CIRPASS - Collaborative Initiative for a Standards-based Digital Product Passport for Stakeholder-Specific Sharing of Product Data for a Circular Economy

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What is CIRPASS?

- Funded by the European Commission under the **Digital Europe Programme**, **CIRPASS** is a collaborative initiative to prepare the ground for the gradual piloting and deployment of a standards-based **Digital Product Passport (DPP)** aligned with the requirements of the Proposal for Ecodesign for Sustainable Product Regulations (ESPR), **with an initial focus on the electronics, batteries, and textile sectors.**

- **Duration:** 18 months (from Oct 2022 to March 2024)

- Build a common understanding on a **cross-sectoral DPP**.

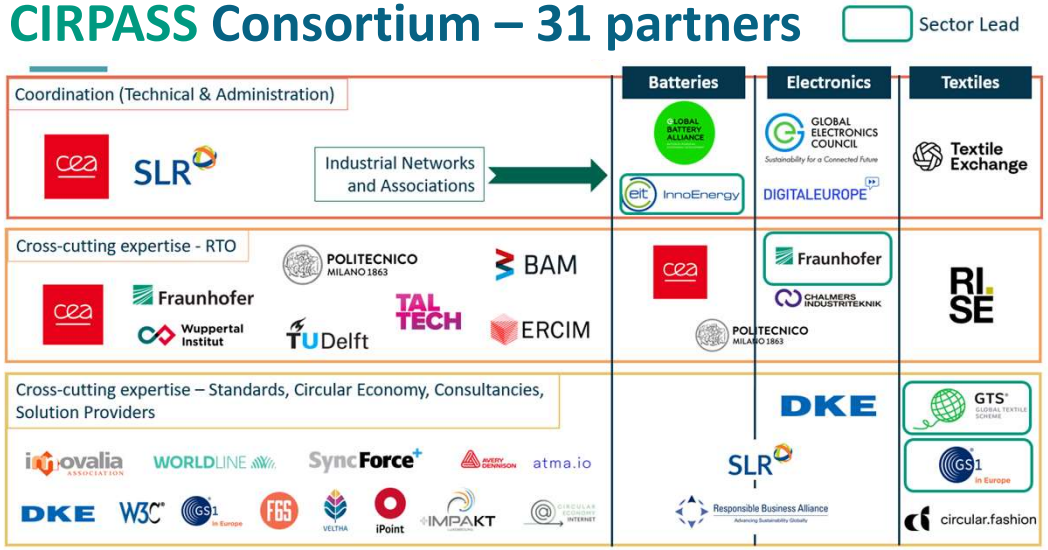
- Be an objective source of information for the **European Commission**
- Be an objective source of information for **all DPP stakeholders**

CIRPASS
Digital Product Passport

A forum for building consensus on a standards-based DPP

Initial sector focus:

CIRPASS Consortium – 31 partners



Partnerships

European Commission
DATA SPACE 4.0
IOTA
StandICT.eu
wbcsd
DATA SPACES SUPPORT CENTRE
EUIPO
NFC FORUM
UNECE
Battery Pass
ETP Fibres Textiles Clothing
Circ Thread
INTERNATIONAL MATERIAL DATA SYSTEM
giz

And many more…

Stakeholder Community

Describe your solution on www.cirpass.eu!

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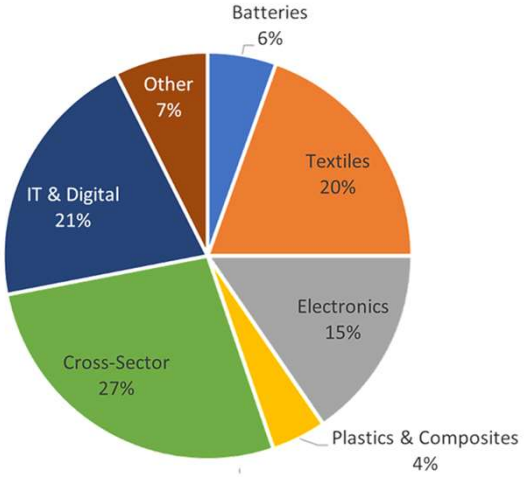
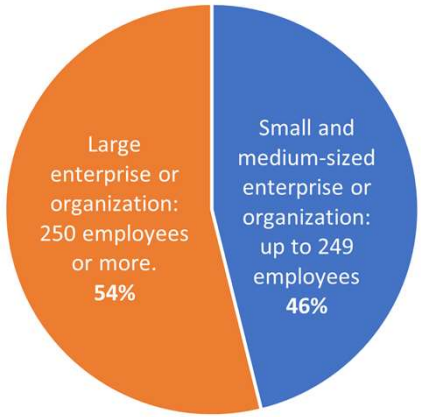
CIRPASS Digital Product Passport

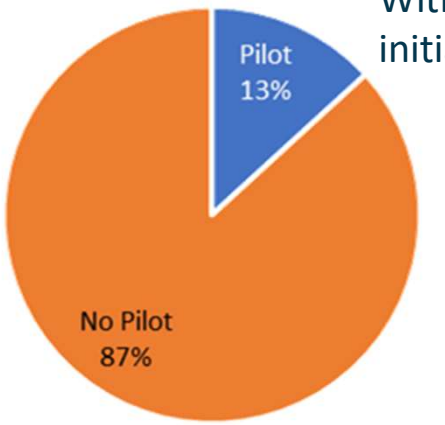
CIRPASS Stakeholder Community

May 2023: **>500 registered stakeholders**, 978 newsletter subscribers, 8000 website visitors/month





With DPP-related initiatives/pilots



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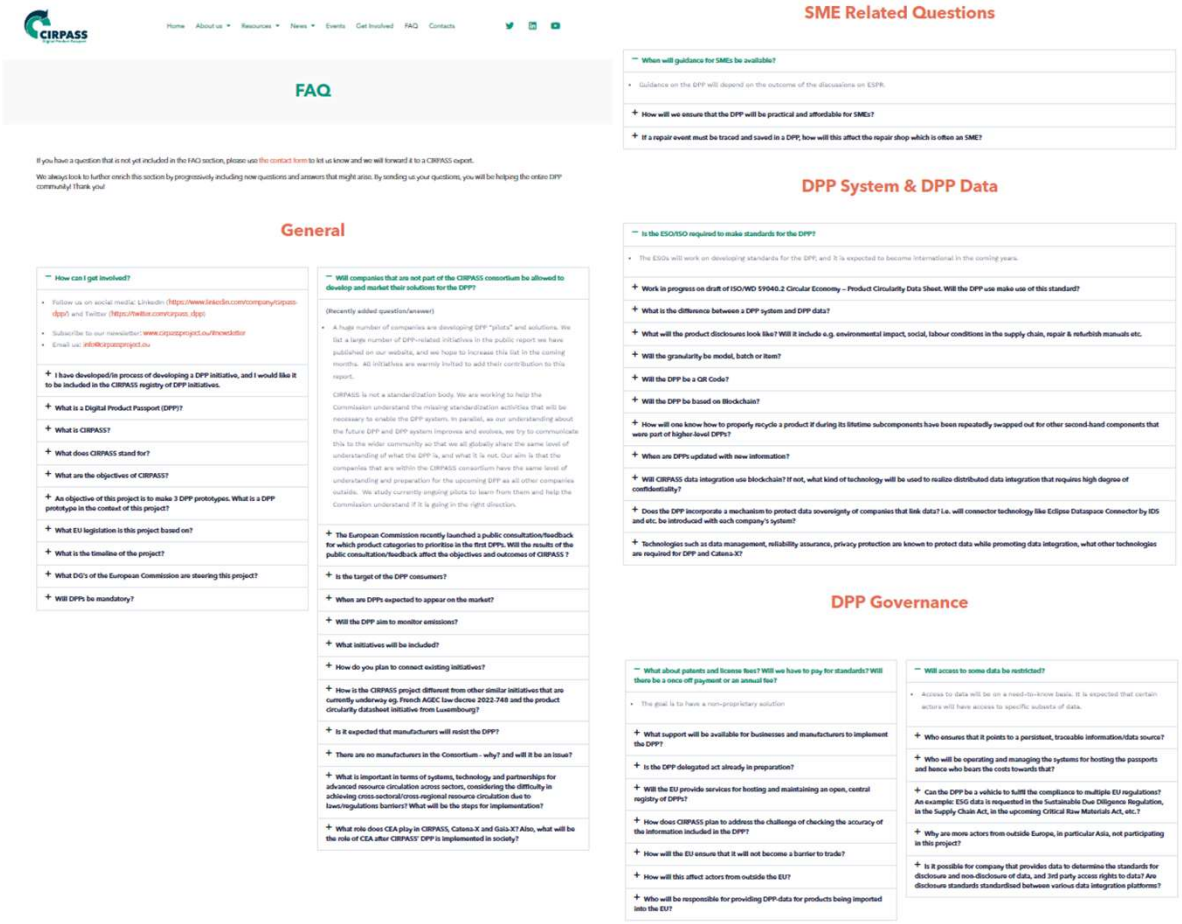
CIRPASS Digital Product Passport

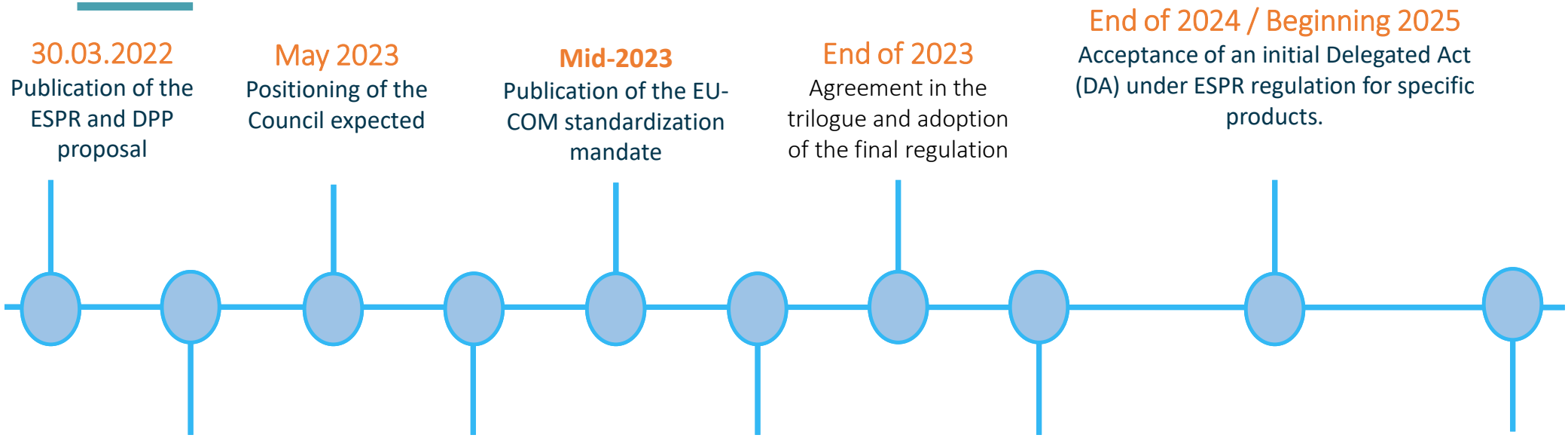
CIRPASS Resources

- Short “**Fact sheets**” on related regulations
- **Benchmark of existing DPP-related initiatives** & **Annex**

Extensive **FAQ**



General timeline



30.03.2022
Publication of the ESPR and DPP proposal

January 2023
Public consultation on the first ESPR work program

May 2023
Positioning of the Council expected

June 2023
Plenary vote on European Parliament (EP) Positioning

Mid-2023
Publication of the EU-COM standardization mandate

Mid/End of 2023
Acquisition under Horizon to pilot a DPP

End of 2023
Agreement in the trilogue and adoption of the final regulation

March 2024
Completion of the CIRPASS project (3 pilot DPPs)

End of 2024 / Beginning 2025
Acceptance of an initial Delegated Act (DA) under ESPR regulation for specific products.

2026 / 2027
First products with mandatory DPP covered by ESPR

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CIRPASS Digital Product Passport

… the Digital Product Pass

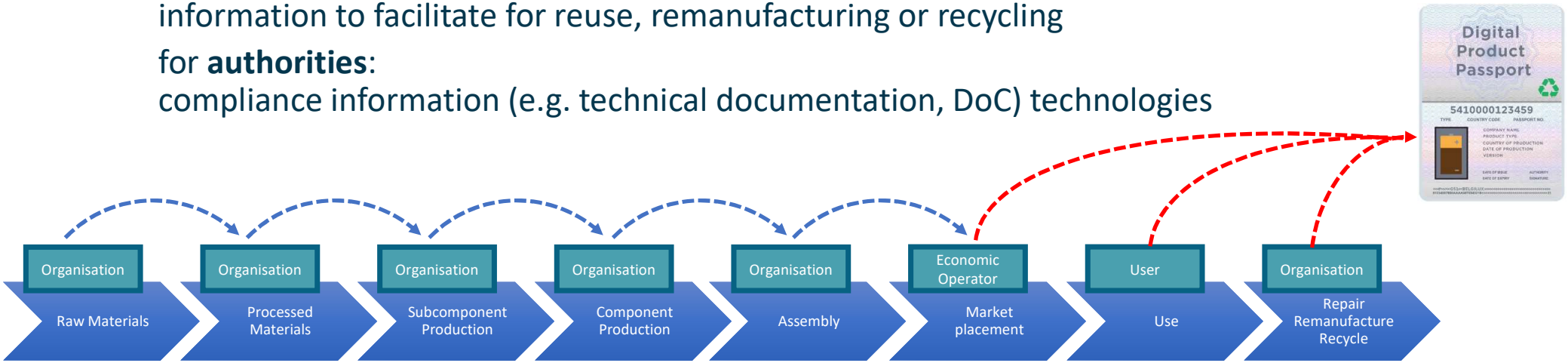
The DPP is an information system for the Circular Economy and it:

- will allow access to product information throughout the product life cycle, on a **need-to-know** basis
- should contain, as relevant to the product:

  for **consumers**:
  data on e.g. environmental impact, circularity, substances of concern

  for **value retention**:
  information to facilitate for reuse, remanufacturing or recycling

  for **authorities**:
  compliance information (e.g. technical documentation, DoC) technologies



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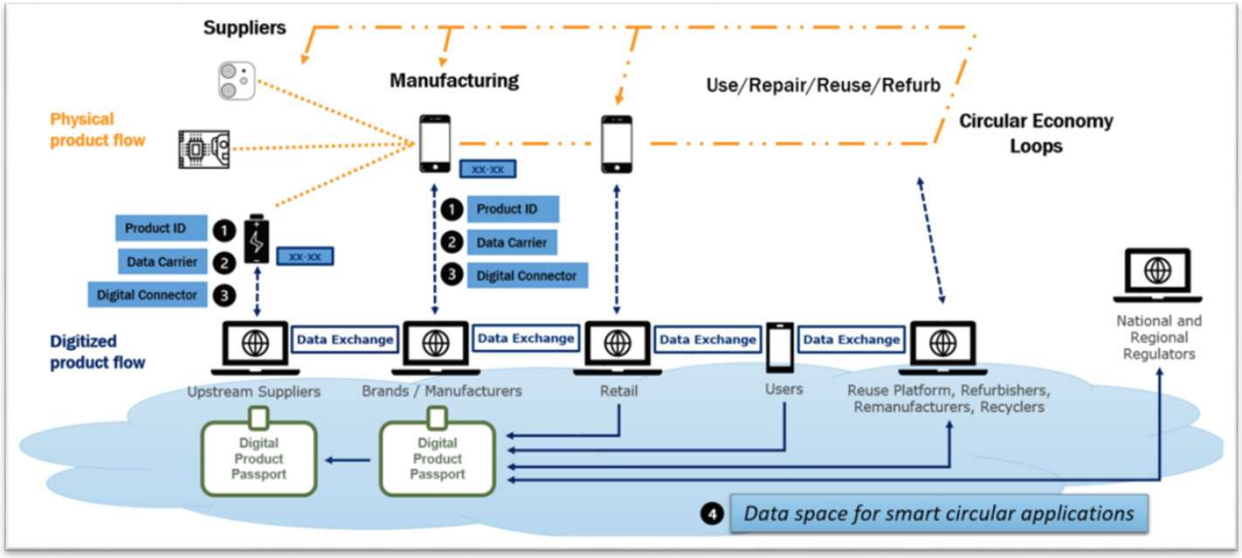
CIRPASS Digital Product Passport

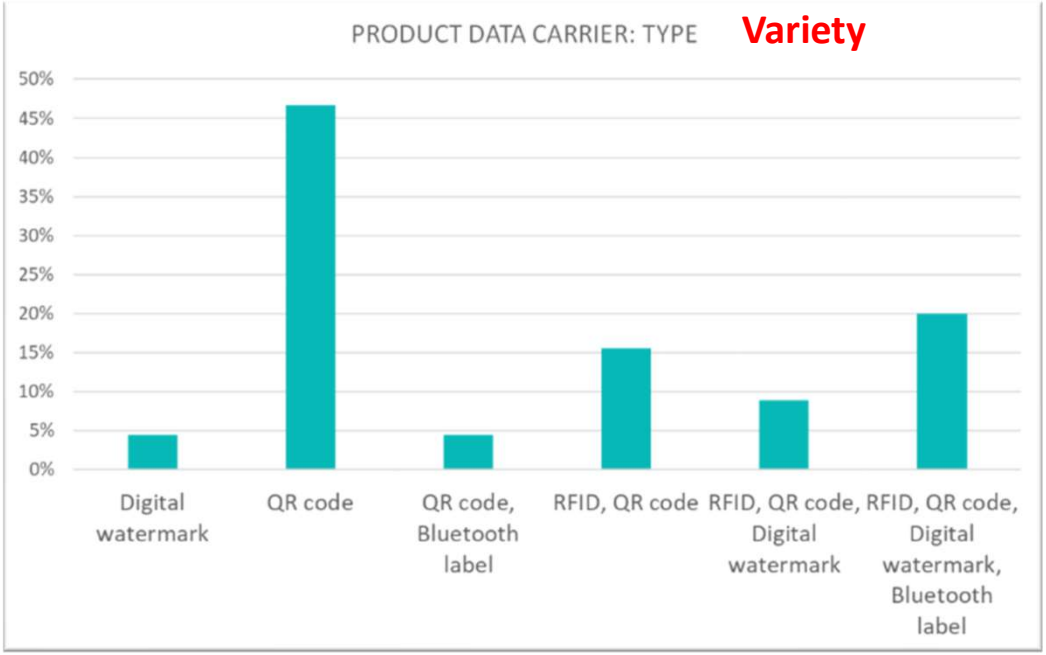
… the DPP system: terminology

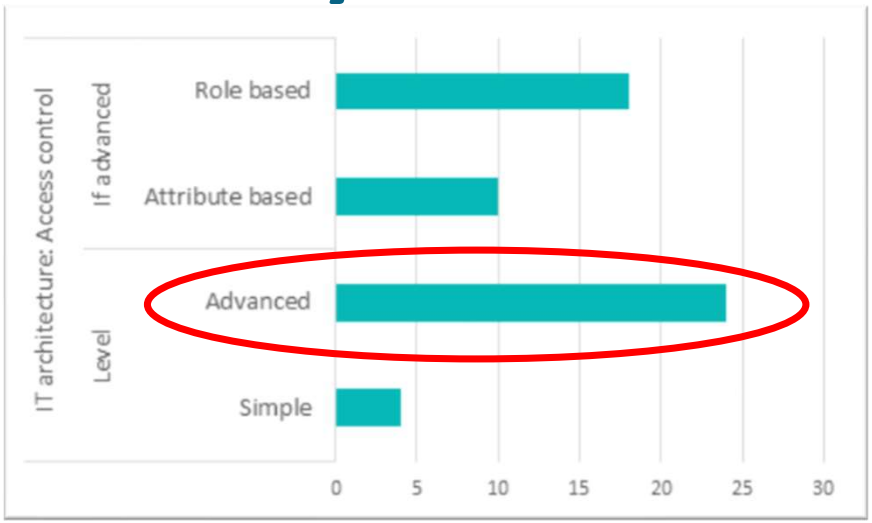
- **(1)** A unique persistent **ID** for the product (model, batch or serialized as necessary)
- **(2)** A persistent **data carrier** (RFID, QR Code, digital watermark, Bluetooth tag, etc.)
- **(3)** A **digital connector** between physical product and the digital place of information (e.g., URI address)
- **(4)** An IT architecture to facilitate the data exchange



Key results from Benchmark study

- A common analysis methodology
- 80 DPP-related initiatives





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Key results: standardisation

- Currently there are 300+ DPP-System Standards
- International standards (National standards, Industry Standards, etc.)
- Requirements to the DPP System as stated in the ESPR
  - Data storage is the responsibility of economic operators or their representatives (IEC 63278-Series)
  - Data authentification, reliability and integrity
  - **Interoperability between DPPs, e.g. IEC 63278-Series, ISO/IEC 30141, W3C (RDF), IEC CDD, eClass**
  - **Products have to be identifiable, e.g. IEC 61406-1-2, ISO/IEC15459, GS1 Digital standard link**

Standards shall enable systems to exchange data

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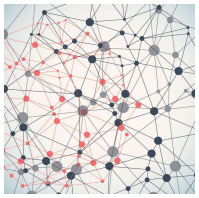
Key results: standardisation (system vs. data)



DPP-System

(to be developed before DPP-deployment)

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

DPP-Data

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

- Possible Track and Trace identifiers :
  - Economic operator's name, registered trade name
  - Global Trade Identification Number or equivalent
  - TARIC Code
  - Global location number
  - Authorised representative
  - Reference of the back-up data prepository
  - …..
- Example of potential attributes
  - Description of the material, component or product
  - Recycled content
  - Substance of concern
  - Environmental footprint profile
  - Classes of performance
  - Technical parameters
  - …….

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CIRPASS vision for the DPP system

- **The DPP is an information system for the Circular Economy.**

- We focus on **data-level interoperability** to minimize constraints and facilitate adoption.
- Aim for a maximum reuse of legacy systems and legacy data.
- Transitioning to a Circular Economy will require great flexibility.
  - We believe that we need a DPP system with built-in flexibility.
- The DPP will be with us for a long time → Need state-of-the-art technologies

Proposition: ***The DPP is a knowledge graph***

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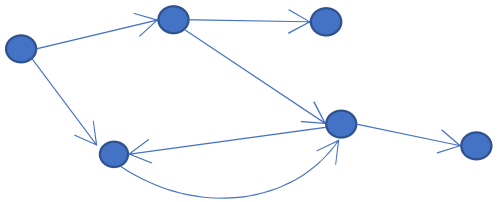
Gentle introduction to Knowledge Graphs

- A **knowledge graph** is made of assertions made in predicate logic:
  - Assertion : {Subject → predicate → object}
  - E.g. { The sky → has color → blue }
- Each assertion forms a « **semantic triple** ».
  - <subject> <predicate> <object> .

- A knowledge graph is a **directed** graph made of semantic triples.



- **knowledge graph = ontology + data**
- An **ontology** contains:
  - **Classes:** the distinct types of things that exist in our data.
  - **Relationships:** properties that connect two classes.
  - **Attributes:** properties that describe an individual class.

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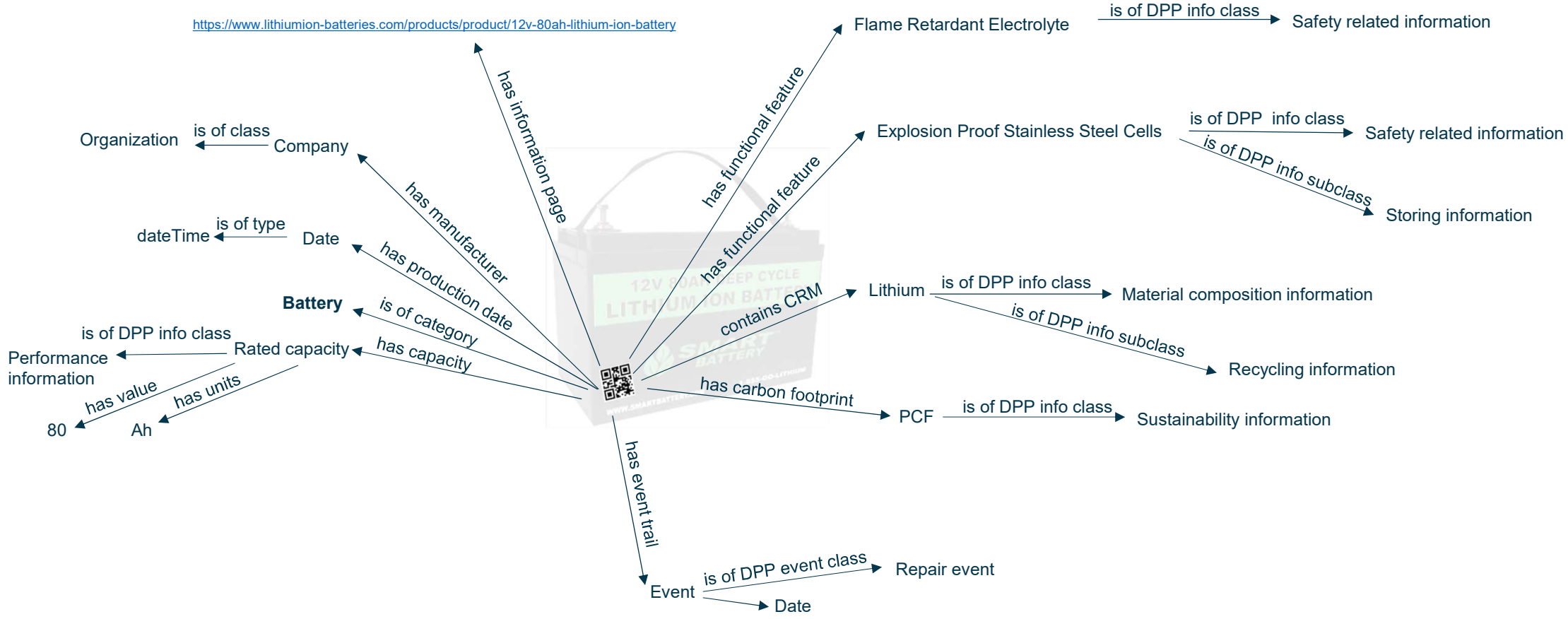
Example DPP knowledge graph for a battery



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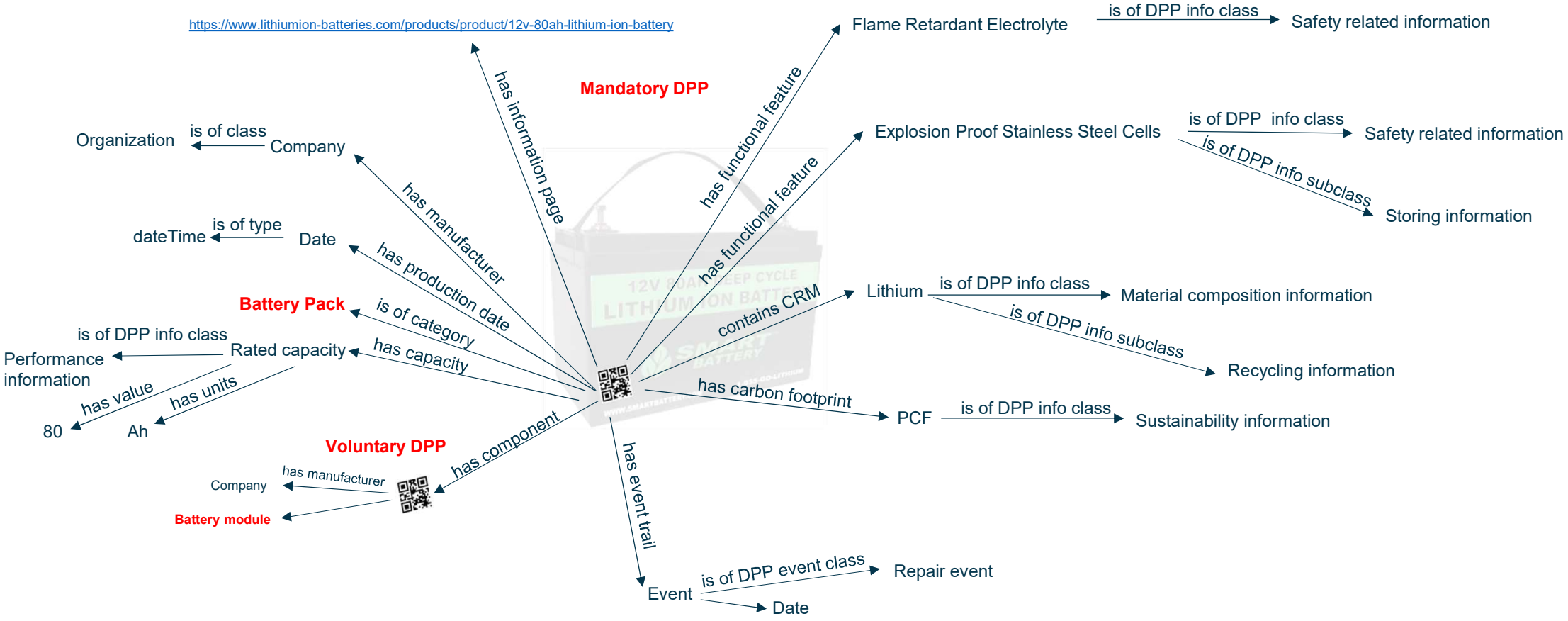
Example DPP knowledge graph for a battery



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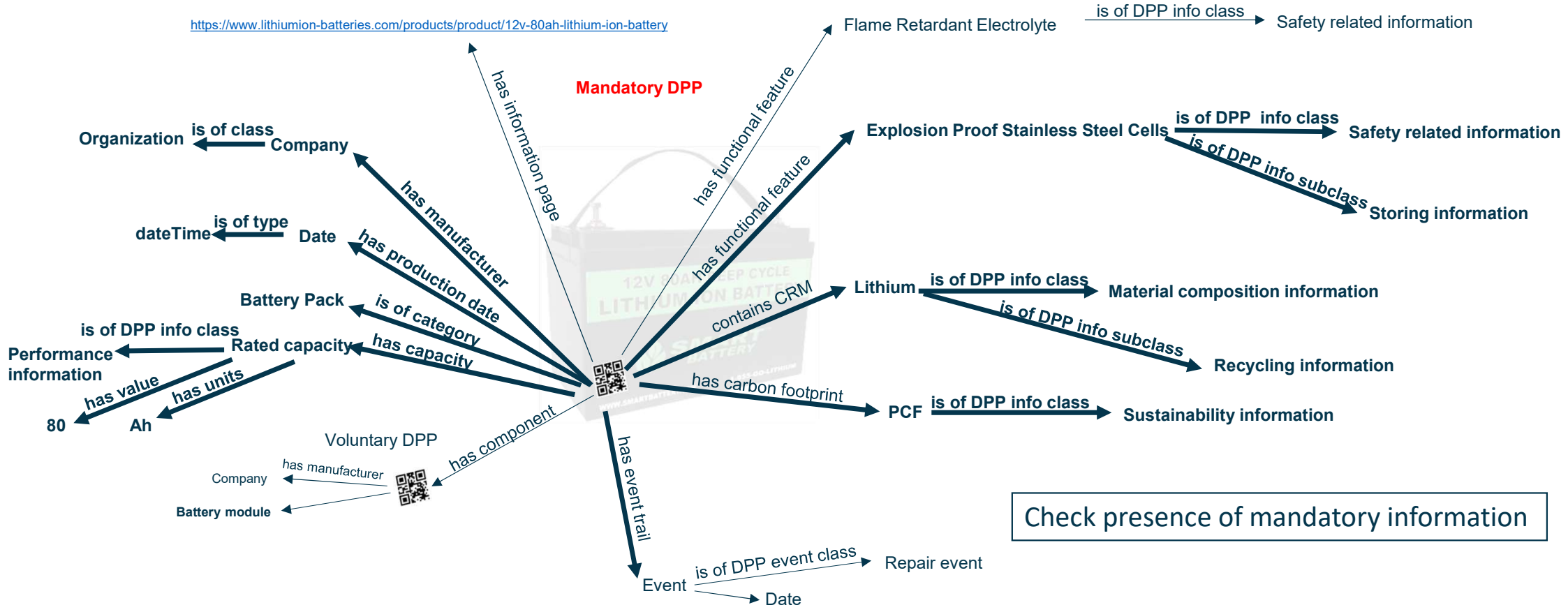
Verifying DPP compliance

e.g. using the SHACL (Shapes Constraint Language)



Check presence of mandatory information

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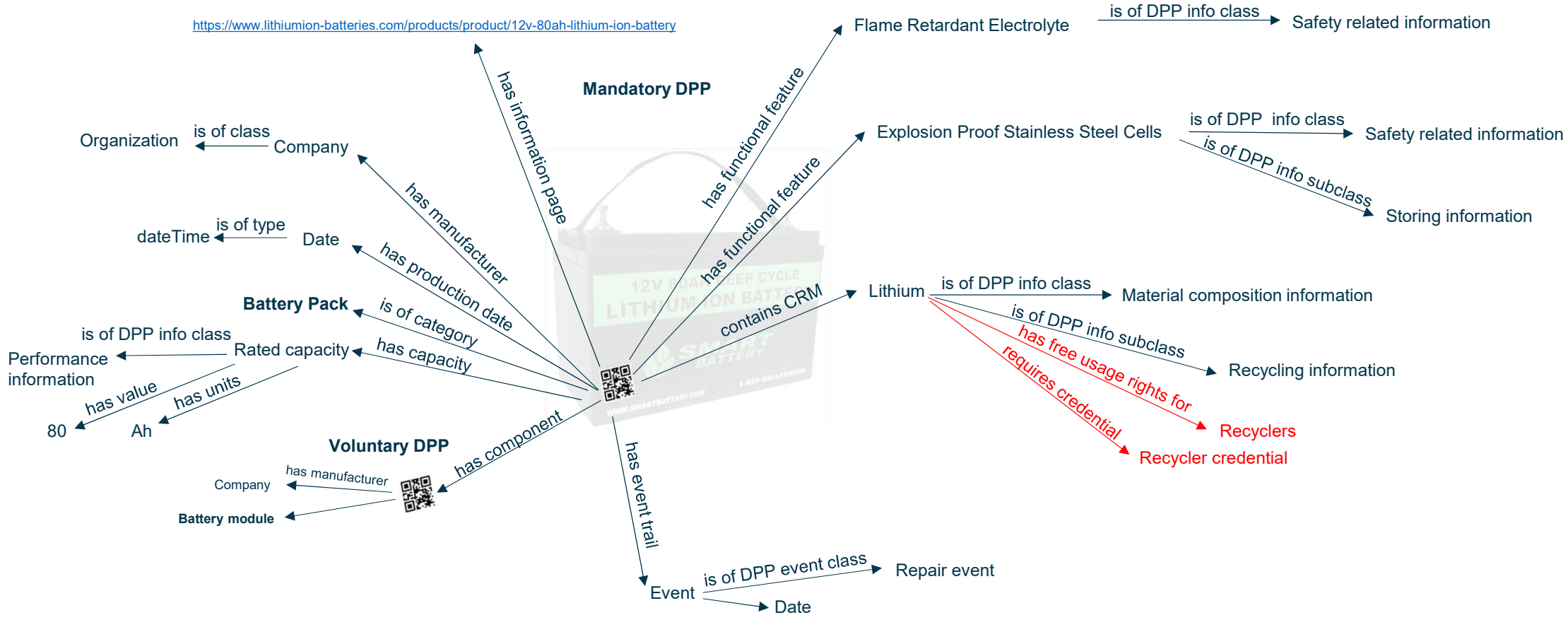
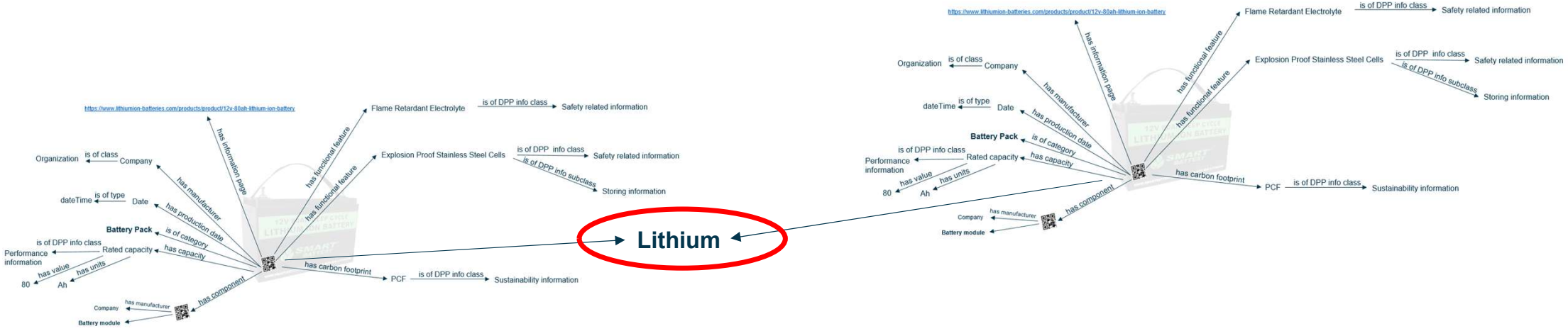
Linking legal rights to data (sticky policies)



A DPP « data fabric »

- DPP knowledge graphs are “woven” together to form a “data fabric” → data fusion



- Market Surveillance Authorities, who have the appropriate usage and access rights, can perform queries to the DPP « data fabric », e.g., using the SPARQL query language.
  - *“List all battery packs models manufactured in Europe between 2028 and 2029 containing Lithium”*

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Ongoing work @ CIRPASS

- In preparation:
  - Consultation on DPP data gathering effort
  - Report on identification schemes
  - Report on current standards landscape
  - A common “DPP language” consultation
  - “DPP use cases” and “DPP user stories” report
  - Cost estimation of DPP-as-a-Service consultation
  - Links to external resources on benefits of digitalization for industry
  - Study on potential DLT-based services for DPPs
  - Study of the environmental impact of the DPP (@FhG IZM)

***Register here*: https://cirpassproject.eu/get-involved/**

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Q&A

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Thank you!

www.cirpass.eu

Contact us: info@cirpassproject.eu

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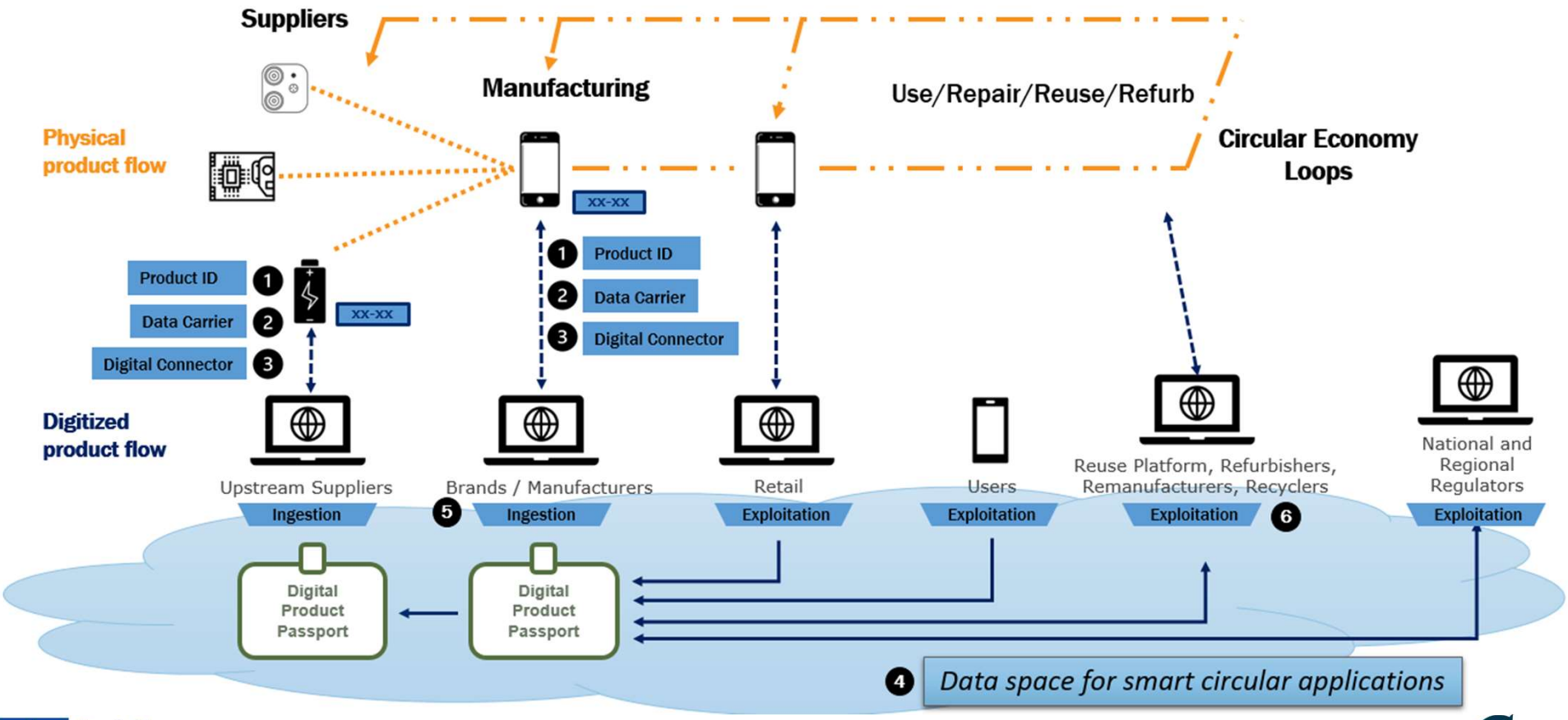
DPP system – 6 pillars / terminology



CIRPASS public report

- "Benchmark of existing DPP-oriented reference architectures"
- Available online:
  - https://cirpassproject.eu/wp-content/uploads/2023/03/CIRPASS_Benchmark-of-existing-DPP-oriented-reference-architectures.pdf

- Contents of the report:
  - Methodology for initiative selection
  - Detailed descriptions for 32 pilots

  →provided by initiative owners!

  - Analysis of 80 DPP-related initiatives according to a common framework

ID	Initiative short name	ID	Initiative short name
1	atma.io	17	itmatters
2	BP	18	Peppol
3	Wordline B-TraaS	19	QI-Digital
4	CircThread	20	RCS BP
5	Circular.fashion	21	RR
6	CYCLANCE	22	Worldline TCS
7	DDCC	23	TextileGenesis
8	DIBICHAIN	24	Tings
9	Digiprime	25	Tokenized Distributed Ledger
10	DNV	26	Toxnot
11	EasyBat	27	Worldline TBD
12	EON	28	TRACE
13	EPEAT Ecolabrl	29	TRICK
14	eReuseDPP RR	30	TrusTrace
15	FEDeRATED	31	Vine
16	GTS	32	ZVEI DPP4.0

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