# Digital Product Passports –
# a Pillar of Circular Economy

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# DunavNET - Accelerating digital transformation

**Established** in 2006, HQ in Dublin (Ireland), development in Novi Sad (Serbia)

Co-founders of international IoT associations, **regular keynote speakers** at international events, EU and ITU experts for IoT

fleetNET's **FIRST customer** in 2011

**TagItSmart**, €7mil. IoT project, managed by DNET, started 2016

Collaboration with **Microsoft** started 2015

glueNET with **Henkel** since 2018, deployments in Heineken and Carlsberg

**First AI solution** for poultry farms deployed 2018

Working with Africa, IoT and entrepreneurship **(ACEIoT)**

Collaboration with **SAS**, since 2019

Invested over 5 mil. EUR into **creating own IPR** in IoT/AI domain

Spin-off smart city solutions into a joint venture, 2021

30 **IoT developers** and experts



Microsoft IoT is already delivering tangible results across industries

SUSTAINABLE DEVELOPMENT GOALS



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# Circular economy

The circular economy is a model that aims **to keep products, materials, and resources in use for as long as possible, minimizing waste**.

- Instead of a "take-make-dispose" approach, closing the loop of product lifecycles through greater resource efficiency.

**Design Out Waste and Pollution:**

• Products are designed with their entire lifecycle in mind.

• Aim to eliminate waste at the source.

**Keep Products and Materials in Use:**

• Promote reusing, repairing, refurbishing, and recycling.

• Extend product lifespans.

**Regenerate Natural Systems:**

• Restore and enhance natural capital.

• Use renewable resources and sustainable practices.

# Why Circular Economy?

**Economic Benefits:**

- Cost savings through efficient resource use.

- New business opportunities in recycling, repair, and refurbishment.

**Environmental Benefits:**

- Reduced waste and pollution.

- Conservation of natural resources.

**Social Benefits:**

- Job creation in new industries.

- Enhanced quality of life through sustainable practices.

# Digital Product Passports

**Digital records containing comprehensive information about a product's lifecycle**.

- Improve transparency and traceability across the supply chain.

**Functionalities**:

- Collect product information across the product lifecycle.

- Digitally store data (e.g., in the cloud).

- Provide easy data access to stakeholders (e.g., through scannable QR codes).

**Shared Information:**

- Origin of raw materials.

- Recycled vs. virgin materials.

- Resource consumption.

- Emissions.

- Waste.

- Transport emissions.

- Packaging.

- (Eco-) labels.

- Repair history.

# The EU as a Regulatory First-Mover

The EC is the first large regulator aiming for mandatory DPPs to promote the transition to a circular economy, provide new business opportunities, and support consumers.

Examples exist, but most are early-stage and industry-specific.

DPP implementation poses significant challenges due to the broad intended cross-industry scope and the complexity of setup.

ESPR establishes EU DPP and is a key link between policies.

- Builds on several European Union policies

- Extends the scope and covering a broader range of products.

# Key Questions and Challenges for EU DPP

- Which industries/product groups should be prioritized and why?

- Should requirements differ by company size?

- What level should DPPs be applied at?

- How and by whom should data be stored?

- What data carrier(s) should be used?

- How should access to the data be allowed?

- What information/data will be included in the DPP at what degree of standardization?

- Who collects and updates the data?

- How is the DPP data verified?

Product passports shall be connected through a data carrier to a unique product identifier.

The data carrier and the UID shall comply with ISO/IEC 15459:2015 standard.

**GS1 Digital Link shall be used to plan for user and consumer product interaction.**

GS1 Digital Links shall be added to the products themselves rather than just the hang tags or the outer packaging.

To avoid fraud and tampering, switch to random and unique IDs (UIDs)

Set up GS1 EPCIS repositories to allow supply chain players to share traceability data and connect supply chain events to distinct IDs.

Implement specialized, scalable common UID/EPCIS repositories for the ever-increasing range of manufactured goods.

**Implement traceability systems that enable tracking of all events that occur between raw materials and the finished product.**

**Implement centralized and interoperable systems that can collect and combine data from diverse sources in order to get ready for the reporting requirements for the product passport.**

**Implement measures that ensure the appropriate data is shared securely with the appropriate internal or external users or IT systems.**

# TagItSmart!

**OPEN**

**Do you know their story?
Let the products speak...**

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NET
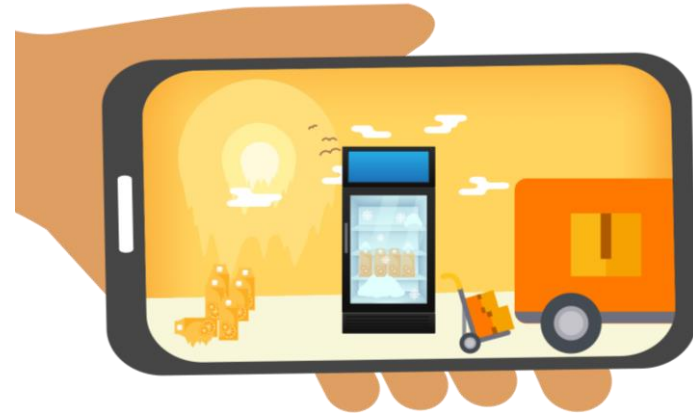
# TagItSmart! Provides customer services along the Mass-Market Products lifestyle

**MANUFACTURE**

**MOVE**
DELIVERY CONTROL

**PURCHASE**
AUGMENTED PRODUCT

Reliable delivery

- Product authentication
- Product traceability
- Product quality (freshness. expiry date...)
- Label compliance
- Personalized offer, promo, discount according to product's context
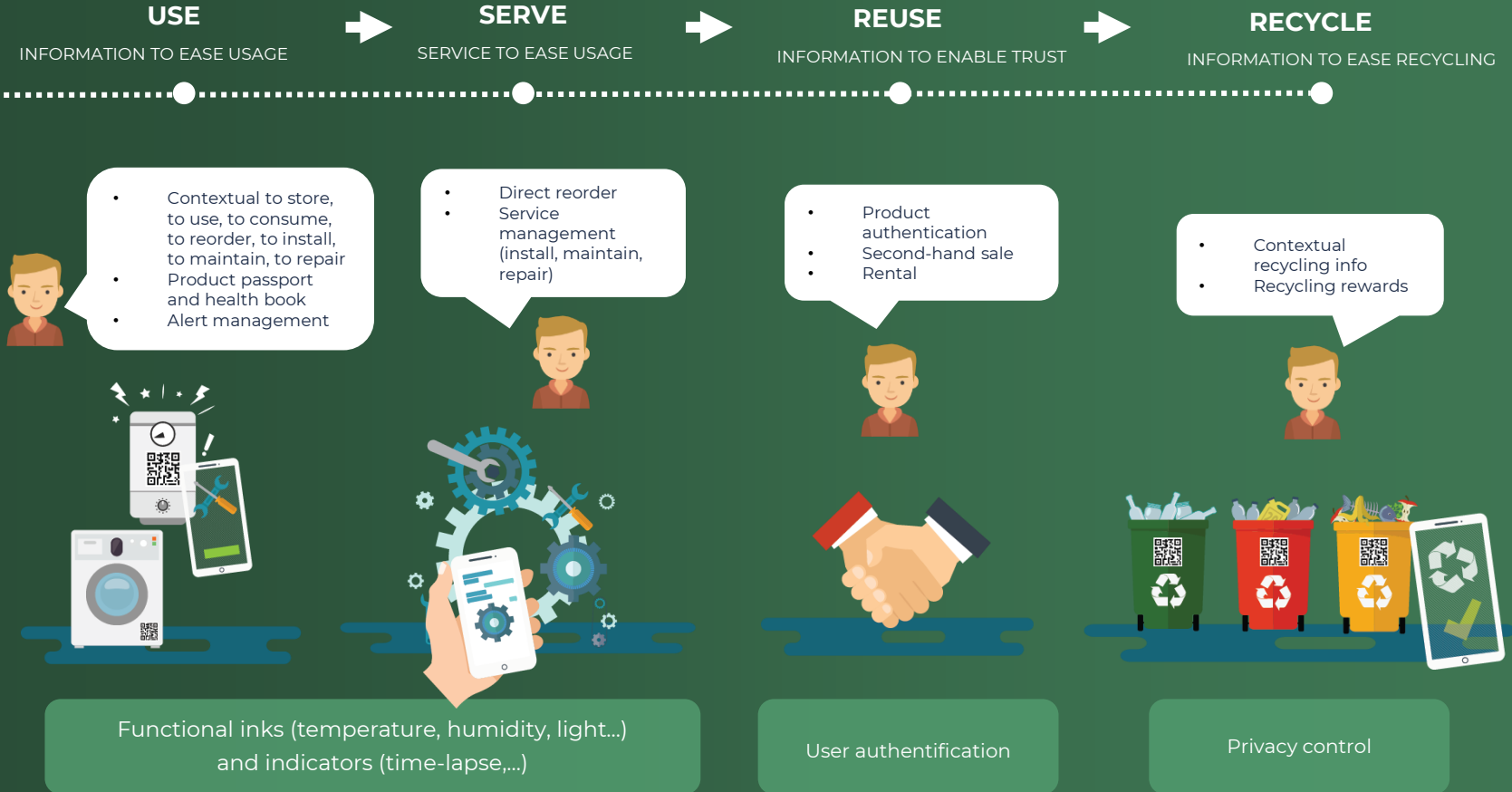- Transaction outputs (receipt warranty)

**TagItSmart** capabilities
- Product passport bootstrapping
- Identity management
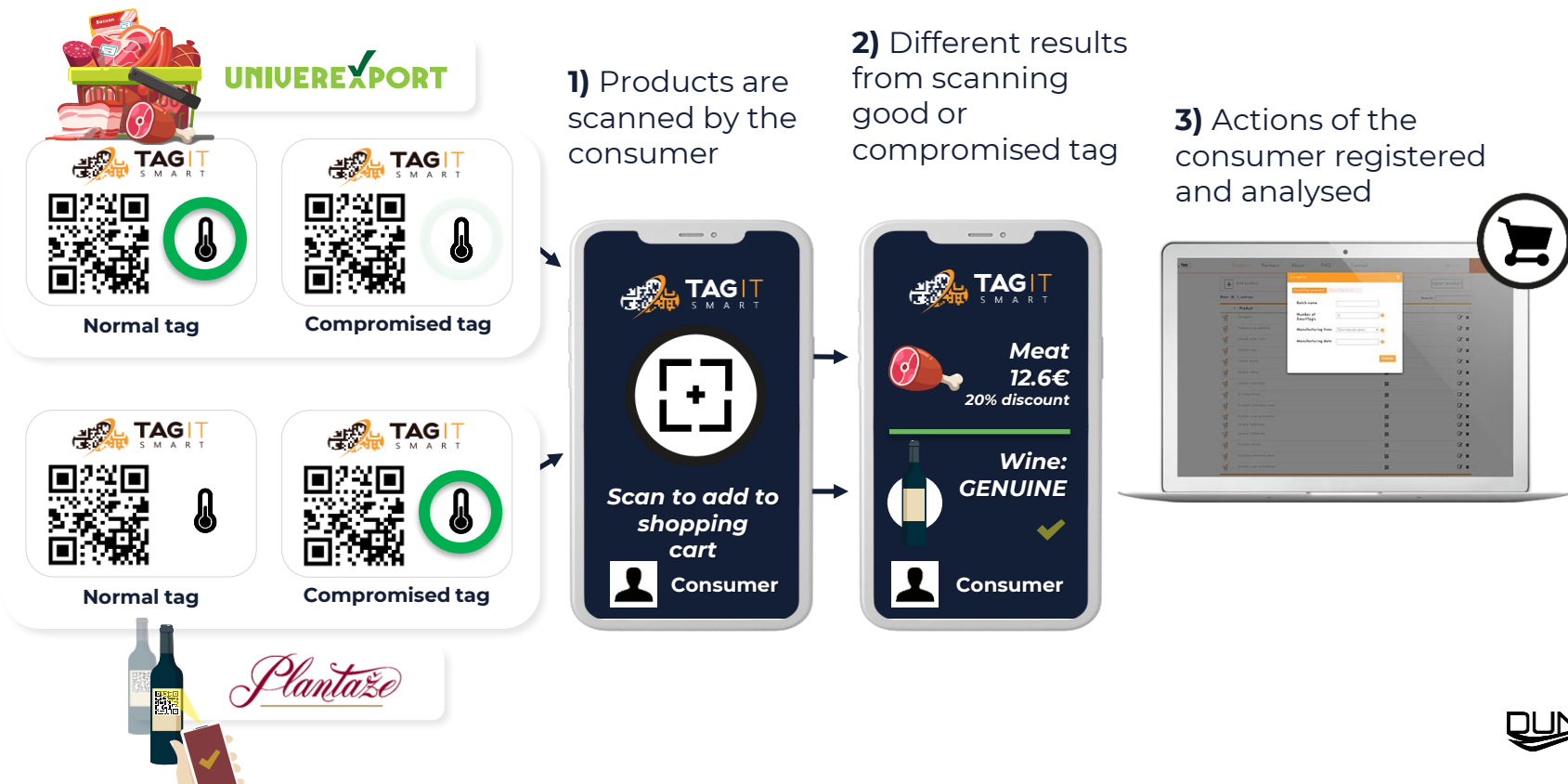- Tagging process (QR code, printed NFC)

**TagItSmart** capabilities
- Reliable delivery

- Environment sensing

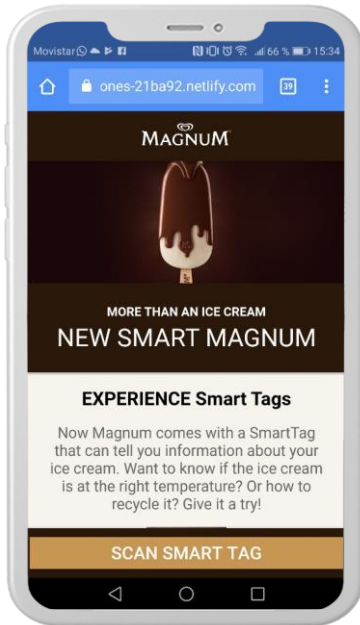# TagItSmart! Provides customer services along the Mass-Market Products lifestyle

**USE**
INFORMATION TO EASE USAGE

**SERVE**
SERVICE TO EASE USAGE

**REUSE**
INFORMATION TO ENABLE TRUST

**RECYCLE**
INFORMATION TO EASE RECYCLING

- Contextual to store, to use, to consume, to reorder, to install, to maintain, to repair
- Product passport and health book
- Alert management

- Direct reorder
- Service management (install, maintain, repair)

- Product authentication
- Second-hand sale
- Rental

- Contextual recycling info
- Recycling rewards

Functional inks (temperature, humidity, light...) and indicators (time-lapse,...)

User authentification

Privacy control

# TagItSmart: enabling transparent interaction with consumer



UNIVEREXPORT

**Normal tag**

**Compromised tag**

**Normal tag**

**Compromised tag**

Plantaže

**1)** Products are scanned by the consumer

**2)** Different results from scanning good or compromised tag

**3)** Actions of the consumer registered and analysed

**Scan to add to shopping cart**

Consumer

*Meat*
**12.6€**
*20% discount*

*Wine: GENUINE*

Consumer

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# Enabling transparent interaction with consumers



**SCAN**

**COLD CHAIN**
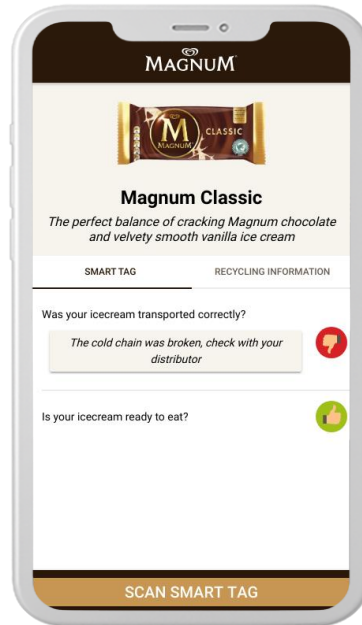
**EAT TEMP.**
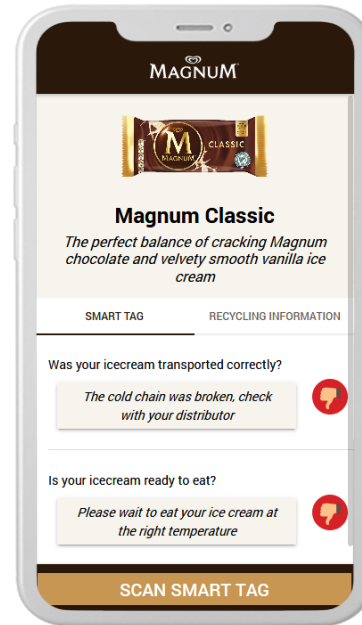
**RECYCLING**

# Follow the steak!

![FishEUTrust logo]

- **20 partners: 9 RTD, 9 SMEs, 1 association (Eurofish), 1 NP-SME (EuroFIR)**

- **2 Associated partners: WRG, EAS**

- **14 EU countries:** South (IT, ES, PT, MT, HR), Central (SI, DE, BE), Northern (DK, NO, UK), Eastern (RO, RS, ME)

- **CLLs covering Mediterranean, Atlantic, N Sea:**

  PT, MT, ES, DK and HR

- Multi-actor & multi-disciplinary consortium:

  research, aquaculture production technology, ICT, social sciences and consumer behavior, culinary innovation, business development, market analysis, regulation & policy, training & education

  Call: HORIZON-CL6-2021-FARM2FORK-01-10:
  Sea to fork transparency and consumer engagement



Legend
🐟 CLL

NO NORCE
DK DTU EUROFISH
DK OXY
UK WRG
DE BTU
BE EAS EuroFIR
RO UMF
ES CETGA
SI JSI
IT UNIPD
RS BELIT
IT UNIBO
ME DigitalSmart
IT UNIFI
HR Bugenvila
PT IPMA
ES JdIC MICRUX
IT REDINN
MT ABT
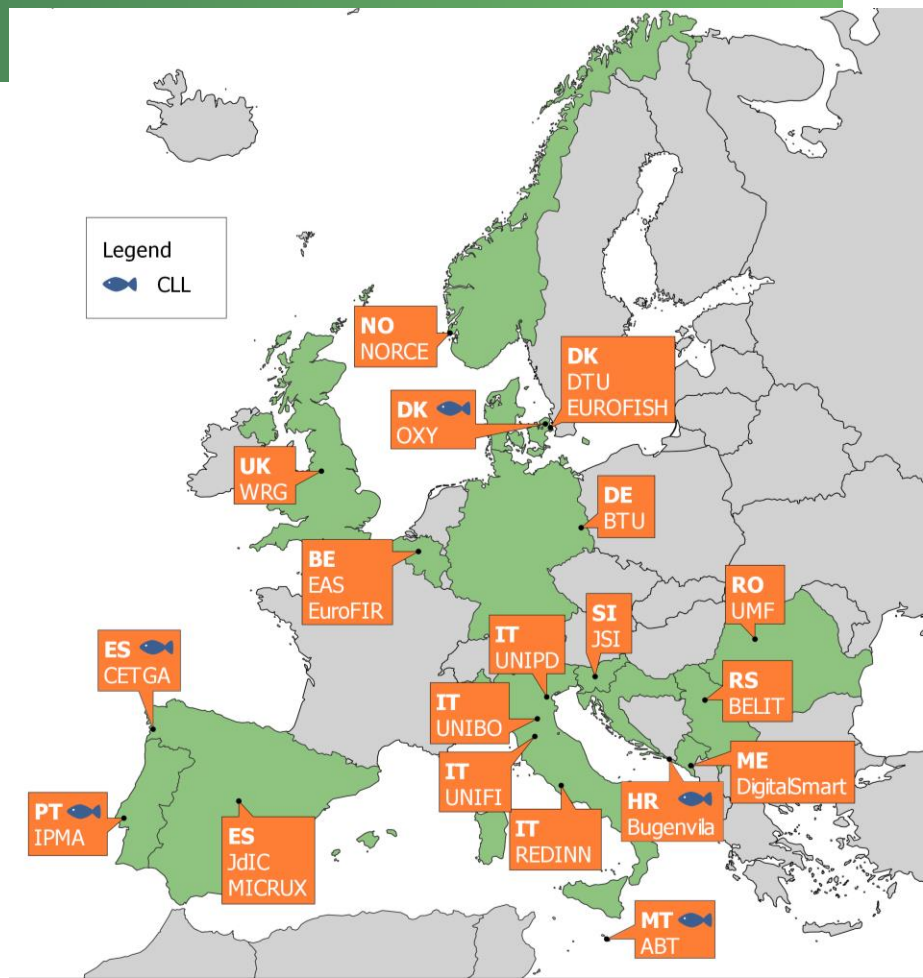
# Lack of supply chain data integration limits transparency
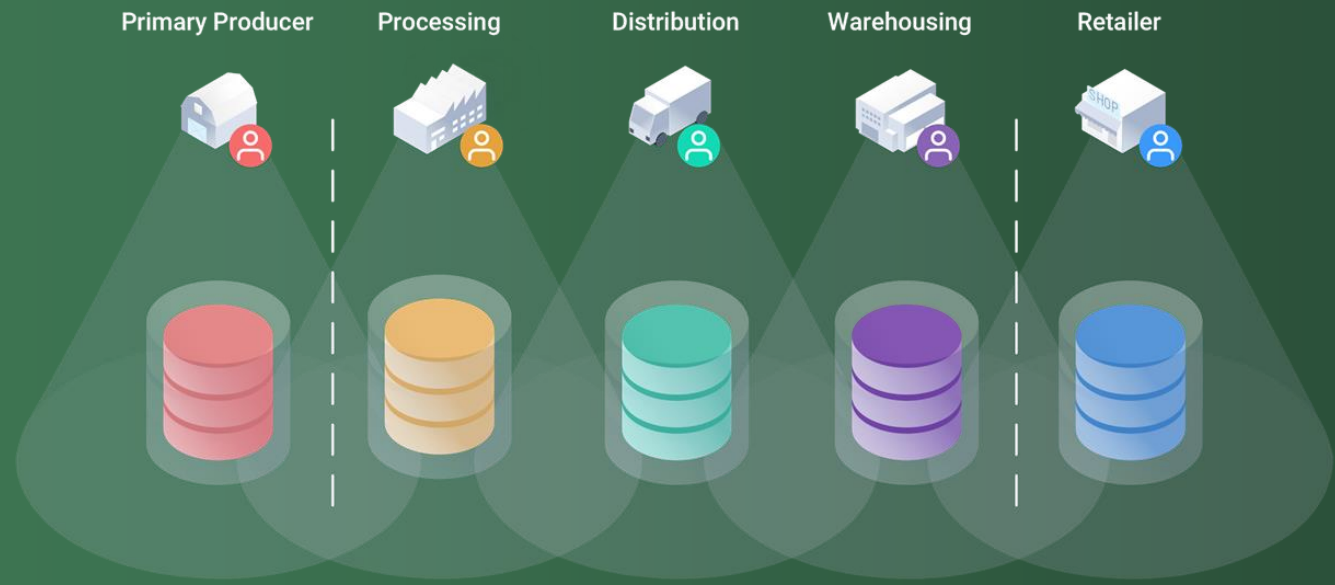
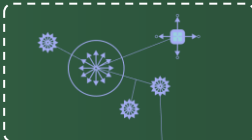# Global Knowledge Graph



Primary Producer
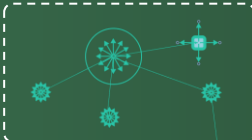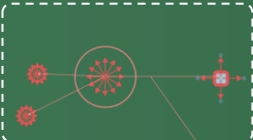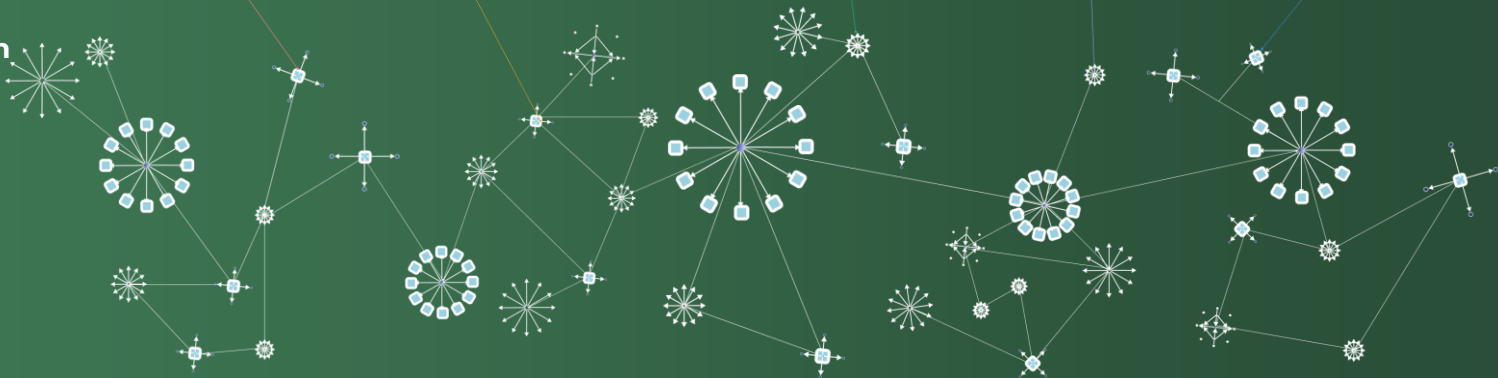
Processing

Distribution

Warehousing

Retailer

**Private knowledge graphs**

**ODN public knowledge graph**

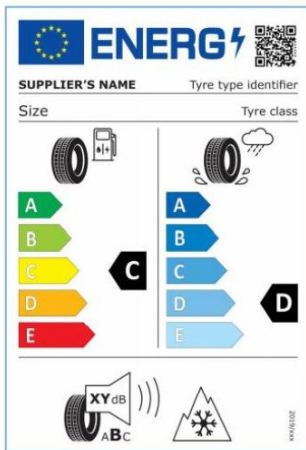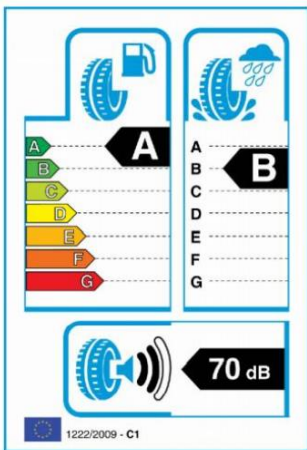Highly structured linked data

**Blockchain layer**

# Summarized information based on reliable input data



**2012 EU Tyre Label**
Regulation 1222/2009

**2021 EU Tyre Label**
Regulation 2020/740

| | |
|---|---|
| Batch number: | 124 |
| Number of bottles: | 600 |
| Sulfur [g]: | |
| Type of wine: | Red |
| Location: | |
| Crop type: | |
| Variety: | Vranac Pro Corde |
| Pesticides - the last treatment: | 20.8.2023. |
| Harvest date: | 30.9.2023. |
| Sugar content [%]: | |
| Acid: | |
| pH: | |
| Temperature [°C]: | 13 |
| Energy label: | |

Pesticide usage | Irrigation | CO₂
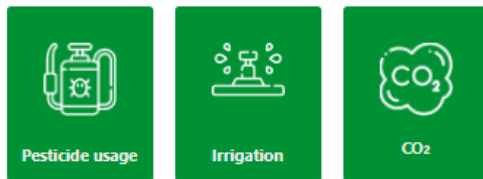
Low environment impact
Medium environment impact
High environment impact

| | |
|---|---|
| Producer: | Agroprodukt Šinković |
| Type: | MeatProvenance |
| Hybrid: | Ros 308 |
| Cycle: | 30.3.2022. |
| Environmental conditions: | Optimalni |
| Vaccines: | Da |
| Transport conditions: | Optimalni |
| Energy label: | |

Animal wellbeing
Production cycle

Animal wellbeing
Transport

CO₂
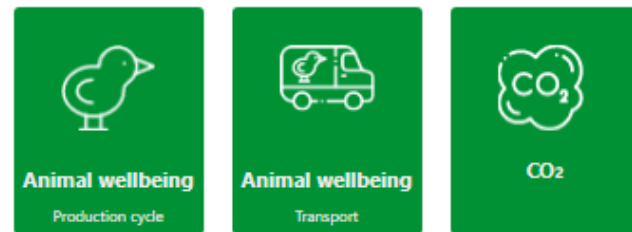
Low environment impact
Medium environment impact
High environment impact

# TRACEWINDU
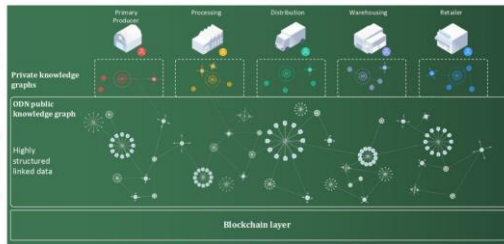


The proposed solution in WP4 will rely on the previous experiences and lessons learned,
supported by the and outputs from WP1-3

TASK OUTPUT: Architectural considerations, conference and journal papers, contribute to M5

# For take away…

Digital wine.

Digital "sarma".

Digital Product passports.

# More info:

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