Digital Product Passport
Central building block of
Green and Digital Transformation

11.09.2023

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- **12/2019: European Green Deal**

  „[…] for example, an electronic product passport could provide information on a product's origin, composition, repair and disassembly options, and end-of-life handling"

- **03/2020: European *Circular Economy Action Plan* (CEAP)**

- **12/2020: Battery Regulation (**Article 65**)**

  „[…], by 1 January 2026, industrial batteries and electric-vehicle batteries shall have an electronic record for each individual battery […]. The battery passport shall be linked to the information about the basic characteristics of each battery type and model stored in the data sources of the system […]".*

- **03/2022: Draft of the ESPR (Ecodesign Requirement for Sustainable Products)**

  „[…] The proposal also includes the creation of a digital product passport to electronically register, process and share product-related information amongst supply chain businesses, authorities and consumers. […]

→ **05/2023: Draft Standardization Request on DPP (ESPR & others) was submitted to CEN-CENELEC**

DPP – Origins/Motivation - stakeholders, interests, requirements

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Digitization efforts of the economy plus new business models	Battery regulation	ESPR Ecodesign for Sustainable Products Regulation	CE-marking / approval regulations	LkSG
potentiell alle Produkte	Batterien	washing machines, refrigerators, TV sets, lighting and motors. In the future, textiles, furniture, steel, cement and chemicals will also be	broad product categories	
	Besonderheit: Traktionsbatterien			

Origins/Motivation of the DPP idea
- **Circular Economy**
- **R-strategies (re-use, re-cycling, re-manufacturing, re-pair)**
- **social aspects (forced labor, child labor, etc.)**
- **ecological aspects (PCF)**
- **animal welfare**
- **traceability**
- **Access to mandatory product information**
- **Proof of conformity**
- **Consumer information**
- **Operating instructions**
- **Usability /Maintenance**
- **Quality assurance (QI)**
- **New business models**
- **Identification / nameplate**
- **etc.**

Various Stakeholders
- **Product manufacturers**
- **Integrators**
- **Users / Consumers**
- **Recyclers**
- **Market surveillance**
- **Third parties**
- **etc.**

Central building block of the Digital and Green Transformation

➡ **It makes sense not to think about the design of the DPP from one origin - it should be approached as universally as possible.**

➡ **The interests of the stakeholders and the requirements derived from the various ideas for a digital product passport may not be compatible.**

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4. Data access via battery passport and Registry
Access rights differing between access groups[2]
- "General public"
- "Notified bodies, market surveillance authorities and the Commission"
- Interested person: "Any natural or legal person with a legitimate interest"

Battery Passport Systems
Decentralised data storage by responsible (or authorised) economic operator with model and individual battery information

Product Passport Registry
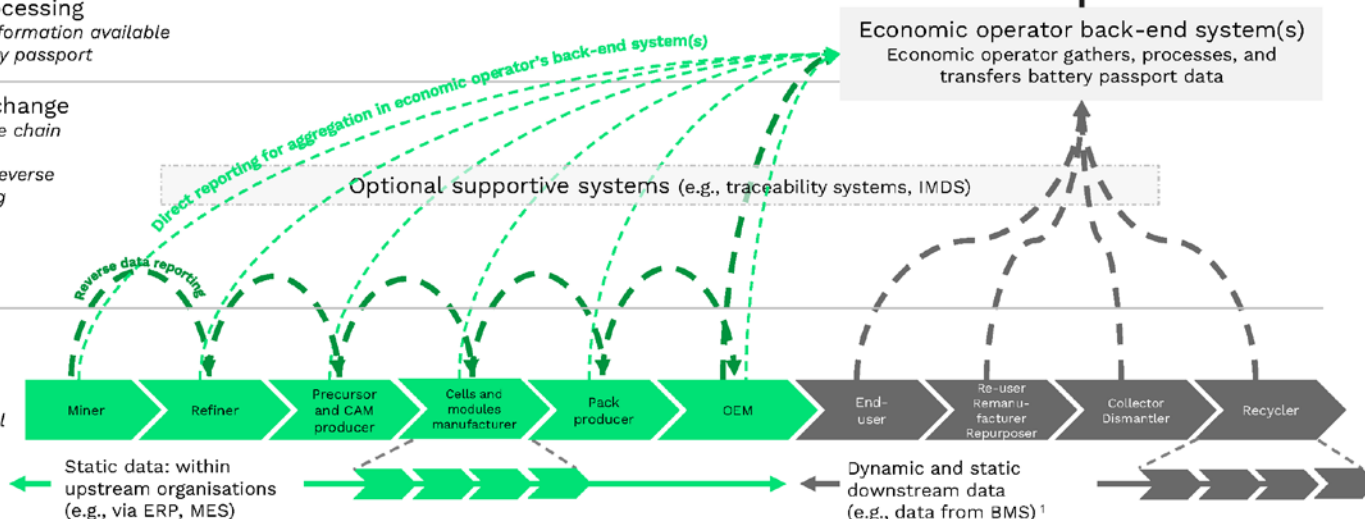By the European Commission including at least identification data

3. Data processing
for making information available via the battery passport

Economic operator back-end system(s)
Economic operator gathers, processes, and transfers battery passport data

2. Data exchange
between value chain participants, via direct or reverse data reporting

Direct reporting for aggregation in economic operator's back-end system(s)

Reverse data reporting

Optional supportive systems (e.g., traceability systems, IMDS)

1. Data collection
within organizational boundaries

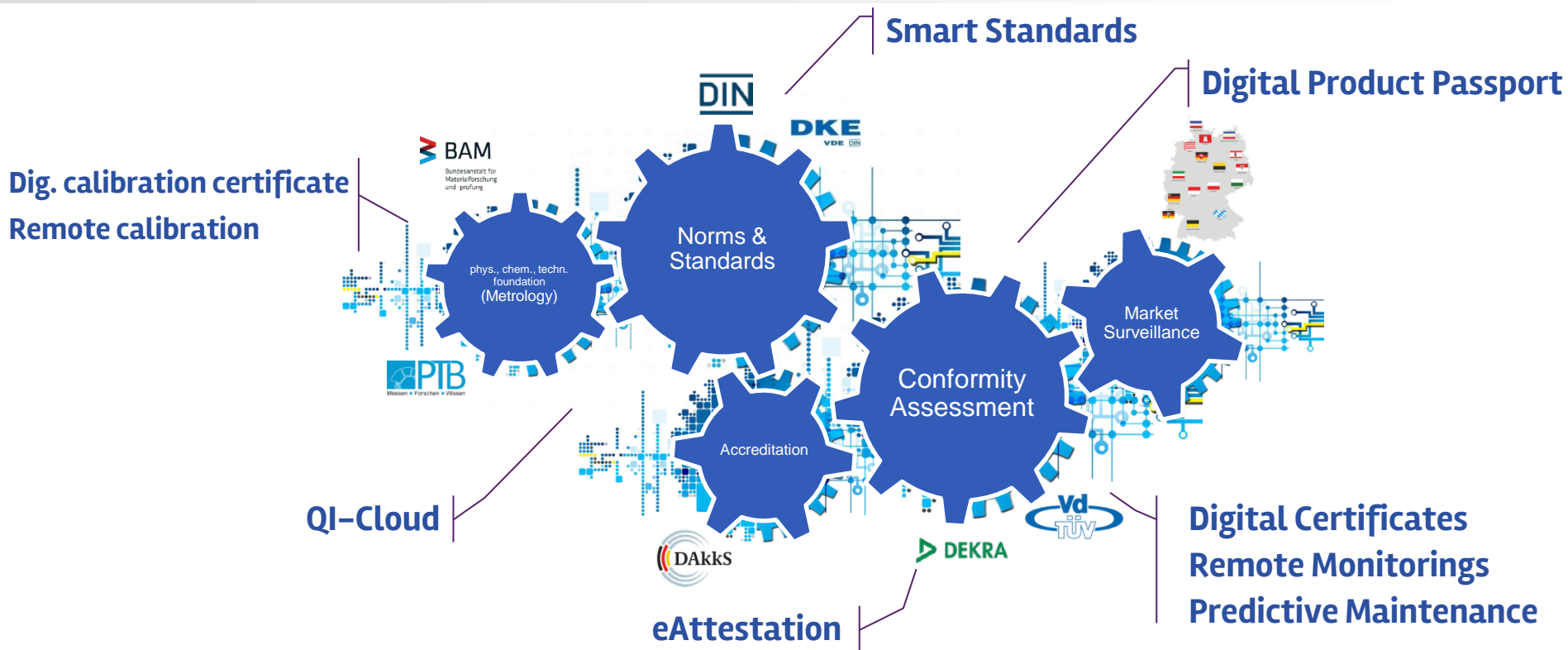| Miner | Refiner | Precursor and CAM producer | Cells and modules manufacturer | Pack producer | OEM | End-user | Re-user Remanu-facturer Repurposer | Collector Dismantler | Recycler |

Static data: within upstream organisations (e.g., via ERP, MES)

Dynamic and static downstream data (e.g., data from BMS) [1]

Static upstream data

Dynamic and static downstream data

Supported by:
Federal Ministry for Economic Affairs and Climate Action
on the basis of a decision by the German Bundestag
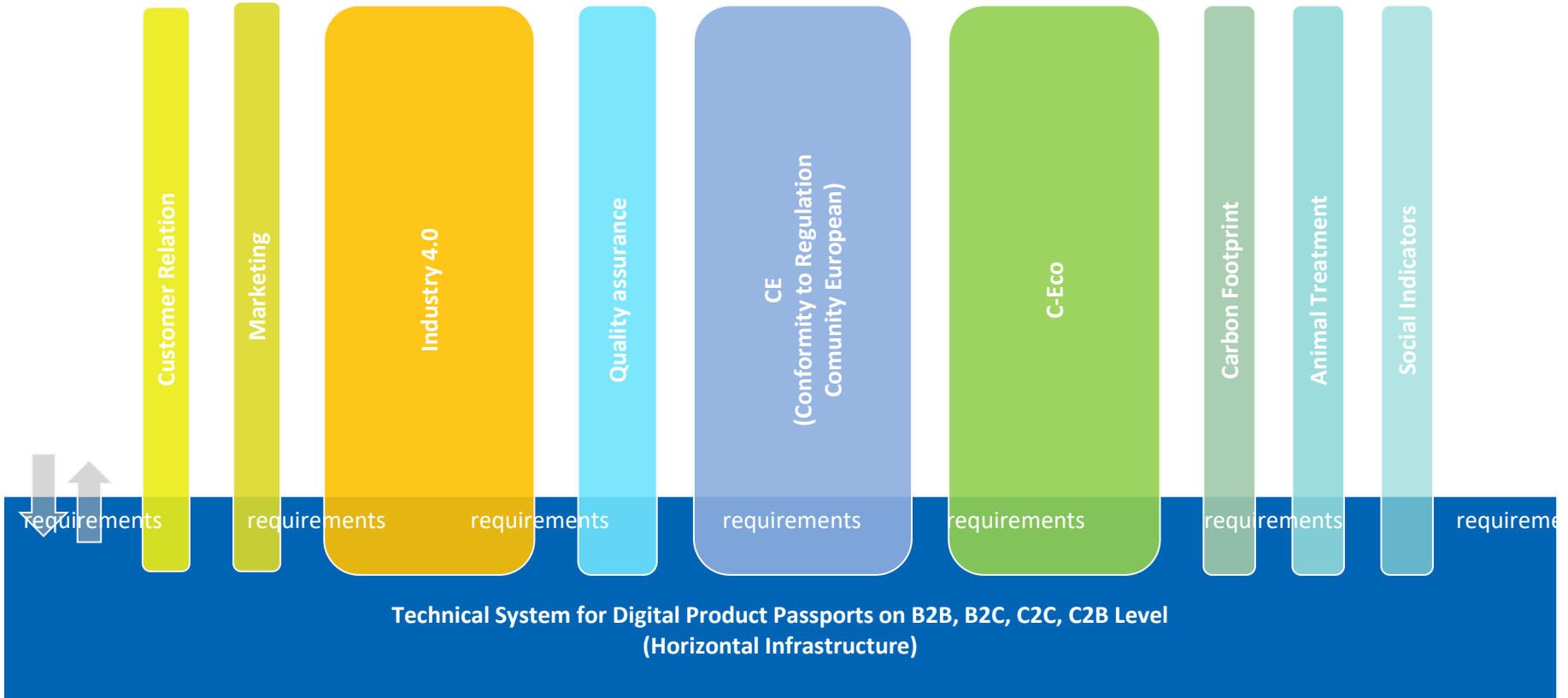
Battery Pass

thebatterypass.eu

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1) Today, only data of the battery's use phase is made accessible via the battery passport
2) The actors named under "data collection" are included in the different access groups with specific access rights to be defined

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Smart Standards

Digital Product Passport

Dig. calibration certificate
Remote calibration

QI–Cloud

eAttestation

Digital Certificates
Remote Monitorings
Predictive Maintenance

New digital solutions and tools for a digital quality infrastructure

DPP - System, Data-Structure & Governance as horizontal Infrastructure for several issues

Customer Relation

Marketing

Industry 4.0

Quality assurance

CE (Conformity to Regulation Comunity European)

C-Eco

Carbon Footprint

Animal Treatment

Social Indicators

requirements requirements requirements requirements requirements requirements requireme

Technical System for Digital Product Passports on B2B, B2C, C2C, C2B Level (Horizontal Infrastructure)

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Existing building blocks and solutions

A standardization search through Stand.ICT already addresses more than 170 standards (ISO, IEC, ISO/IEC). In particular, also on the areas mentioned by the EU so far:

(1)   **Data carriers and unique identifiers**
(2)   **Access rights management**
(3)   **Interoperability (technical, semantic, organisation)**
(4)   **Data storage**
(5)   **Data processing (introduction, modification, update)**
(6)   **Data authentication, reliability, and integrity**
(7)   **Data security and privacy**
(8)   **Data structure**

In addition, there are various activities that are directly related to the DPP: Digital Twin, Digital Nameplate/AAS, Product Circularity Data Sheet, Building Resource Passport, Digital Resume File, Digital Represantion of Product Information, Plant Passport and many more.

➡ **Build on existing, prevent double standardization and create interoperability.**

A Bird'S eye ICT Standardisation in Digital Product Passport

www.standict.eu/digital-product-passport-standards-report

Live Demo: Example Siemens

Source: | © Siemens 2022 |

DKE BKT-Sitzung Nr. 31, Frankfurt, 16.03.2023 | Prof. Dr. Dieter Wegener

SIEMENS

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There is a need for →

- ➢ a cross-requirement **holistic concept** for the DPP

- ➢ a **meta-structure**/framework that creates **interoperability of sector and system specific implementation**

- ➢ the **use of existing** (standards and implementations)

- ➢ **international connectivity**

- ➢ **Long-term**
  - **openness to innovation**
  - **anticipation of** forthcoming complementary **regulations**

- ➢ **avoiding overloading and fragmentation** (politically and technically normative)

DPP design

DPP-system

(to be developed before DPP deployment)

- All standards and protocols related to the IT architecture, like standards on:
  - Data carriers and unique identifiers
  - Access rights management
  - Interoperability (technical, semantic, organisation), including data exchange protocols and formats
  - Data storage
  - Data processing (introduction, modification, update)
  - Data authentication, reliability, and integrity
  - Data security and privacy
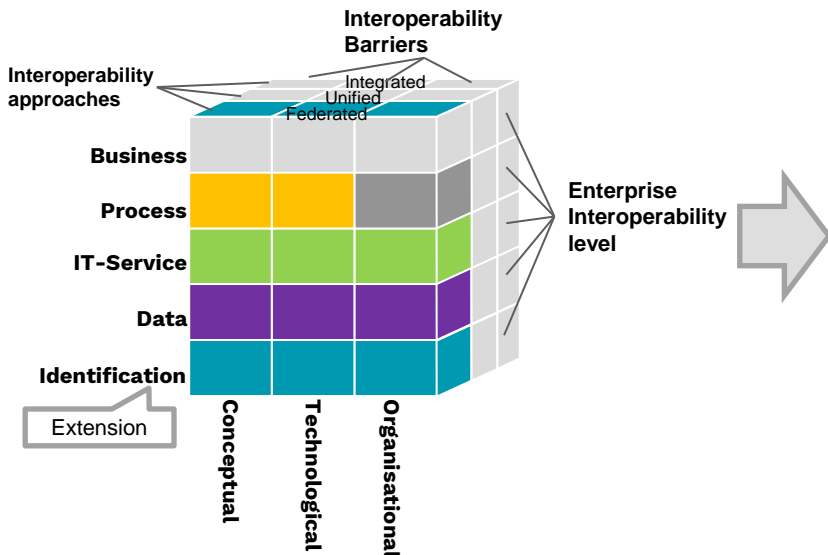
- The DPP registry

Digital Product Passport

DPP-data

(to be identified when developing product-group specific secondary legislation)

Possible Track & Trace identifiers

- Economic operator's name, registered trade name
- Global Trade Identification Number or equivalent
- TARIC code or equivalent
- Global location number or equivalent
- Authorised representative
- …

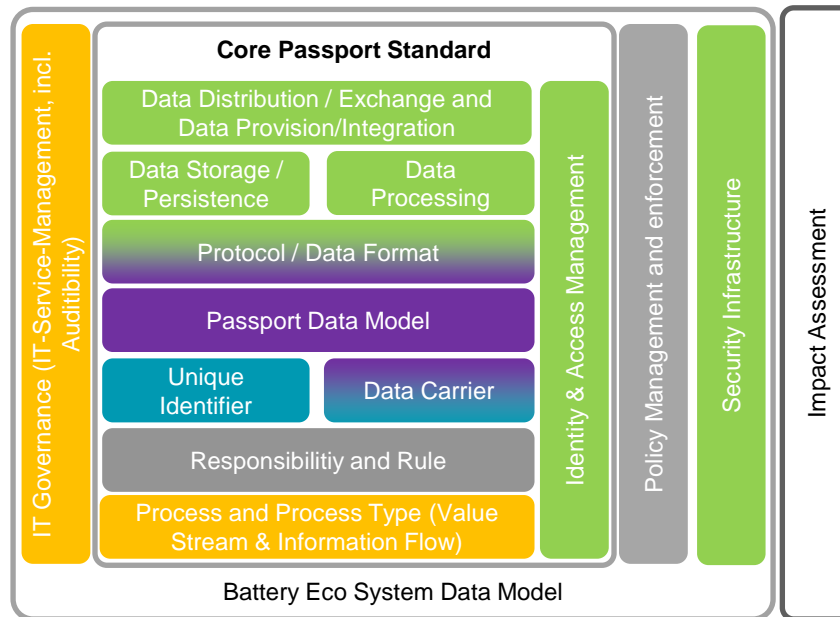**Example of potential attributes**

- Description of the material, component, or product
- Recycled content
- Substances of concern
- Environmental footprint profile
- Classes of performance
- Technical parameters
- …

European Commission

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Extended Enterprise Interoperability Framework (ISO 11354)

Interoperability Barriers

Interoperability approaches

Integrated
Unified
Federated

Business
Process
IT-Service
Data
Identification

Enterprise Interoperability level

Conceptual
Technological
Organisational

Extension

The Enterprise Interoperability Framework allows to:
- Capture and structure interoperability knowledge/solutions in the framework through a barrier-driven approach
- Provide support to enterprise interoperability engineers and industry end users to carry out their interoperability projects.

Technical Standard Stack

IT Governance (IT-Service-Management, incl. Auditibility)

Core Passport Standard

Data Distribution / Exchange and Data Provision/Integration

Data Storage / Persistence

Data Processing

Protocol / Data Format

Passport Data Model

Unique Identifier

Data Carrier

Responsibilitiy and Rule

Process and Process Type (Value Stream & Information Flow)

Identity & Access Management

Policy Management and enforcement

Security Infrastructure

Impact Assessment

Battery Eco System Data Model

Technical Standard Stack to cover every technical aspect of the battery data ecosystem, i.e. data storage (central vs. decentral)

Battery Pass

thebatterypass.eu

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Mapping ESPR Requirements to DPP Meta Structure

ESPR Requirements

EUROPEAN COMMISSION

DPP-system

(to be developed before DPP deployment)

Digital Product Passport
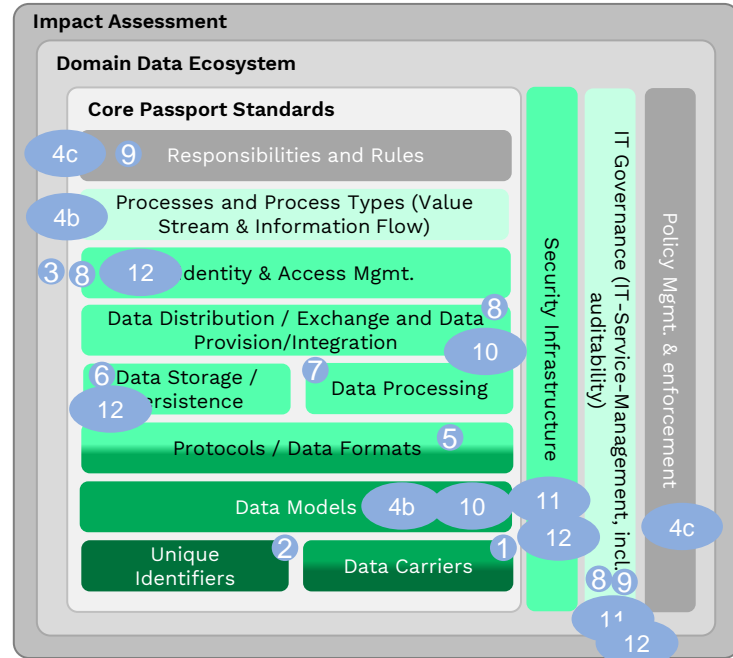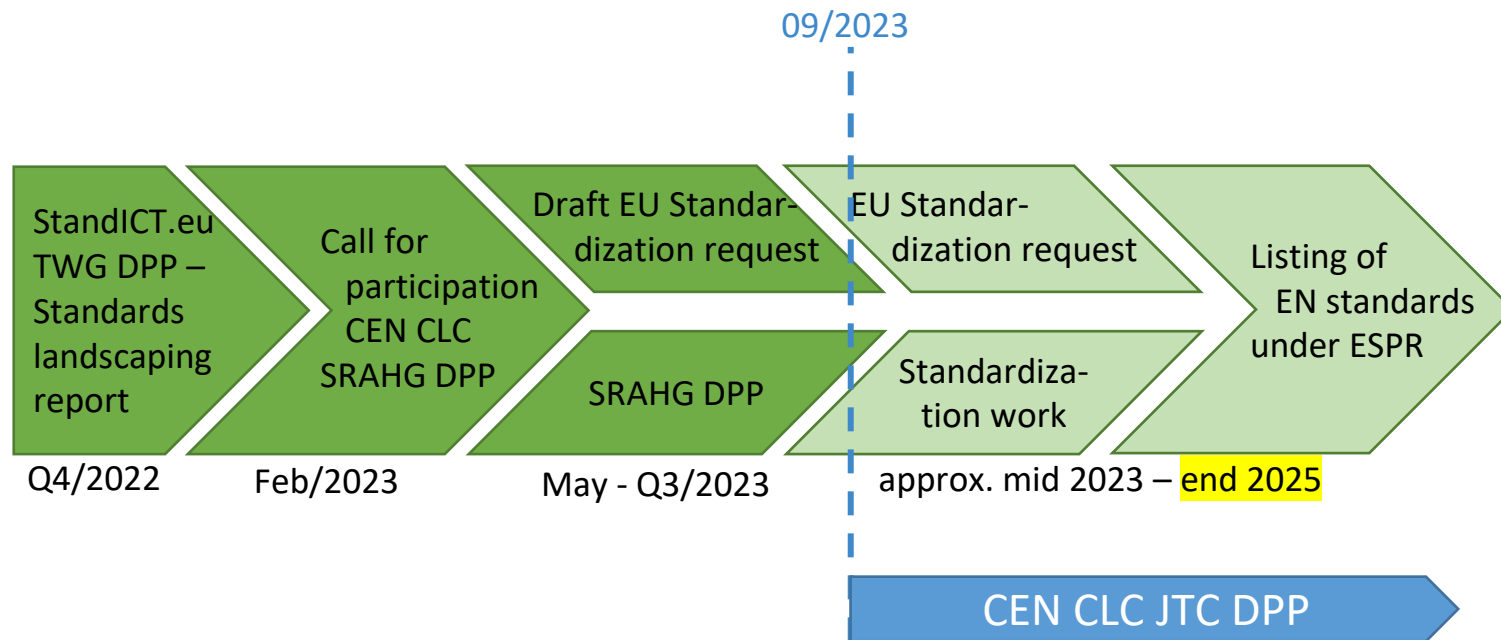
- All **standards** and **protocols** related to the IT architecture, like standards on:
  - Data carriers and unique identifiers ① ②
  - Access rights management ③
  - Interoperability (technical, semantic, organisation), including data exchange protocols and formats ④ ⑤
  - Data storage ⑥
  - Data processing (introduction, modification, update) ⑦
  - Data authentication, reliability, and integrity ⑧ ⑨ ⑩
  - Data security and privacy ⑪ ⑫

Technical Standard Stack ④ ④a

based on
DKE Battery Pass

Impact Assessment

Domain Data Ecosystem

Core Passport Standards

④c ⑨ Responsibilities and Rules

④b Processes and Process Types (Value Stream & Information Flow)

③ ⑧ ⑫ Identity & Access Mgmt.

Data Distribution / Exchange and Data Provision/Integration ⑧ ⑩

⑥ Data Storage / Persistence ⑫ ⑦ Data Processing

Protocols / Data Formats ⑤

Data Models ④b ⑩ ⑪ ⑫

Unique Identifiers ② Data Carriers ① ⑧ ⑨

Security Infrastructure

IT Governance (IT-Service-Management, incl. auditability) ④c

Policy Mgmt. & enforcement

⑪ ⑫

Completing the activities of European standardisation on DPP

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09/2023

| StandICT.eu TWG DPP – Standards landscaping report | Call for participation CEN CLC SRAHG DPP | Draft EU Standardization request | EU Standardization request | Listing of EN standards under ESPR |

SRAHG DPP

Standardization work

Q4/2022 · Feb/2023 · May - Q3/2023 · approx. mid 2023 – **end 2025**

CEN CLC JTC DPP

CEN/CLC JTC DPP for a Meta-Structure on DPP

CEN/CLC JTC DPP – network tasks (e.g. Circular Economy)

International Standardisation

ISO/IEC JTC 1/SC 42 Artificial Intelligence

ISO/IEC JTC 1/SC 41 Internet of Things and Digital Twin

ISO/IEC JTC1/SC 38 Cloud computing

ISO/IEC JTC 1/SC 32 Data management and interchange

ISO/TC 323 Circular Economy

ISO/TC 307 Blockchain and distributed ledger technologies

European Standardisation

CEN/TC 428 ICT professionalism and Digital competences

possible CEN/CLC JTC DPP

CEN/TC Circular Economy

CEN-CENELEC Strategic Advisory Body on Environment (SABE)

Standardisation Request/Mandate

CEN-CENELEC-ETSI Smart Manufacturing Coordination Group

CEN-CLC/JTC 13 Cybersecurity and data protection

CEN-CLC Ecodesign Coordination Group (Eco-CG)

CEN-CLC/JTC 21 Artificial Intelligence

Flags by Sinisa Maric auf Pixabay

DPP - outlook

while the data for DPP is a question
of the data flow through
the supply chain and life cycle of products
between all market participants

the DPP

wisely introduced and shaping international structures

could be the entrance and foundation
for the success of an international green and digital transformation

a transformation, which benefits the European economy

Vielen Dank
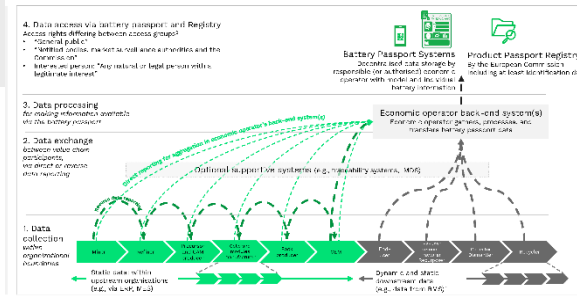
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