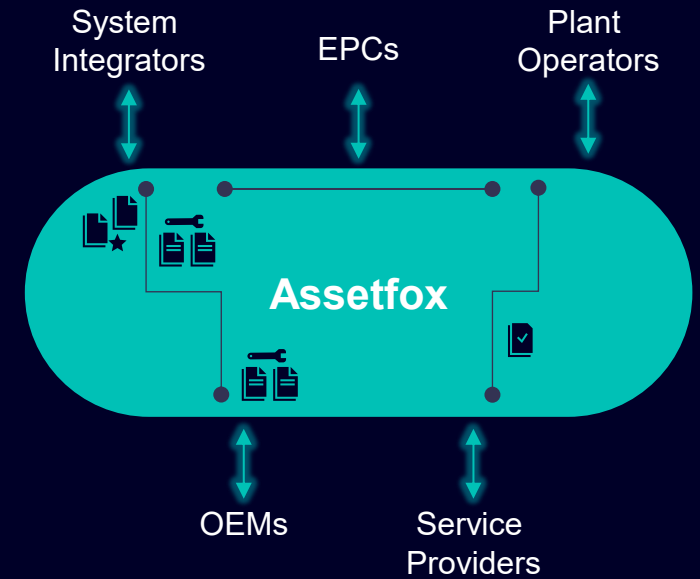
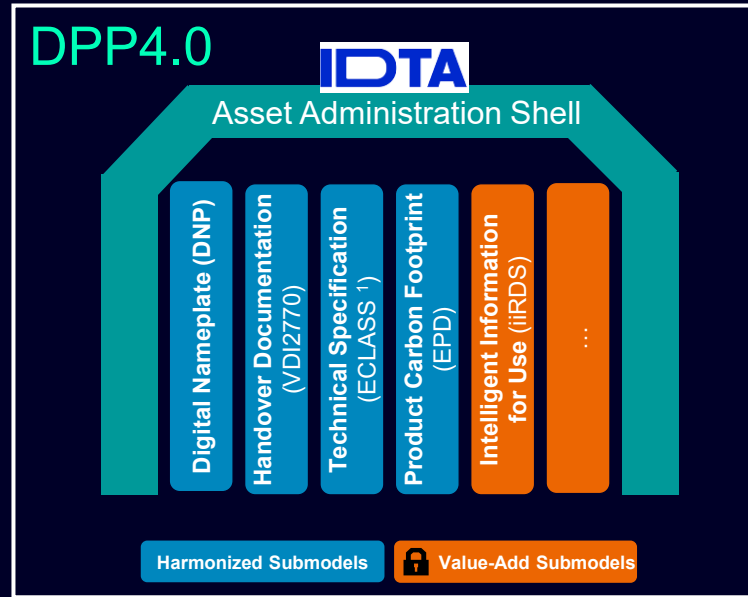
Lifecycle

Engineering Phase
(Greenfield)

Operations & Maintenance
Phase
(Brownfield)



Digital Data Chain: Providing “Digital Twins” at our customers fingertips to increase workflow efficiency significantly and setting the stage for the upcoming Digital Product Passport requirements



1 Product Identification

» Identification Link according to IEC 61406-1 provides significant OPEX reduction by avoiding search time in workflows

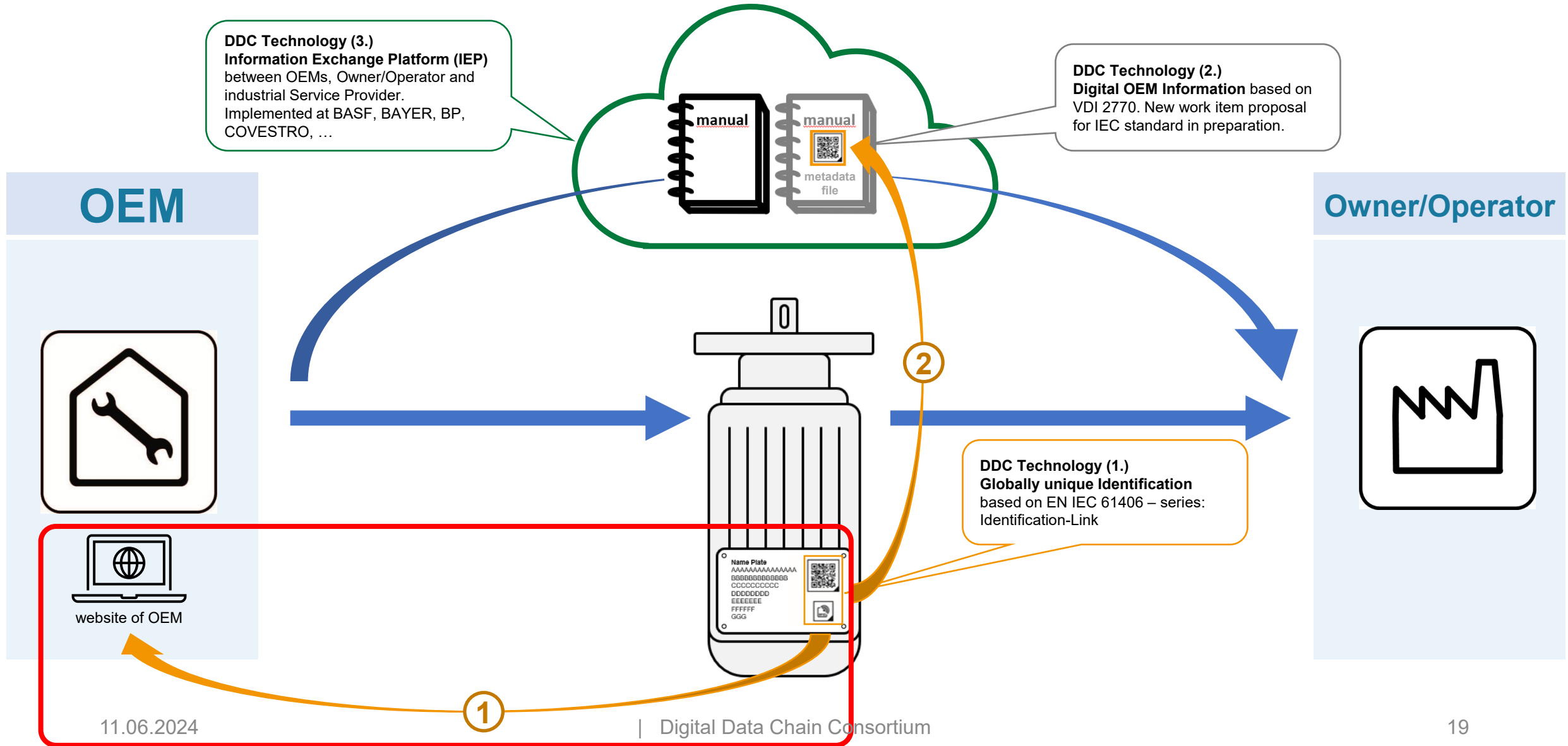
2 Provisioning Service

» Reducing the Product Carbon Footprint (PCF) and costs by generating and accessing standardized product information “Digital Twin” via AAS (IEC 63278)

3 Information Exchange Platform

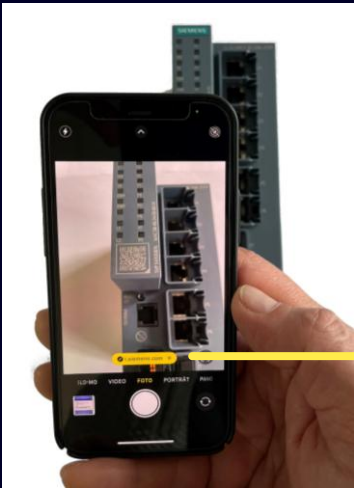
» Seamless & easy exchange of Digital Twins and corresponding Apps via AAS in an ecosystem of shareholders over the entire lifecycle

The DIGITAL DATA CHAIN → Combining the technologies



Live Demo: Example Siemens

Product




ID Link



i.siemens.com >

Online Digital Nameplate

SIEMENS English



6GK5206-2BS00-2AC2
SCALANCE XC206-2SFP

SCALANCE XC206-2SFP manageable Layer 2 IE switch; IEC 62443-4-2 certified; 6x 10/100 Mbit/s RJ45 ports; 2x 100/1000 Mbit/s SFP; 1x console port; diagnostics LED; redundant power supply; temperature range -40 °C to +70 °C; assembly: DIN rail/S7 mounting rail/wall Office redundancy functions features (RSTP, VLAN,...); PROFINET IO device; Ethernet/IP-compliant; C-plug slot;

Lieferfreigabe 12/01/2016

Digital nameplate

CE Ex UK CA CCC EAC TÜV IECEx FM APPROVED EPD More certificates

The test symbols depicted on the nameplate indicate the certificates and directives with which the product complies.

Support entries

- Manual/Operating instructions 21
- Technical data
- Asset Administration Shell (AAS)**
- Certificate 39
- Download/Software 10
- Product note 22
- FAQ 25
- Application example 9
- Catalog/Brochure 2

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View in Asset Administration Shell with AASX Package Explorer

AASX Package Explorer V3.0 - local file: C:\Users\adpsa\Siemens AG\DDC - Digital Data Chain - Documents\DDC - Management\025 Communication & Marketing\Events\HM_2024\AASen für die drei ausgewählten Produkte\SIEMENS_TYPE_XC206_6GK5206-2BS00-2AC2 (3)...

Asset Administration Shell (AAS) Content

Digital Nameplate

This Digital Nameplate stands for a standardized Submodel of the Asset Administration Shell (AAS). It is based on IEC 61406 series for identification of the asset and IEC 63278 series for interoperable access of information. Submodel, AAS and IEC standards are, among others, also important building blocks of the Digital Product Passport (DPP4.0) initiative.

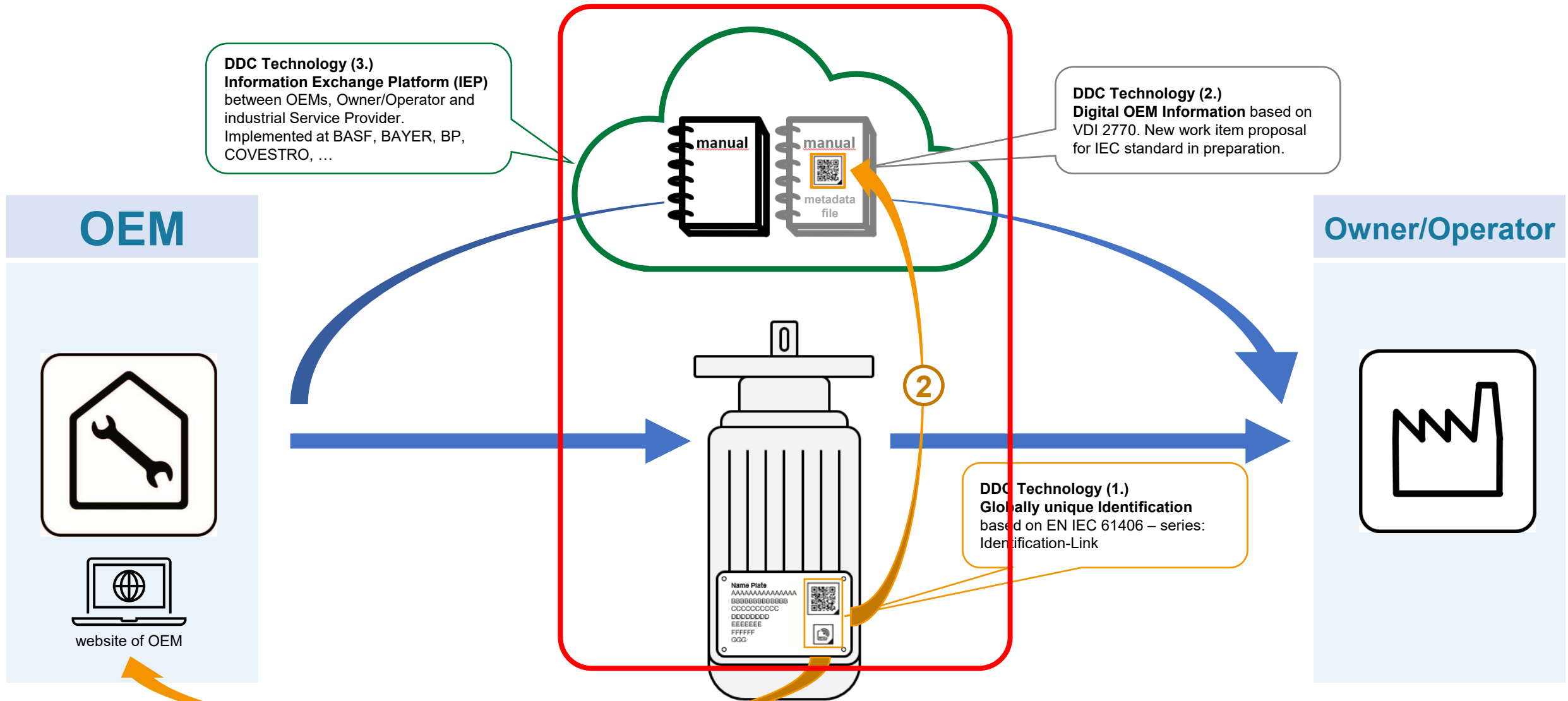
This is version V2.0 of the Submodel for digital nameplate. It is maintained by the Industrial Digital Twin Association (IDTA). It currently features a mix of URI and ECLASS properties and is already prepared to be updated with IEC CDD properties.

managed switch
AG
SIEMENS

(11) SCALANCE XC206-2SFP manageable Layer 2 IE Switch
(12) XC-200 managed switch
(13) managed switch Layer 2 IE Switch
(14) 6GK5206-2BS00-2AC2
(15) 6GK5206-2BS00-2AC2
(16) (not analyzed)

CE

The DIGITAL DATA CHAIN → Combining the technologies



Sharecat Information Exchange Platform

Radar sensor for continuous level measurement of liquids and bulk solids

Verification status

i

★
🔔²
👤
⋮

Revision #1 ▾	Serial Number	Description	Class	Info Classification
In construction	58655705	All-round radar measuring device	Radar sensor	Confidential (Restricted)

🔒

✔ Draft

✔ Under review

✔ Released

4 Superseded

MARK AS VOID

Detailed Information

Instance Information

Production Date*
2022

Batch Number*

Company Specification
VEGAPULS 6X

Design Codes

Product Information

Model ID*
VEGAPULS 6X

Product Description
Radar sensor for continuous level measurement of liquids and bulk solids

Manufacturer
VEGA

Photos

Documents & Files

Document Category ▾	Document Id	Title	File Name	Manufacturer	Description	Key Words	Language	Valid From	Status
Technical specification	695_DE_Technische_Spezifikation	Technische Spezifikation	📄 02-01_Technis...	VEGA Grieshaber KG	VDI-2770 gebundenes Paket für technische Spezifikationen	VEGA; VEGAPULS 6X; radar	de		Released
Technical specification	697_EN_Technical_specification	Technical specification	📄 02-01_Technic...	VEGA Grieshaber KG	VDI-2770 wrapped package for technical specification	VEGA; VEGAPULS 6X; radar	en		Released

SAP Business Network for Asset Collaboration

SAP Equipment

37000000 / 37010000 / LESER 433 - SAFETY VALVE /

LESER 433 - SAFETY VALVE 10136145

Manage

Manufacturer: LESER ID Link Shared By: 1 Partners Functional Location: E60 External IDs Status: Published Languages: EN

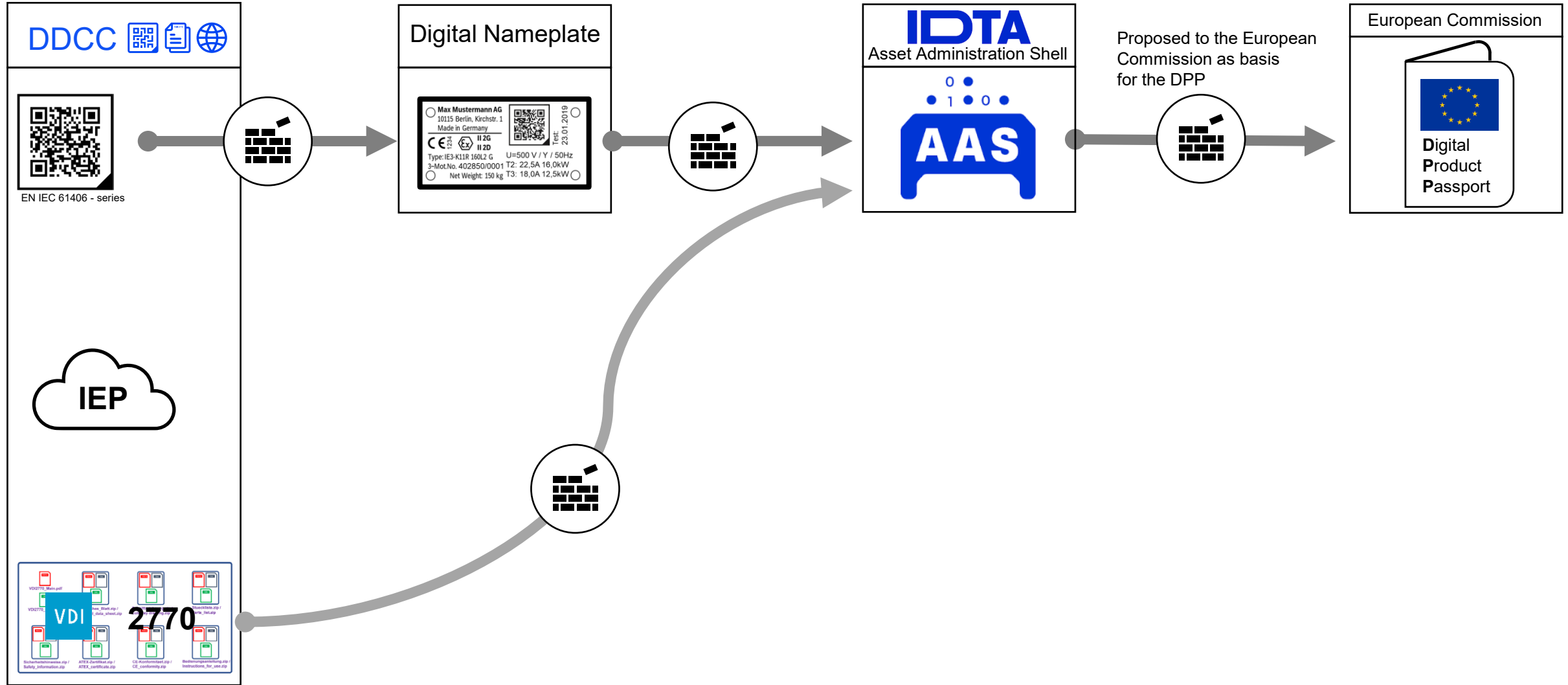
INFORMATION STRUCTURE & PARTS **DOCUMENTATION** MAINTENANCE & SERVICE TIMELINE

Documents

All (16) Equipment (7) Models (9) Locations (0) Tagged Images (0) Search Documents Download

<input type="checkbox"/>	Document	File Name	File Type	Confidentiality	Phase	Category	Language	Source	File Size	From	Changed On
<input type="checkbox"/>	Abnahmedokument D.POCOPE.7	Abnahmedokument_Dummy.pdf More	PDF		Acquisition	Others	German	SAP PoC Operator	7 KB		2021-07-01
<input type="checkbox"/>	Zeichnung D.POCOPE.9	Zeichnung_Dummy.pdf More	PDF		Design / Installation	Drawings/Schemes	German	SAP PoC Operator	7 KB		2021-07-01
<input type="checkbox"/>	Zertifikat D.POCOPE.4	10259764_Cert_10956330_DE.pdf More	PDF		Operation	Certificates	German	SAP PoC Operator	447 KB		2021-07-01
	Bestellung	02 BASF									

DIGITAL DATA CHAIN → relation to other standards and technologies



building block for

Artificial Intelligence

Why do we need a DPP / Digital Twin when we have AI available?

The DPP / Digital Twin is the information source for the AI to provide reliable, comprehensive and trustworthy answers!

Because no AI is a clairvoyant 😊



Christoph Attila Kun

Global Product Manager *Digital Data Chain* @ BASF

Manager *Digital Data Chain Consortium GbR* → www.digitaldatachain.com

Factory-X Use Case lead: Collaborative Information Logistics

Chairman VDI Experts Council 2770

National delegate CEN/CENELEC JTC 24 – EU Digital Product Passport

Mobil : +49 1522 8866364

Mail: christoph-attila.kun@basf.com

Please don't hesitate to contact us, if you are interested in the Digital Data Chain (DDC) and its global implementation!



Digital Data Chain Consortium

www.digitaldatachain.com