



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**

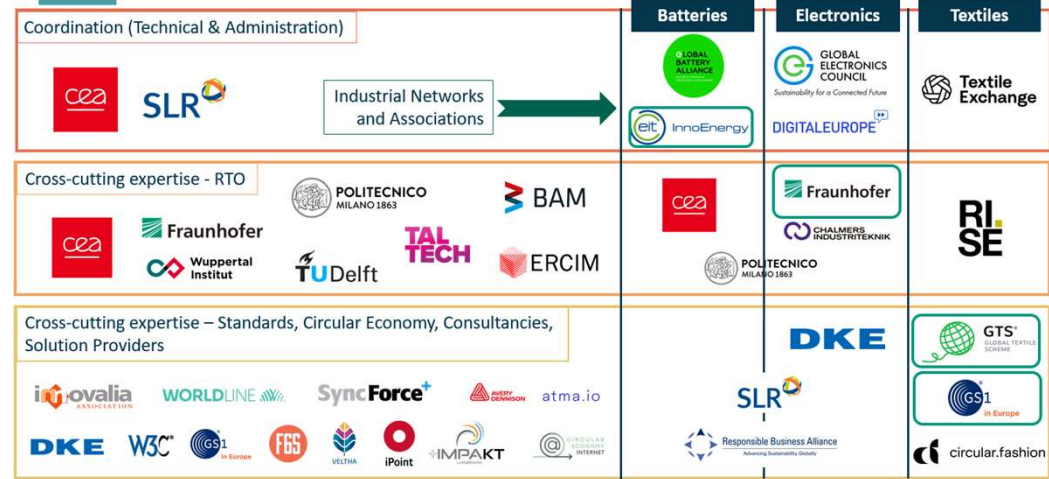


A forum for building consensus on a standards-based DPP

Initial sector focus:



CIRPASS Consortium – 31 partners Sector Lead



Partnerships



And many more...



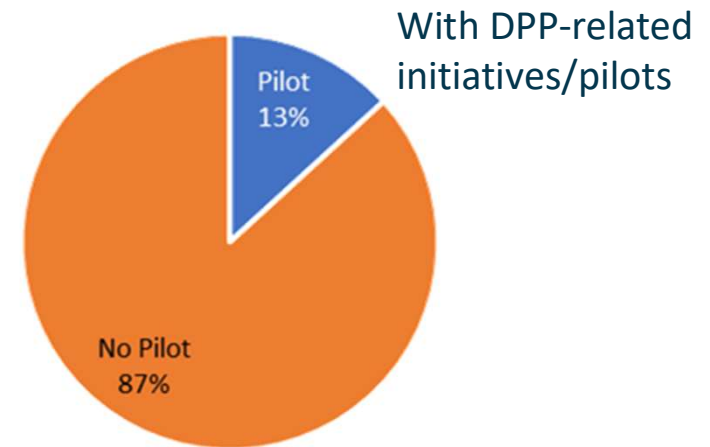
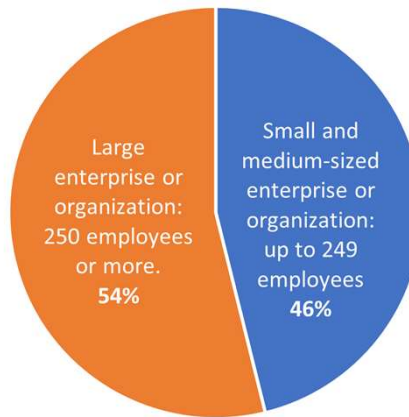
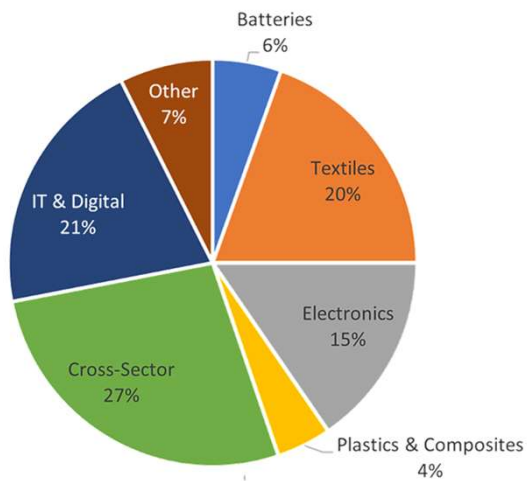
Stakeholder Community

Describe your solution on www.cirpass.eu!



CIRPASS Stakeholder Community

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



CIRPASS Resources

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

Project Results

Benchmark of existing DPP-oriented reference architectures

This document presents the outcomes of the benchmarking activity performed within WP3 of CIRPASS. The objective is to frame existing DPP-related initiatives and observe general macro-trends and existing gaps in view of the alignment with the ESPR Proposal goals. The deliverable is structured in three sections, focusing on (i) the presentation of the adopted classification methodology, (ii) the formalised presentation of a sub-set of existing DPP-related initiatives focusing on the IT architecture, (iii) the critical analysis of the entire set of mapped initiatives. Take-home messages and recommendations are summarised in the final section of D3.1 to be further considered within the future activities of CIRPASS.

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Annex to the "Benchmark of existing DPP-oriented reference architectures"

This document is a supplementary Annex to the CIRPASS report "Benchmark of existing DPP reference architectures". This Annex provides summary profiles, organised according to a common template, of initiatives that are related to the Digital Product Passport (DPP). It thus provides the European Commission and the DPP stakeholder community with an overview of potentially relevant services and products.

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Extensive FAQ



If you have a question that is not yet included in the FAQ section, please use the [contact form](#) to let us know and we will forward it to a CIRPASS expert. We always look to further enrich this section by progressively including new questions and answers that might arise. By sending us your questions, you will be helping the entire DPP community! Thank you!

General

<p>How can I get involved?</p> <ul style="list-style-type: none">Follow us on social media: LinkedIn (https://www.linkedin.com/company/cirpass-dpp/) and Twitter (https://twitter.com/cirpass_dpp)Subscribe to our newsletter: www.cirpassproject.eu/thebulletinEmail us: info@cirpassproject.eu	<p>Will companies that are not part of the CIRPASS consortium be allowed to develop and market their solutions for the DPP?</p> <p>(Recently asked questions/answers)</p> <ul style="list-style-type: none">A huge number of companies are developing DPP "pilots" and solutions. We list a large number of DPP-related initiatives in the public report we have published on our website, and we hope to increase this list in the coming months. All initiatives are warmly invited to add their contribution to this report.CIRPASS is not a standardisation body. We are working to help the Commission understand the missing standardisation activities that will be necessary to enable the DPP system. In parallel, as our understanding about the future DPP and EPR systems improves and evolves, we try to communicate this to the wider community so that we all globally share the same level of understanding of what the DPP is, and what it is not. Our aim is that the companies that are within the CIRPASS consortium have the same level of understanding and preparation for the upcoming DPP as all other companies outside. We truly currently engage pilots to learn from them and help the Commission understand if it is going in the right direction.
<ul style="list-style-type: none">I have developed/in process of developing a DPP initiative, and I would like it to be included in the CIRPASS registry of DPP initiatives.What is a Digital Product Passport (DPP)?What is CIRPASS?What does CIRPASS stand for?What are the objectives of CIRPASS?An objective of this project is to make 3 DPP prototypes. What is a DPP prototype in the context of this project?What EU legislation is this project based on?What is the timeline of the project?What Do's of the European Commission are steering this project?Will DPPs be mandatory?	<ul style="list-style-type: none">The European Commission recently launched a public consultation/feedback for which product categories to prioritise as the first DPPs. Will the results of the public consultation/feedback affect the objectives and outcomes of CIRPASS?Is the target of the DPP consumers?When are DPPs expected to appear on the market?Will the DPP aim to monitor emissions?What initiatives will be included?How do you plan to connect existing initiatives?How is the CIRPASS project different from other similar initiatives that are currently underway eg. French AECI law decree 2022-748 and the product circularity database initiative from Luxembourg?Is it expected that manufacturers will resist the DPP?There are no manufacturers in the Consortium - why and will it be an issue?What is important in terms of systems, technology and partnerships for advanced resource circulation across sectors, considering the difficulty in achieving cross-sectoral/cross-regional resource circulation due to laws/regulations barriers? What will be the steps for implementation?What role does CEA play in CIRPASS, Catena-X and Gaia-X? Also, what will be the role of CEA after CIRPASS' DPP is implemented in society?

SME Related Questions

When will guidance for SMEs be available?
Guidance on the DPP will depend on the outcome of the discussions on ESPR.
How will we ensure that the DPP will be practical and affordable for SMEs?
If a repair event must be traced and saved in a DPP, how will this affect the repair shop which is often an SME?

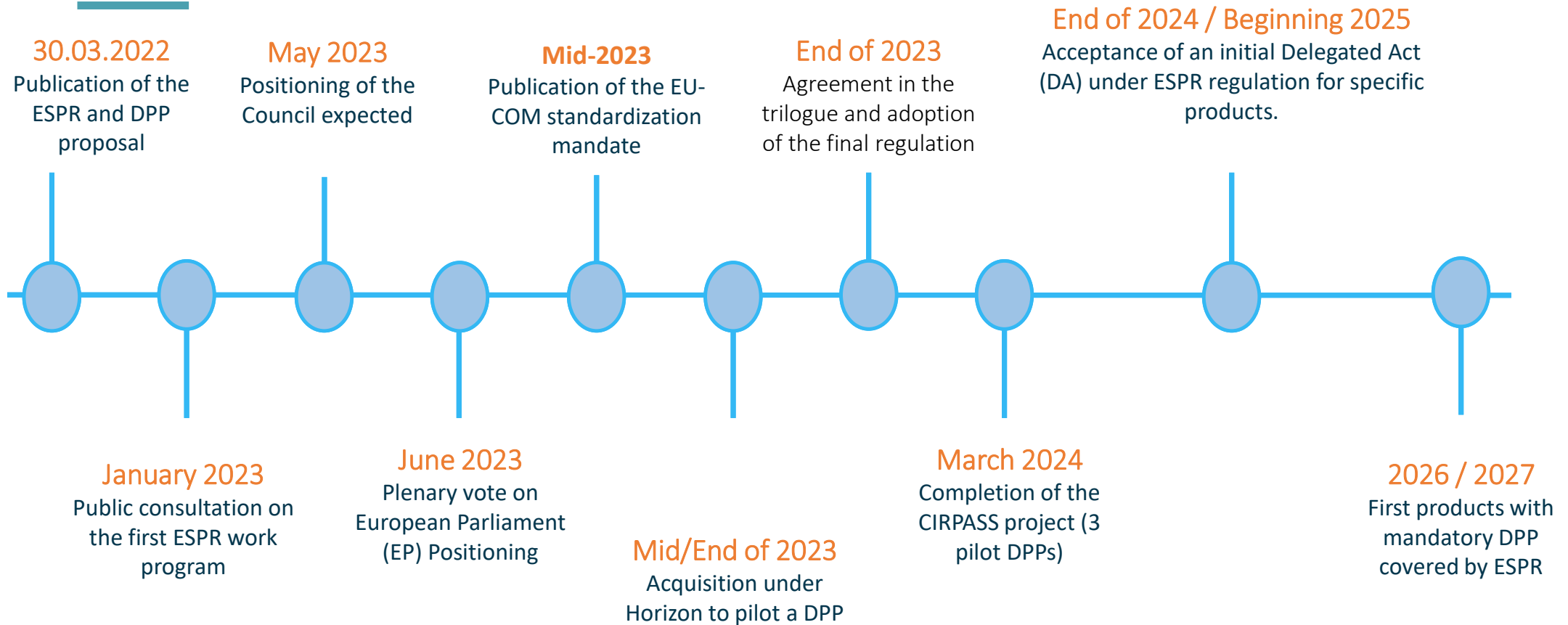
DPP System & DPP Data

Is the ISO/ISO required to make standards for the DPP?
The ISOs will work on developing standards for the DPP, and it is expected to become International in the coming years.
Work in progress on draft of ISO/WD 59048.2 Circular Economy - Product Circularity Data Sheet. Will the DPP use make use of this standard?
What is the difference between a DPP system and DPP data?
What will the product disclosures look like? Will it include e.g. environmental impact, social, labour conditions in the supply chain, repair & refurbish manuals etc.
Will the granularity be needed, batch or item?
Will the DPP be a QR Code?
Will the DPP be based on Blockchain?
How will one know how to properly recycle a product if during its lifetime subcomponents have been repeatedly swapped out for other second-hand components that were part of higher-level DPPs?
When are DPPs updated with new information?
Will CIRPASS data integration use blockchain? If not, what kind of technology will be used to realize distributed data integration that requires high degree of confidentiality?
Does the DPP incorporate a mechanism to protect data sovereignty of companies that link data? I.e. will connector technology like Eclipse Datapass Connector by IDS and etc. be introduced with each company's system?
Technologies such as data management, reliability assurance, privacy protection are known to protect data while preventing data integration, what other technologies are required for DPP and Catena-X?

DPP Governance

What about patents and license fees? Will we have to pay for standards? Will there be a once-off payment or an annual fee?
The goal is to have a non-proprietary solution.
What support will be available for businesses and manufacturers to implement the DPP?
Is the DPP-delegated act already in preparation?
Will the EU provide services for hosting and maintaining an open, central registry of DPPs?
How does CIRPASS plan to address the challenge of checking the accuracy of the information included in the DPP?
How will the EU ensure that it will not become a barrier to trade?
How will this affect actors from outside the EU?
Who will be responsible for providing DPP-data for products being imported into the EU?
Will access to some data be restricted?
Access to data will be on a need-to-know basis. It is expected that certain actors will have access to specific subsets of data.
Who ensures that it points to a persistent, traceable information/data source?
Who will be operating and managing the systems for hosting the passports and hence who bears the costs towards that?
Can the DPP be a vehicle to fulfil the compliance to multiple EU regulations? An example: ESG data is requested in the Sustainable Due Diligence Regulation, in the Supply Chain Act, in the upcoming Circular Flow Materials Act, etc.?
Why are more actors from outside Europe, in particular Asia, not participating in this project?
Is it possible for company that provides data to determine the standards for disclosure and non-disclosure of data, and 3rd party access rights to data? Are disclosure standards standardised between various data integration platforms?

General timeline



... 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**:

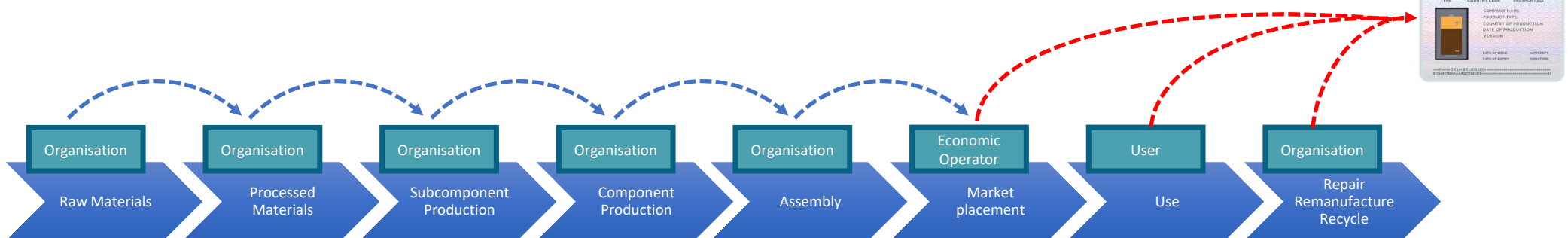
data on e.g. environmental impact, circularity, substances of concern

for **value retention**:

information to facilitate for reuse, remanufacturing or recycling

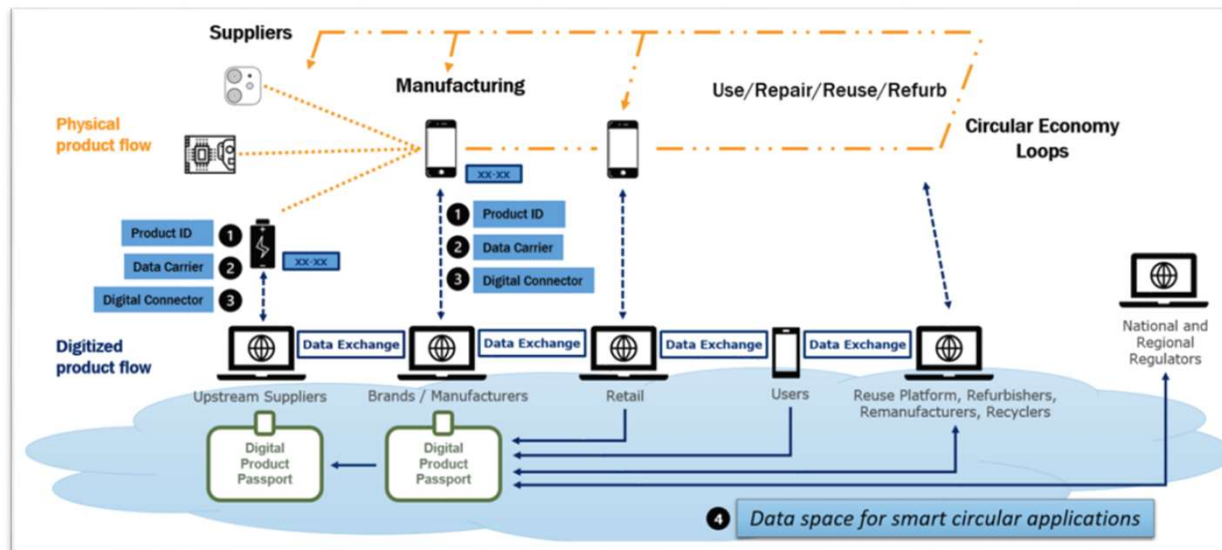
for **authorities**:

compliance information (e.g. technical documentation, DoC) technologies



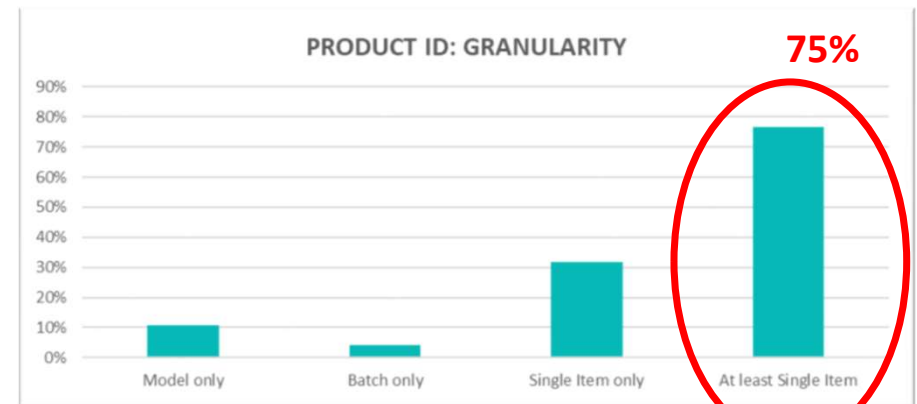
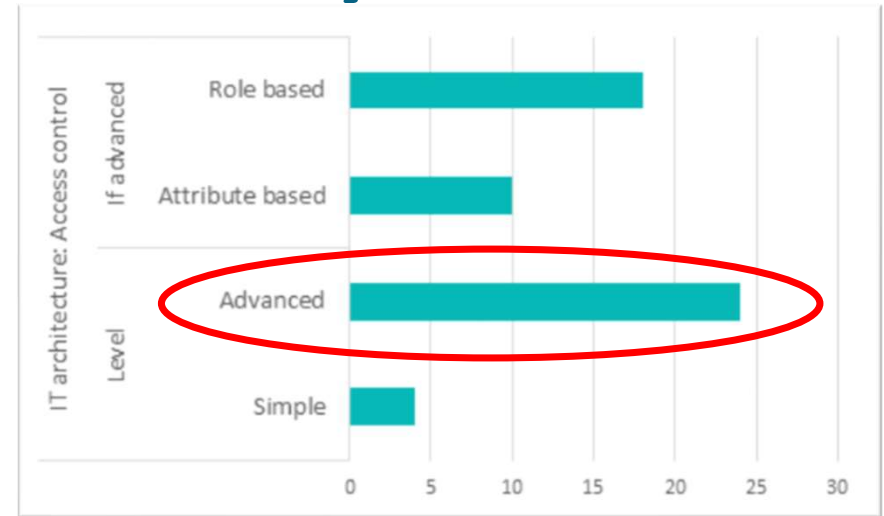
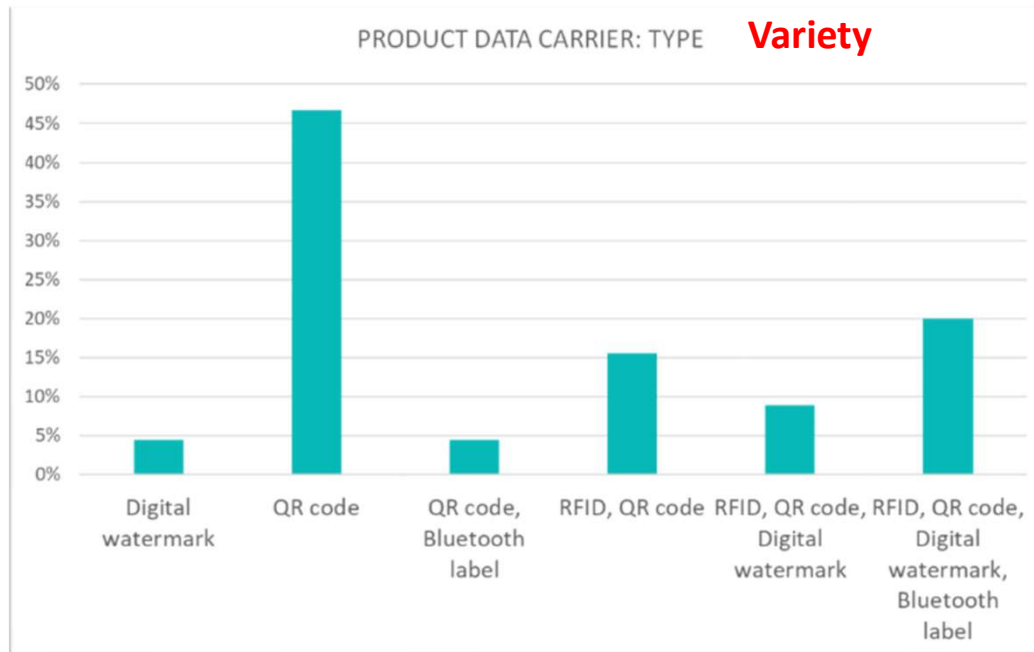
... the DPP system: terminology

- (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



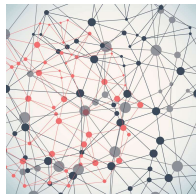
Key results: standardisation

- 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 authentication, 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

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
 -

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

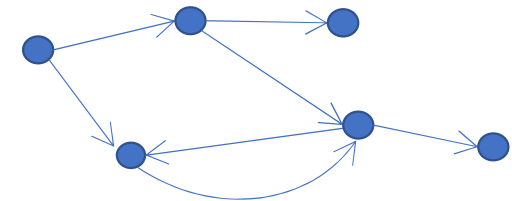
Proposition: The DPP is a knowledge graph

Gentle introduction to Knowledge Graphs

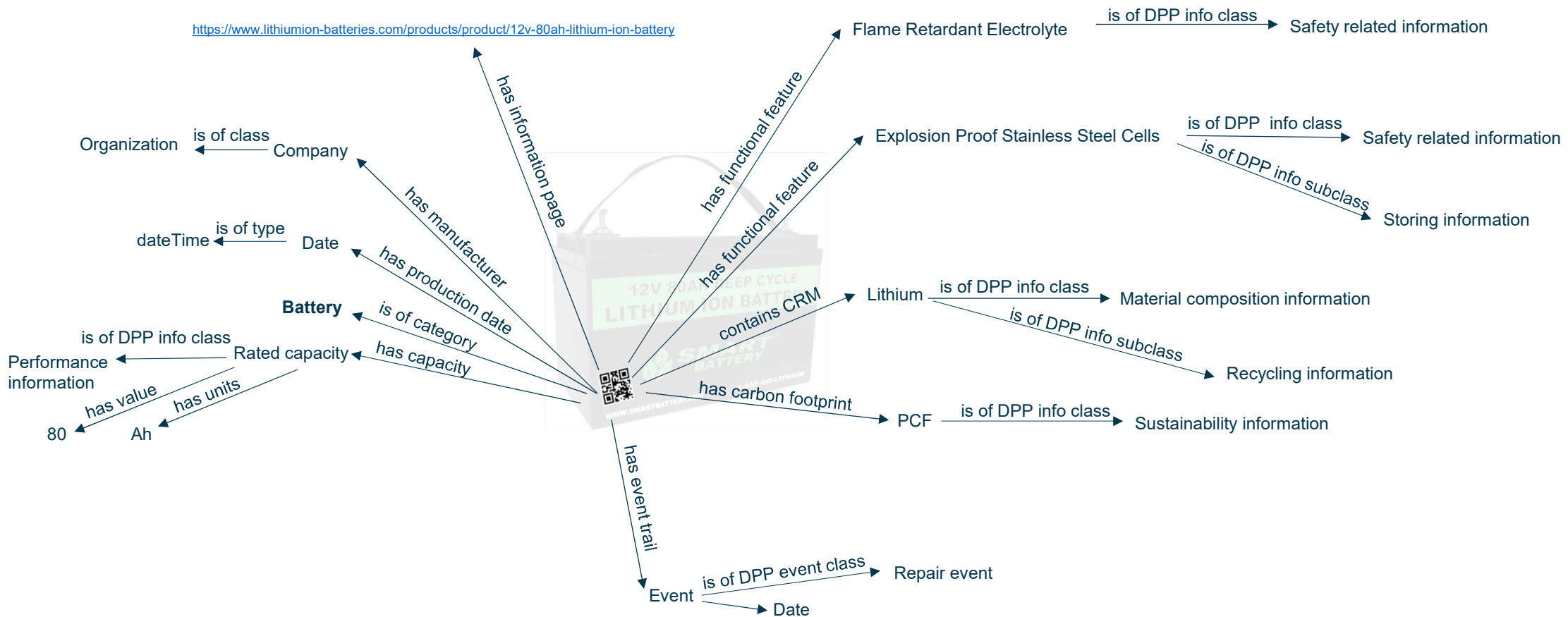
- A **knowledge graph** is made of assertions made in predicate logic:
 - Assertion : {Subject \rightarrow predicate \rightarrow object}
 - E.g. { The sky \rightarrow has color \rightarrow blue }
- Each assertion forms a « **semantic triple** ».
 - $\langle \text{subject} \rangle \langle \text{predicate} \rangle \langle \text{object} \rangle$.



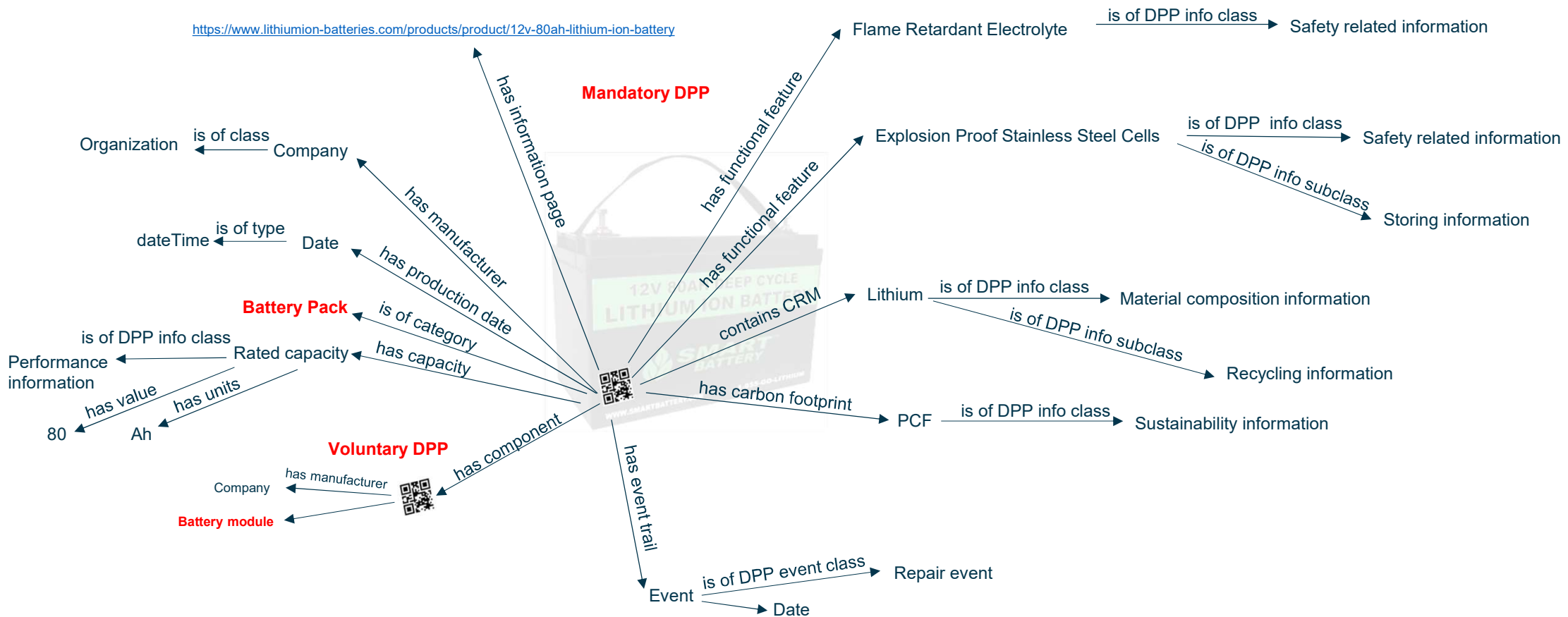
- A knowledge graph is a **directed** graph made of semantic triples.
- **knowledge graph = ontology + data**
- An **ontology** contains:
 - **Classes:** the distinct types of things that exist in our data.
 - **Relationships:** properties that connect two classes.
 - **Attributes:** properties that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



Example DPP knowledge graph for a battery

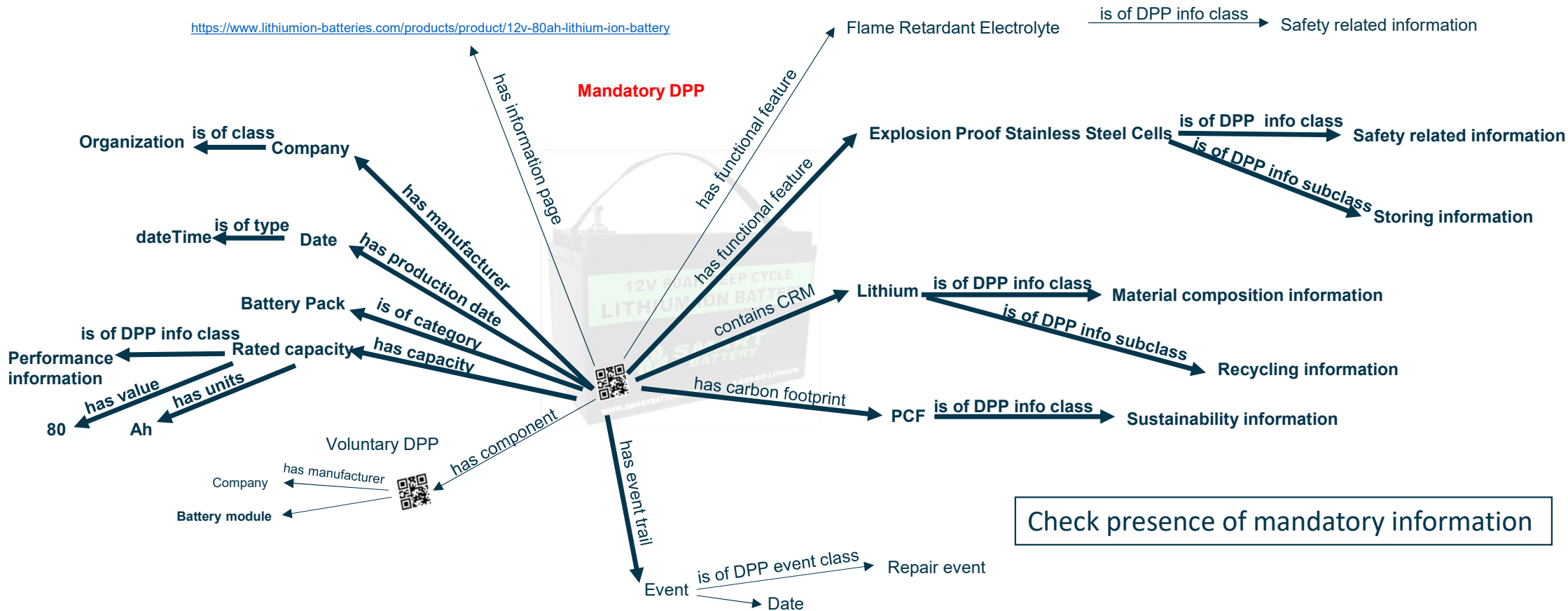


Example DPP knowledge graph for a battery

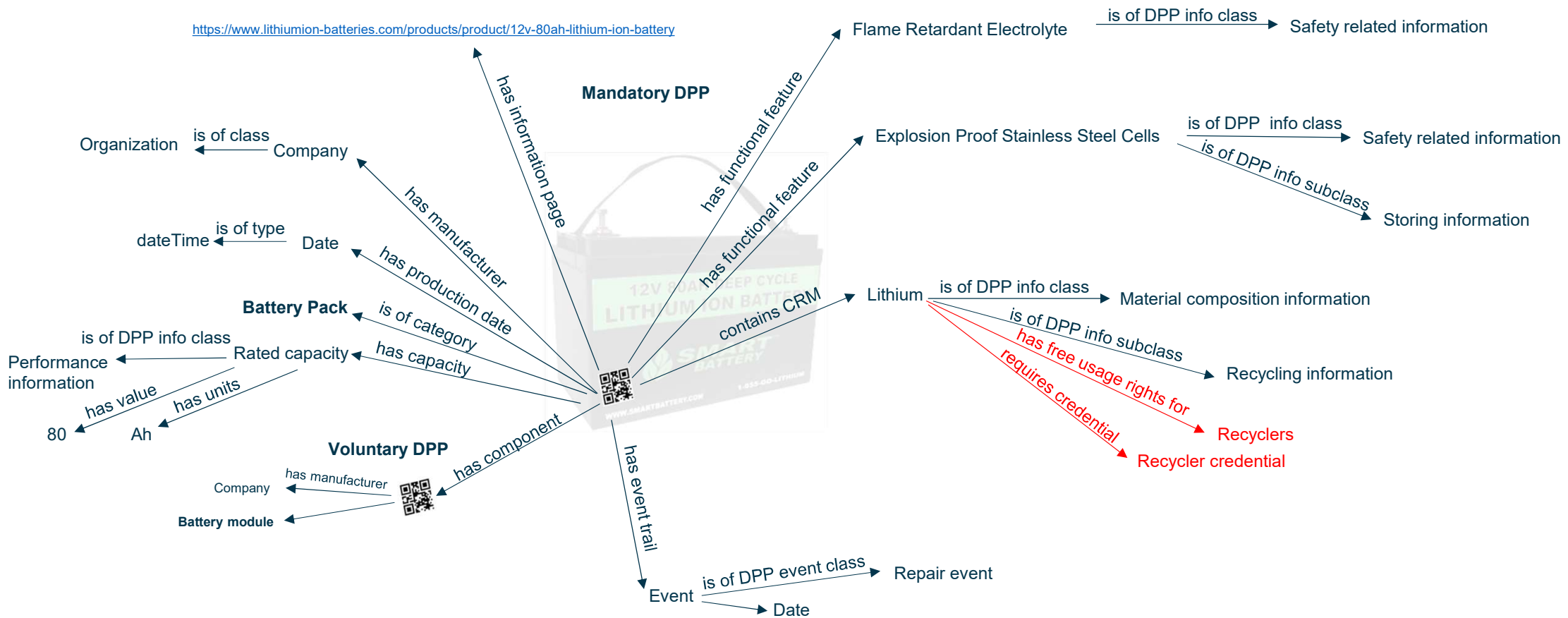


Verifying DPP compliance

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



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”

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/>

Q&A



Thank you!

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Contact us: info@cirpassproject.eu

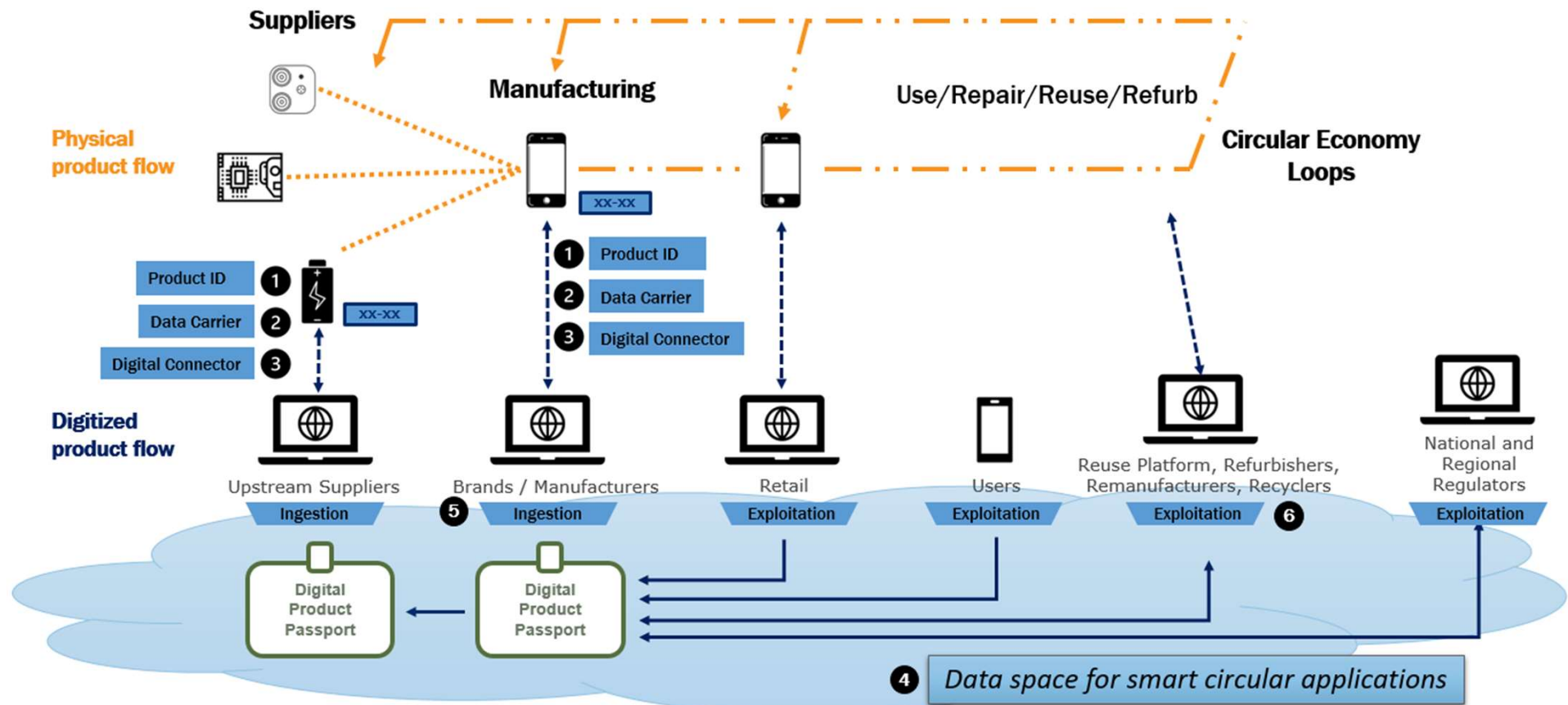
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DPP system – 6 pillars / terminology



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