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

Dieter Wegener, Siemens & 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
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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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 the Asset Administration Shell (AAS)
Each Real Product will get a Digital Twin in the Virtual World

- **Administration Shell of the Asset**
  - Includes Product information with standardized semantic

- **Asset**
  - Unique identifier for the asset in form of a QR Code

- **QR Code on the product**
  - Smartphone camera app
  - Server at product manufacturer
  - Asset Administration Shell at the product manufacturer

Source: Plattform 4.0
“Digital Twin“ based on AAS
Each Real Product will get a Digital Twin in the Virtual World

Source: Grafik-Vorlage Siemens AG
1. SPI: EU Commission's view on DPP
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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
  - ...

Product Lifecycle

- Design
- Engineering
- Production
- Operation
- Recycling

AAS

Submodels

Digital Name Plate

Product Information
  - ...
  - ...

= EU Digital Product Passport (DPP4.0)
“EU Digital Product Passport (DPP4.0)“
Enabling „Digital Transformation“ and new Business Models

Digital Name Plate (DNP4.0)

Product Information provided by manufacturer e.g.:
- IEC 62474 (Material declaration for products of and for the E&I industry)
- Product Carbon Footprint
- ...

+ 

Product Information
- ...
- ...

= 

EU Digital Product Passport (DPP4.0)

Product Lifecycle

Design Engineering Production Operation Recycling

- 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

Suppliers

- PCB
- Housing
- Display
- ...

Manufacturer
Product 1

System Integrator
Control Cabinet

Scope of ZVEI-Show-Case

Manufacturer
Product 2

Manufacturer
Product 3

Manufacturer
Product 4

...

Source:
Grafik-Vorlage Siemens AG
ZVEI-Show-Case “PCF@Control Cabinet”
Demonstrator: Control Cabinet

- Cabinet
- Air-Conditioning
- PLC and Periphery
- Motor Starter, Bus Coupler
- Converter
- Pneumatic
- Circuit Breaker
ZVEI-Show-Case “PCF@Control Cabinet”
Different Possible Data Sources

**Submodel Digital Nameplate**

**Submodel PCF-Data**
- PCF Value of Component and Meta Data

**Asset**

**Provisioning of PCF Value** (different options)

**Option A:**
- PCF-Data-Interface A
  - Demonstrator HMI2022

**Option B:**
- PCF-Data-Interface B
  - Commercial Peer-2-Peer PCF Tool

**Option C:**
- PCF-Data-Interface C
  - Commercial Ecosystem PCF Tool

**Trustworthiness** (different options)

- Central Data Base for HMI2022
  - e.g. ESTAINIUM

- e.g. Catena-X, GAIA-X
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Implementation @ SIEMENS

Scan 2D Code with Camera App

One-to-one Product Identification

Online Representation of the Product in Browser

- Technical Data
- Certificates
- Manuals
- Mall

... freely expandable

Source: © Siemens 2022
Asset Administration Shell (AAS) and Sub Models

Digital twin of the real product

Accessible via Identification Link

In the AAS data lies in standardized sub models

Digital Nameplate
- Origin of the AAS

Technical Data

Product Information

Carbon Footprint

CAD/ECAD Data

Source: © Siemens 2022
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

DNP4.0 im www

Show Case
Live Demo

Product

Online Digital Nameplate

ID-Link

i.siemens.com >

Package

Online Declaration of Conformity

Download

Source: © Siemens 2022

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Q & A
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Other external activities:

(1) since 2014 Chair of ZVEI Management Circle “Industrie 4.0”, Frankfurt
(ZVEI = German Electrical and Electronic Manufacturers’ 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