

PASSAT: Digital Product Passport Austria & Beyond

Umutcan Serles^{1,*}, Ioan Toma²

¹Onlim GmbH, Andreas-Hofer-Strasse 4, 6020 Innsbruck, Austria

²Onlim GmbH, Neutorgasse 13/5, 1010 Vienna, Austria

Abstract

Digital Product Passport (DPP) is an initiative of the European Union that promotes circular economy and sustainability in certain product groups. Its main principle is based on attaching certain metadata to a product about its life cycle and maintaining these metadata as long as the product circulates in some form.

DPPs come with challenges for ICT as data and process models as well as architectures need to be established. There are light tower projects such as CIRPASS that explore different avenues for such challenges and come up with recommendations alongside various national initiatives. In the PASSAT project, our aim is to support Austrian companies in the implementation of DPPs. We will analyze the requirements for DPP implementation and develop reference architectures, data models, and training material for Austrian companies and build on the EU-wide efforts like CIRPASS. In ESWC, we want to especially focus on semantic data models for DPP and exchange ideas with the participants.

Keywords

digital product passport, circular economy, semantic data modeling, sustainability, data spaces

1. Project information

- Project short name/acronym: PASSAT
- Project full name: Digital Product Passport Austria & Beyond
- Project website link: <https://digitaler-produkt-pass.at/>
- Start date: 01/02/2025
- End date: 31/01/2028
- Project status: Ongoing project
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- Project logo: [link](#)
- Project video (optional): not applicable

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*Corresponding author(s).

✉ umutcan.serles@onlim.com (U. Serles); ioan.toma@onlim.com (I. Toma)

🌐 <https://umutcanserles.com/> (U. Serles); <https://sites.google.com/site/ioantoma/> (I. Toma)

🆔 0000-0001-6459-474X (U. Serles); 0009-0000-0924-6283 (I. Toma)



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2. Project summary

The PASSAT project (“Digital Product Passport Austria & Beyond”) aims to establish a data-service ecosystem in Austria to enable Digital Product Passports (DPPs) as a foundation for a sustainable, circular economy. A DPP is a digital record that enables access to key data about a product’s properties, usage, and lifecycle. It travels with the product from production until end-of-life, enabling all stakeholders in the supply chain to contribute and access information. The goal is to promote sustainability, ensure regulatory compliance, and unlock data-driven business models. Achieving this requires a robust data exchange infrastructure to support collaboration across the entire value chain¹. The main objectives of PASSAT are as follows:

- **Requirements and Regulations Analysis:** PASSAT will extend and refine the functional and non-functional requirements for Digital Product Passports (DPPs), building on international efforts like CIRPASS [2]. It will address legal frameworks, business models, technical architectures, and interoperability standards through stakeholder workshops and use-case evaluations.
- **Develop Reusable Ecosystem Components:** To overcome the current lack of standardized, reusable infrastructure for DPPs, PASSAT will create open-source components aligned with international standards. These will support cross-sectoral data ecosystems, accelerate implementation, and be made accessible via a virtual living lab with documentation and tutorials.
- **Real-World DPP Demonstration:** DPPs will be implemented and tested in three use-cases: textiles, electronics, and a transferability use case in the skiing equipment domain. These pilots will evaluate economic and environmental impacts, document practical challenges, and demonstrate solutions through live showcases.
- **Stakeholder Support and Training:** PASSAT will develop and distribute freely licensed (CC) materials, including guidance on technical, regulatory, economic, and ecological aspects of DPPs. These resources will support companies, universities, and other stakeholders in adopting and utilizing DPPs.
- **Input for Standards and Legislation:** The project will contribute to the evolution of international and national standards for DPPs, addressing aspects such as product identifiers, data carriers, access control, interoperability, and data security. It will provide legal guidance to support the coherent drafting and application of delegated acts under the emerging regulatory framework.

3. Project available results

The project was officially started 3 months ago and we are still in the initial phase of requirement collection and literature review. Therefore, currently no public result is available. We hope to use the input we will collect from the networking session in our first results.

4. Relevance to ESWC conference

DPP is a very promising initiative for supporting EU-wide circular economy for products that have high environmental impact but also high recycling potential. Many of the aspects of a DPP are very suitable use cases for semantic technologies, such as its distributed nature and the need for interoperability across different stakeholders.

As one of the important venues for the research and development in semantic technologies, our project carries a significant relevance for ESWC. Especially the “developing reusable ecosystem components” objective is very relevant for the ESWC audience as the information model of the exchanged DPP data will be based on a network of ontologies and be exchanged over data spaces. Semantic web technology stack standards such as RDF(S), JSON-LD and SHACL will be adopted.

¹Content of this section is based on the Project Handbook [1], which is a confidential deliverable.

5. Value brought by the project to ESWC participants

The value brought by the project to the ESWC participants is two fold. First, the participants who are involved with semantic technologies but not yet aware of Digital Product Passports will be introduced to this new and from a technical perspective mostly uncharted domain. Their interaction with us may inspire them to participate in projects within their own national initiatives or build EU-wide cooperations.

Second, the participants who have already been involved with DPP-related activities will learn about a new national initiative as well as a new domain that was not covered by current initiatives so far such as skiing equipment. Moreover, this will give them a chance to explore synergies between different national activities regarding DPPs.

6. Value gained by the project from ESWC participation

Although we have expertise in ontology engineering, DPPs require a layered approach, where domain-specific ontologies must be properly connected with domain-independent ontologies. At this stage of the project, we are in the process of gaining know-how in DPP-specific ontologies, product-specific ontologies for our use cases and also more generic ontologies for fields such as material modeling, manufacturing and recycling. We aim to collect some pointers regarding these type of ontologies and how they can be connected at different levels while implementing a DPP system.

We also hope to meet participants who have been involved in DPP-related projects and benefit from their experience of implementing DPP systems with semantic technologies and data spaces.

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