



DPP4.0 is the industrial answer to the regulatory request on DPP

CAPIEL Plenary Committee Meeting, Frankfurt, 1st July 2022

Prof. Dr. Dieter Wegener | Siemens AG & ZVEI-Speaker „Industrie 4.0“

1

SPI: EU Commission's view on DPP

2

Enabling Technologies: DNP4.0 and AAS

3

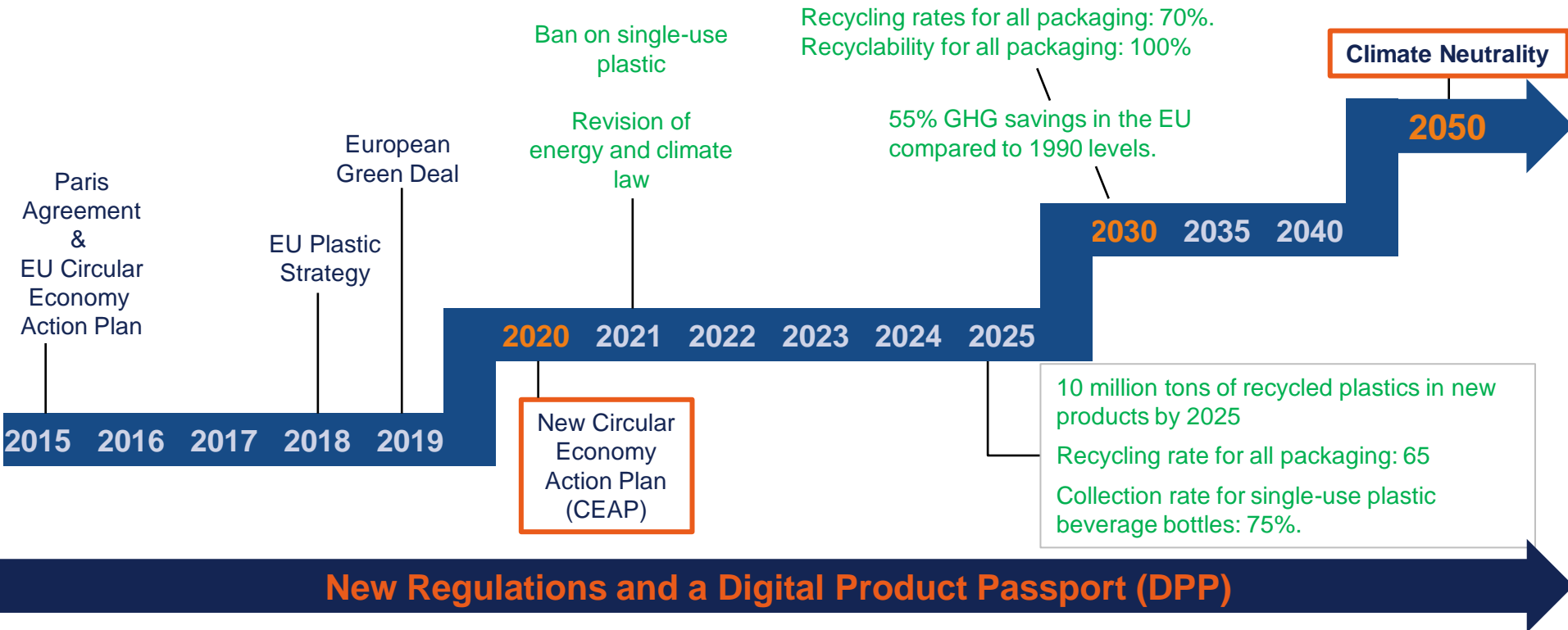
DPP4.0 is the industrial answer on DPP

4

Live Demo on DPP4.0

Roadmap of the European Green Deal

Increasing Requirements to Document Product Information





Ecodesign for Sustainable Products Regulation (ESPR) and Digital Product Passport (DPP)



*Michele GALATOLA
DG GROW – I3 Circular and Green
Economy Unit*

Key product aspects under ESPR

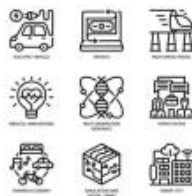
- Durability
- Reliability
- Reusability
- Upgradability
- Repairability
- Possibility of maintenance and refurbishment
- Presence of substances of concern
- Energy use or energy efficiency
- Resource use or resource efficiency
- Recycled content
- Possibility of remanufacturing and recycling
- Possibility of recovery of materials
- Environmental impacts, including carbon and environmental footprint
- Expected generation of waste materials

ESPR

Digital Product Passport (DPP)



Tracking of **raw materials extraction/production**, supporting due diligence efforts



Enable **manufacturers** to create products **digital twins**, embedding all the information required



Tracking the life story of a product, enabling services related to its **remanufacturing, reparability, re-use/re-sale/second-life, recyclability**, new business models



Benefit **market surveillance authorities and customs authorities**, by making available information they would need to carry out their tasks



Make available to **public authorities and policy makers** reliable information. Enable to link **incentives to sustainability performance**



Allow **citizens** to have access to **relevant and verified information** related to the characteristics of the products they own or are considering to buy/rent (e.g. using apps able to read the identifier)



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“Digital Nameplate 4.0 (DNP4.0)“

ZVEI-Demonstrator Shown on SPS-Fair in 2019

ZVEI:
Die Elektroindustrie

STANDARDIZATION COUNCIL
INDUSTRIE 4.0

ABB

FESTO

rexroth
A Bosch Company

Lenze

Schneider Electric

PHOENIX CONTACT

SIEMENS

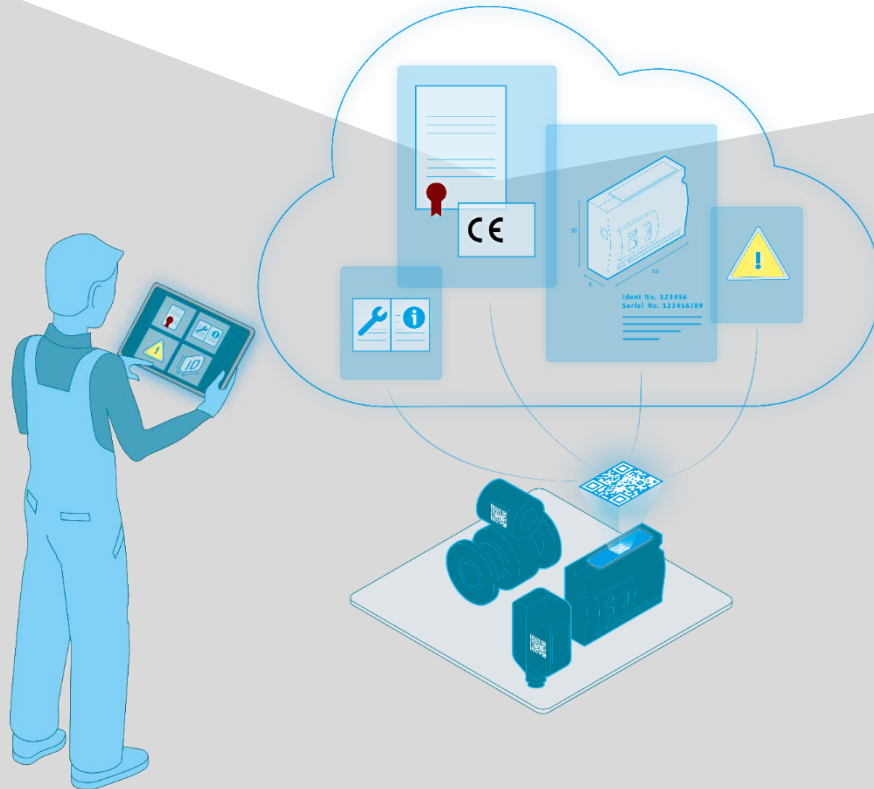
PEPPERL+FUCHS



atp Magazin
11/12-2019

The Digital Nameplate 4.0 (DNP4.0)

Basis for a Feasible DPP-Concept



Saving time and costs

- Access to product documentation online
- No costs for paper and logistics



One valid standard

- Across companies
- via DIN SPEC 91406
-> IEC 61406 ("Identification Link")



Global Access

- Documents in all languages
- Locale Certificates (CE, CCC, ...)

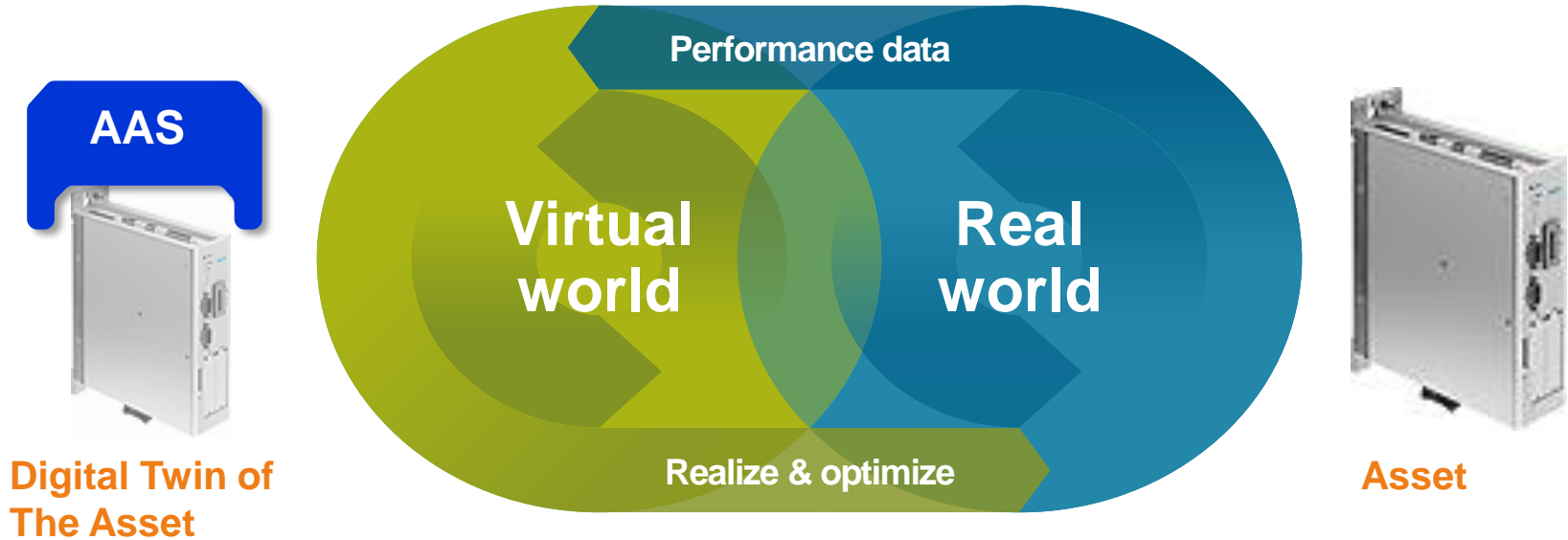


Sustainability

- Saving resources
- No paper documentation anymore

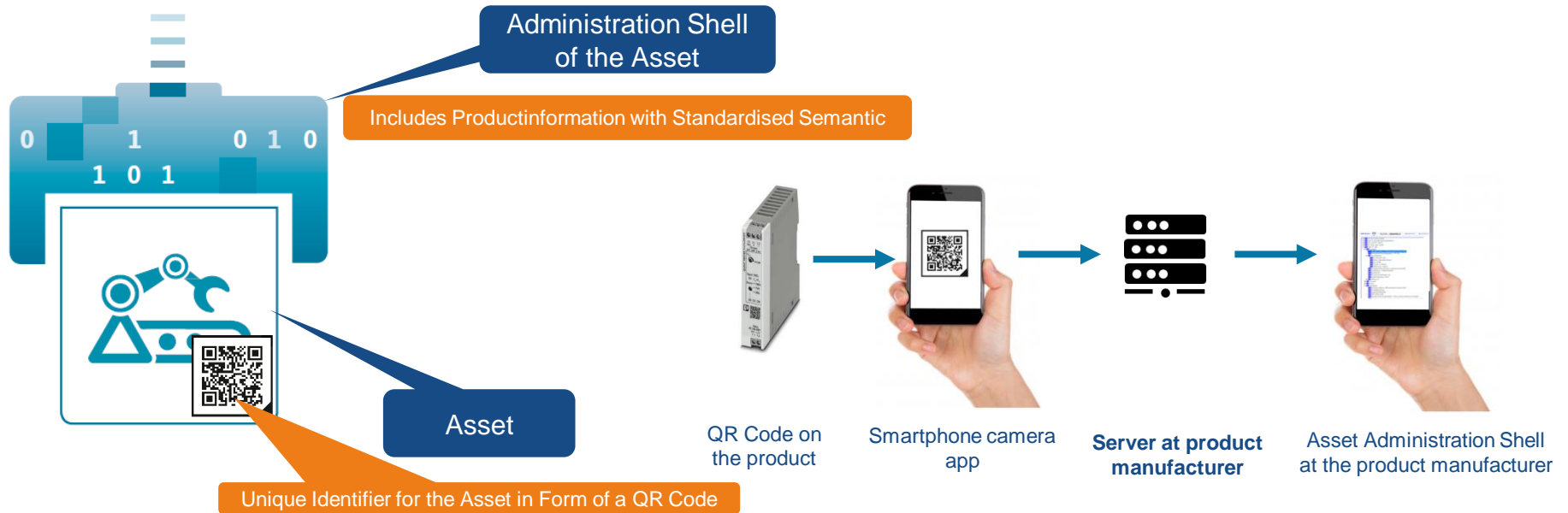
“Digital Twin“ based on Asset Administration Shell (AAS)

Each Real Product will get a Digital Twin in the Virtual World



“Digital Twin“ based on the Asset Administration Shell (AAS)

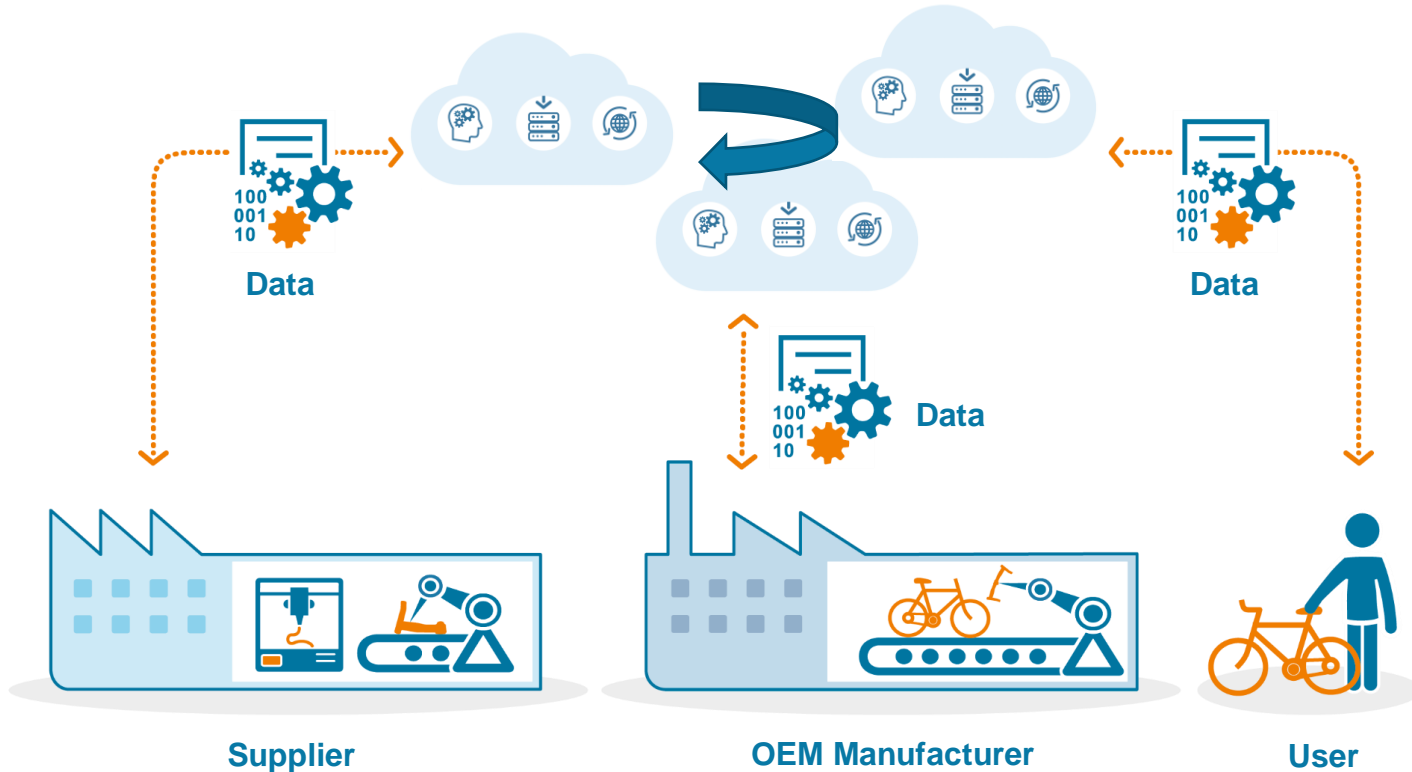
Each Real Product will get a Digital Twin in the Virtual World



Source:
Plattform I4.0

“Digital Twin“ based on AAS

Each Real Product will get a Digital Twin in the Virtual World



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Industrial DPP4.0-approach based on DNP4.0 and AAS

Enabling sharing of Product Information along Product Lifecycle

Product

Digital Name Plate (DNP4.0)



+

Product Information provided by manufacturer e.g.:

- IEC 62474 (Material declaration for products of and for the E&E industry)
- **Product Carbon Footprint**
- ...

Digital Name Plate

+

Product Information

- ...
- ...

=

EU Digital Product Passport

Product Lifecycle

Design

Engineering

Production

Operation

Recycling

AAS

Submodels

“EU Digital Product Passport (DPP4.0)“

Enabling „Digital Transformation“ and new Business Models

Product



+

Product Information provided by manufacturer e.g.:

- IEC 62474 (Material declaration for products of and for the E&E industry)
- **Product Carbon Footprint**
- ...

Digital Name Plate

+

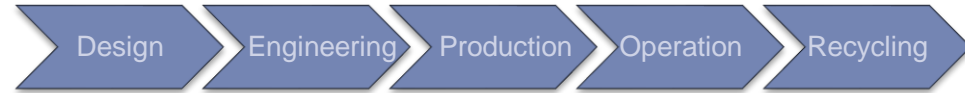
Product Information

- ...
- ...

=

EU Digital Product Passport

Product Lifecycle



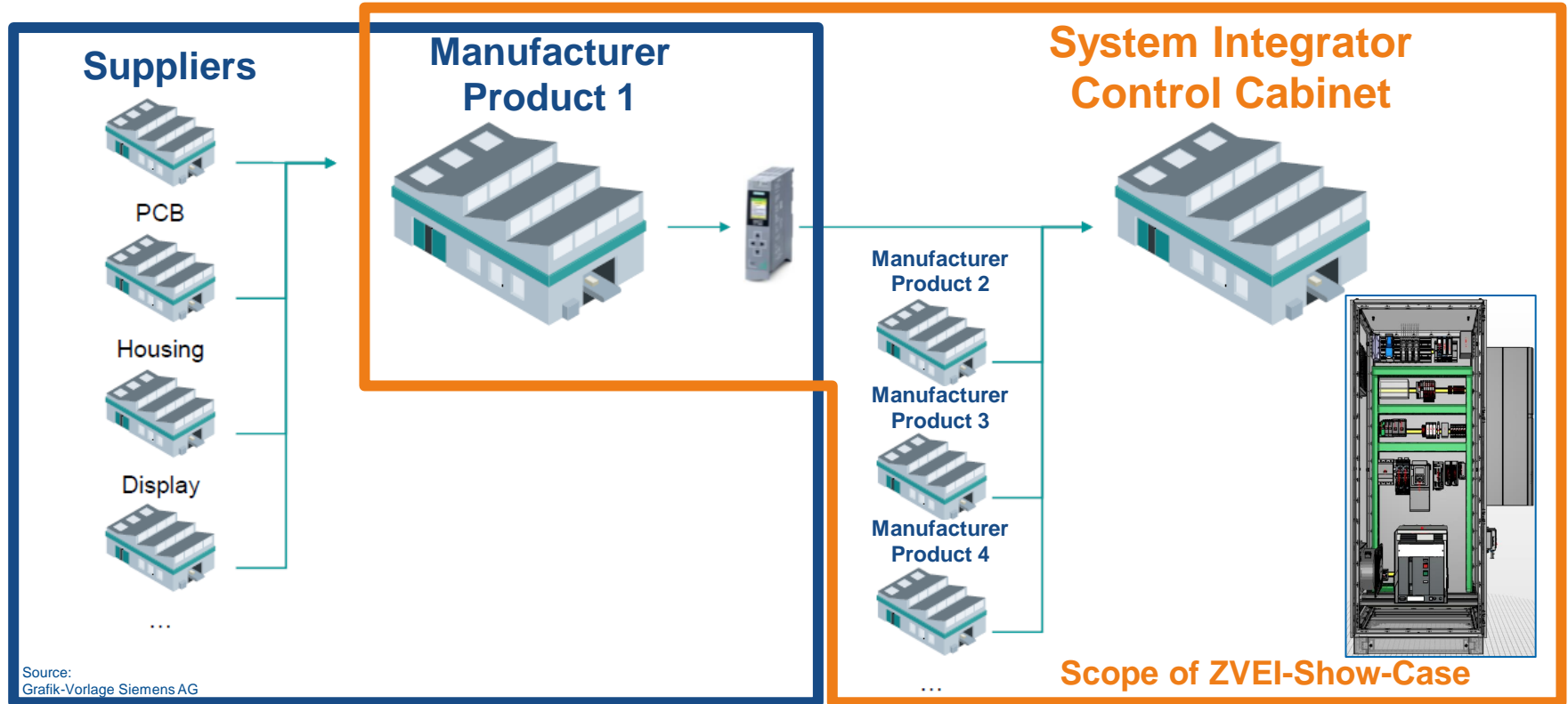
- List of legislation and standards that the product complies with, or the technical specifications that it fulfils
- Information on safe use and instructions, where applicable
- Information relevant for testing, disassembly, maintenance, repair or reassembly
- **Information on Product Environmental and/or Carbon Footprint, or other relevant sustainability characteristics**
- Any possession of sustainability labels, such as the EU Ecolable
- Information on how the product should be recycled and/or handled at the end of life

Other information provided by the manufacturer:

- Digital Services
- New Business Models

ZVEI-Show-Case “PCF@Control Cabinet”

Scope of the Show-Case: From Manufacturer to System Integrator



ZVEI-Show-Case "PCF@Control Cabinet"

Participating Companies and Organisations

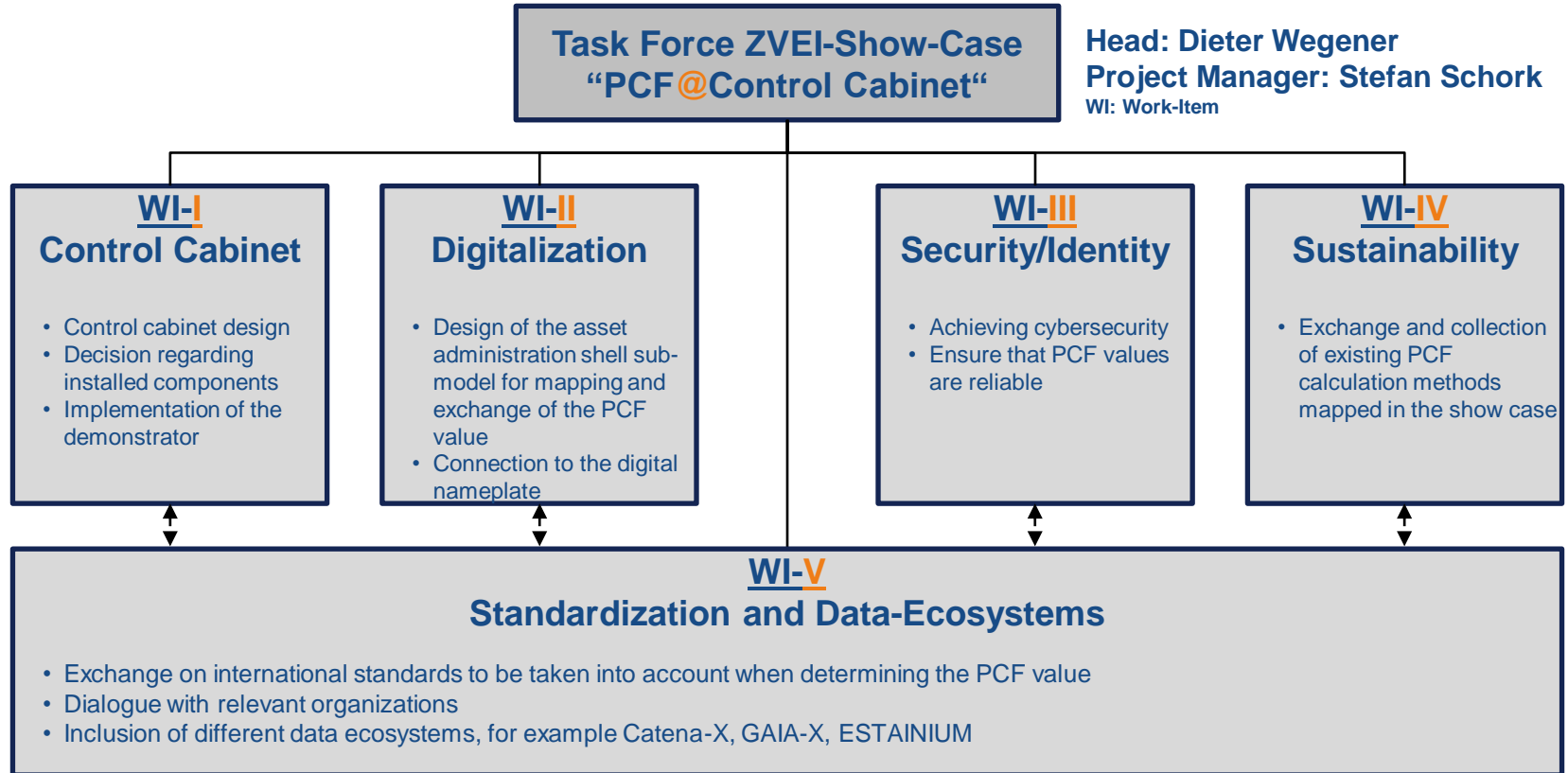


ESR Pollmeier GmbH
Servo-Antriebstechnik



ZVEI-Show-Case “PCF @Control Cabinet”

Project Organization



Increasing Requirements on Accountability for PCF

High Amount is in the Supply Chain and not Transparent

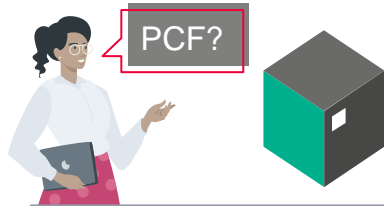
Responsibility

Public pressure

CO₂ Tax

Comp.
Advantage

Customer Request



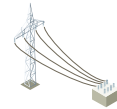
- Requirements for PCF declaration
- Lost projects due to missing PCF info
- Increased willingness to pay for PCF transparency

Product Carbon Footprint (Cradle to Gate)

Direct Emissions
(Scope 1)



Energy
(Scope 2)



9%

Supply Chain
(Scope 3)



91% intransparent¹

Scope 1 & 2

Scope 3

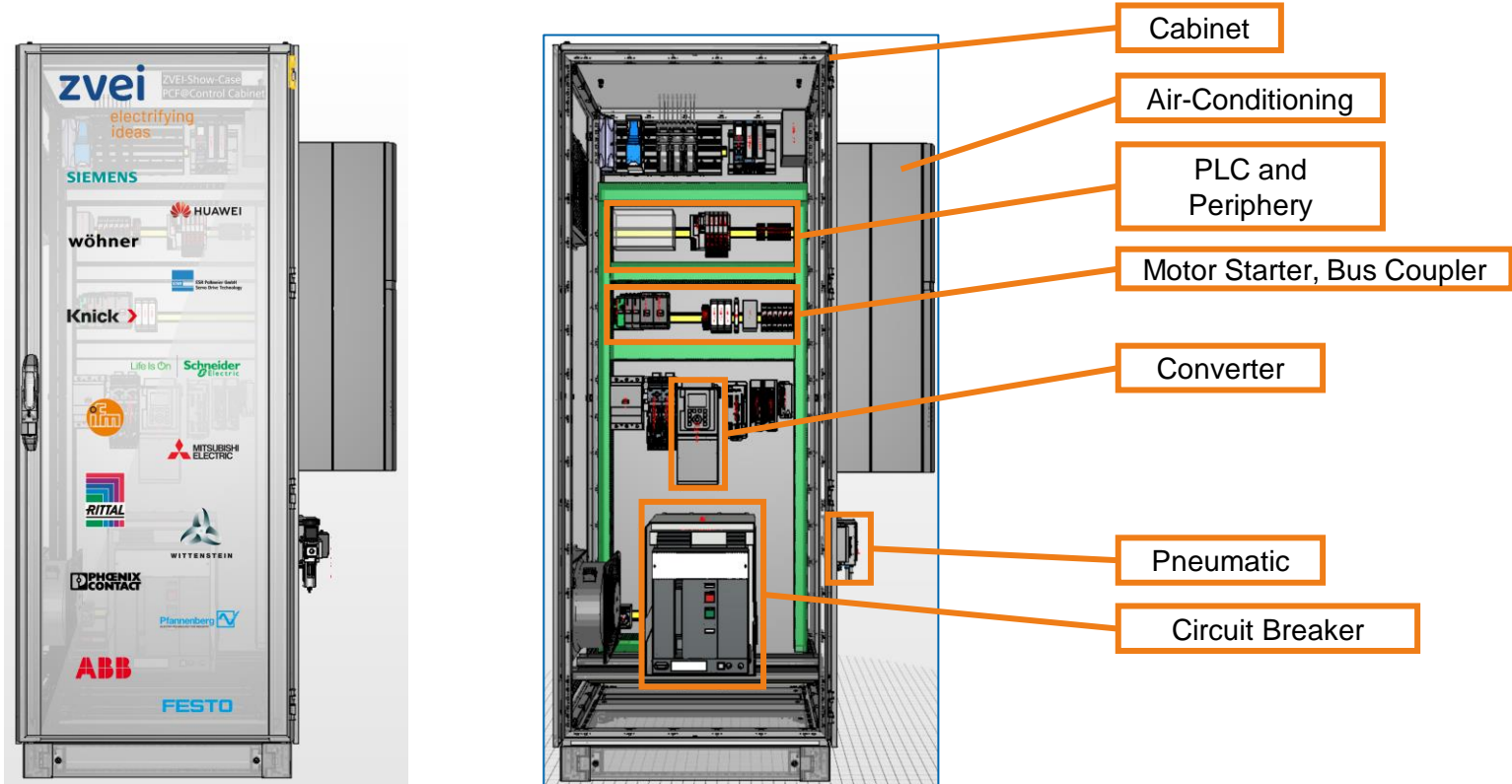
Data are available, but solution for **automated break down** on product level is **missing**
→ PoC in Amberg proved data availability. **Pilot for S7-1500 production line in preparation**

Data from the supply chain are **not accessible** even though the supply chain has major impact on the PCF

¹ Carbon Disclosure Project, Feb 2021

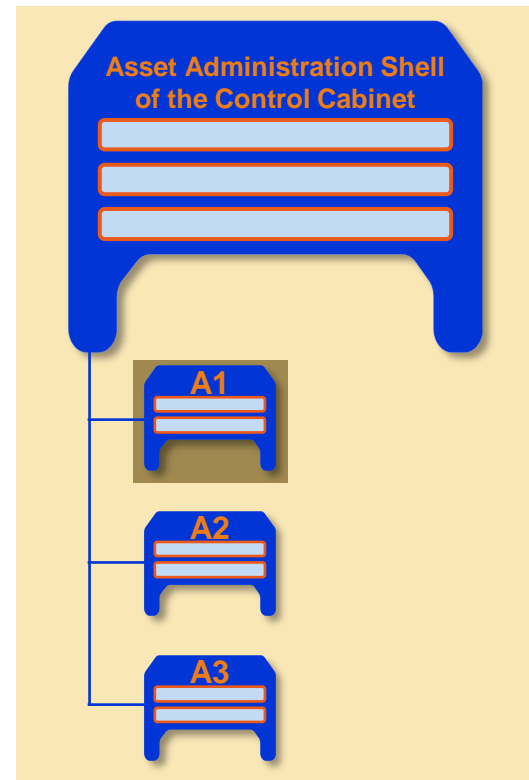
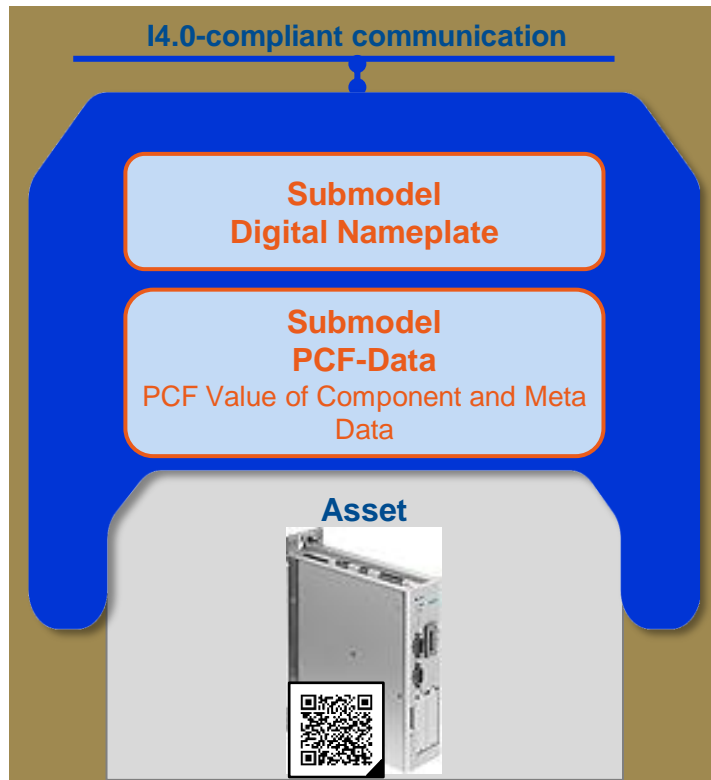
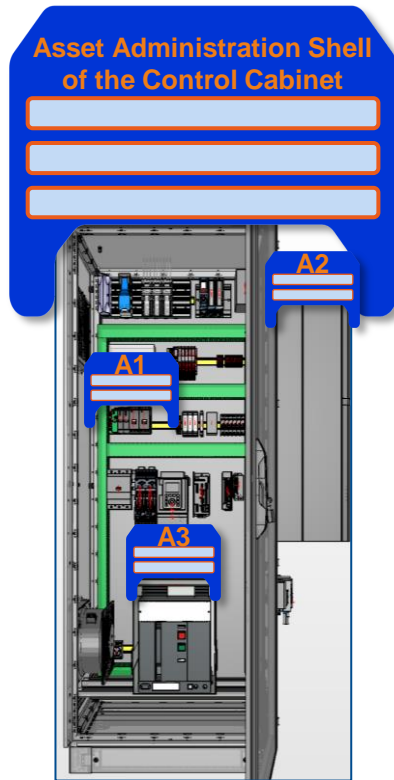
ZVEI-Show-Case “PCF@Control Cabinet”

Demonstrator: Control Cabinet



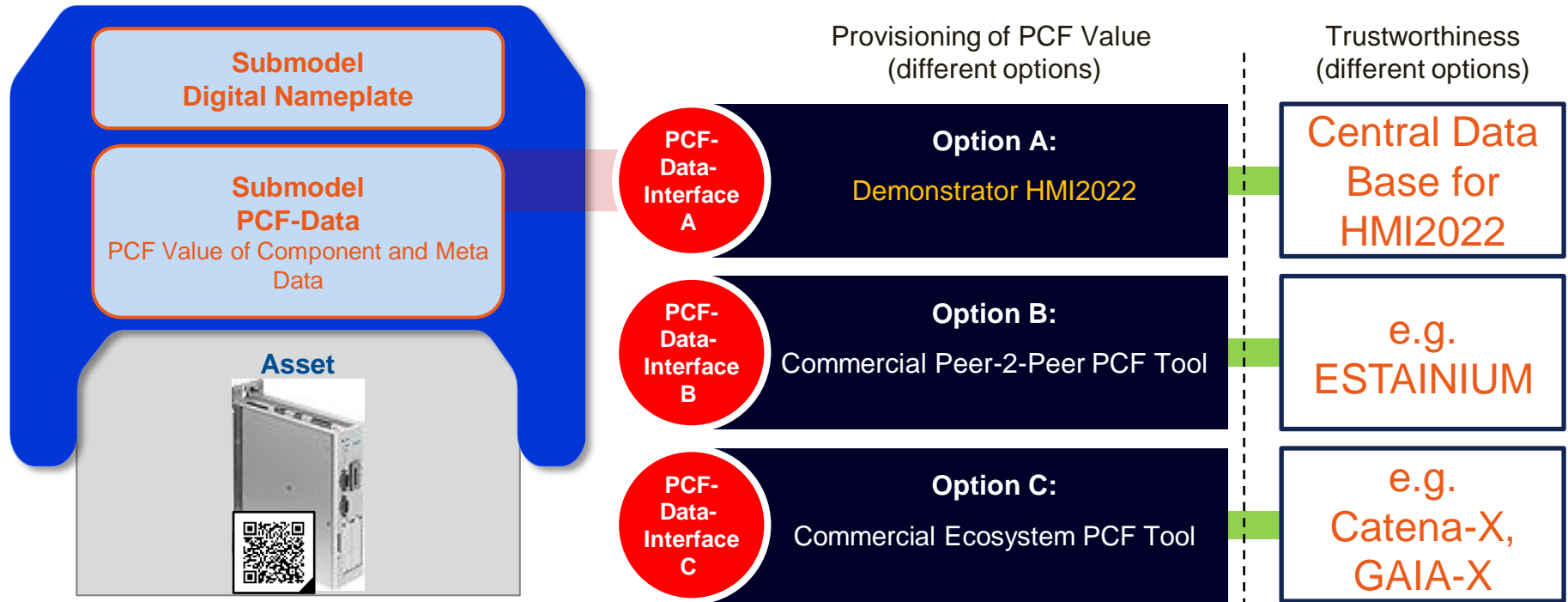
ZVEI-Show-Case “PCF @Control Cabinet”

Demonstrator: Control Cabinet



ZVEI-Show-Case “PCF@Control Cabinet”

Different Possible Data Sources



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Implementation @ SIEMENS

Online Representation of the Product in Browser

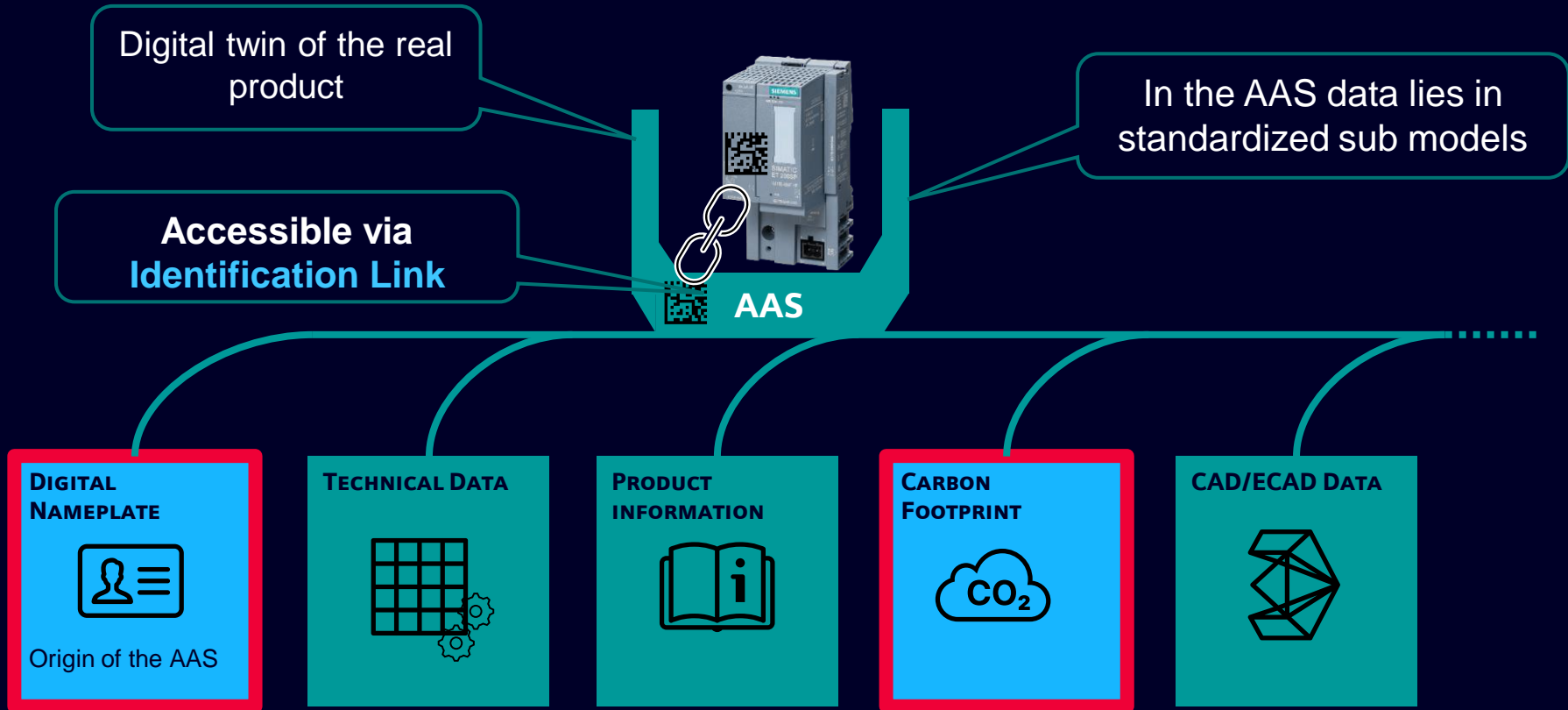
Scan 2D Code with Camera App

One-to-one Product Identification



- Technical Data
- Certificates
- Manuals
- Mail
- ... freely expandable

Asset Administration Shell (AAS) and Sub Models



Implementation of Digital Nameplate (DNP4.0) avoids paper and improves footprint of industrial products significantly

Without Digital Nameplate –
Information on Paper



With Digital Nameplate –
Information in the Internet



Live Demo

Product



ID-Link

 [i.siemens.com](https://www.i.siemens.com) >

Package



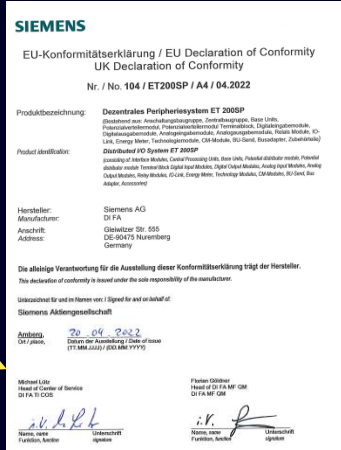
Online Digital Nameplate



Online Declaration of Conformity



PDF of original Dec. of Conf.



Q & A

Contact Information

Prof. Dr. Dieter Wegener

Head of External Cooperation, Siemens Technology

Otto-Hahn-Ring 6, 81739 Munich

Mobile: +49 (173) 2512980, E-mail: dieter.wegener@siemens.com

Other external activities:

- (1) since 2014 Chair of ZVEI Management Circle "Industrie 4.0", Frankfurt
(ZVEI = Electro and Digital Industry Association)
- (2) since 2015 Vice-President DKE, Frankfurt
(DKE = German Commission for Electrical, Electronic & Information Technologies of DIN and VDE)
- (3) since 2016 Chair of Advisory Board SCI4.0 (Co-Founder), Frankfurt
(SCI4.0 = "Standardization Council Industrie 4.0")
- (4) since 2019 Vice-Chair of DMEC (Co-Founder), Digital Europe, Brussels
(DMEC = Digital Manufacturing Executive Council)
- (5) since 2019 Chair of DIN Presidential Committee FOCUS.ICT for "German ICT- Standardization", DIN, Berlin
- (6) since 2019 Member of DIN/DKE-Coordination Group "German AI-Standardization Roadmap", DIN, Berlin
- (7) since 2021 Vice-Chair of ZVEI Management Circle "Environment-, Energy- & Climate Politics", Frankfurt

