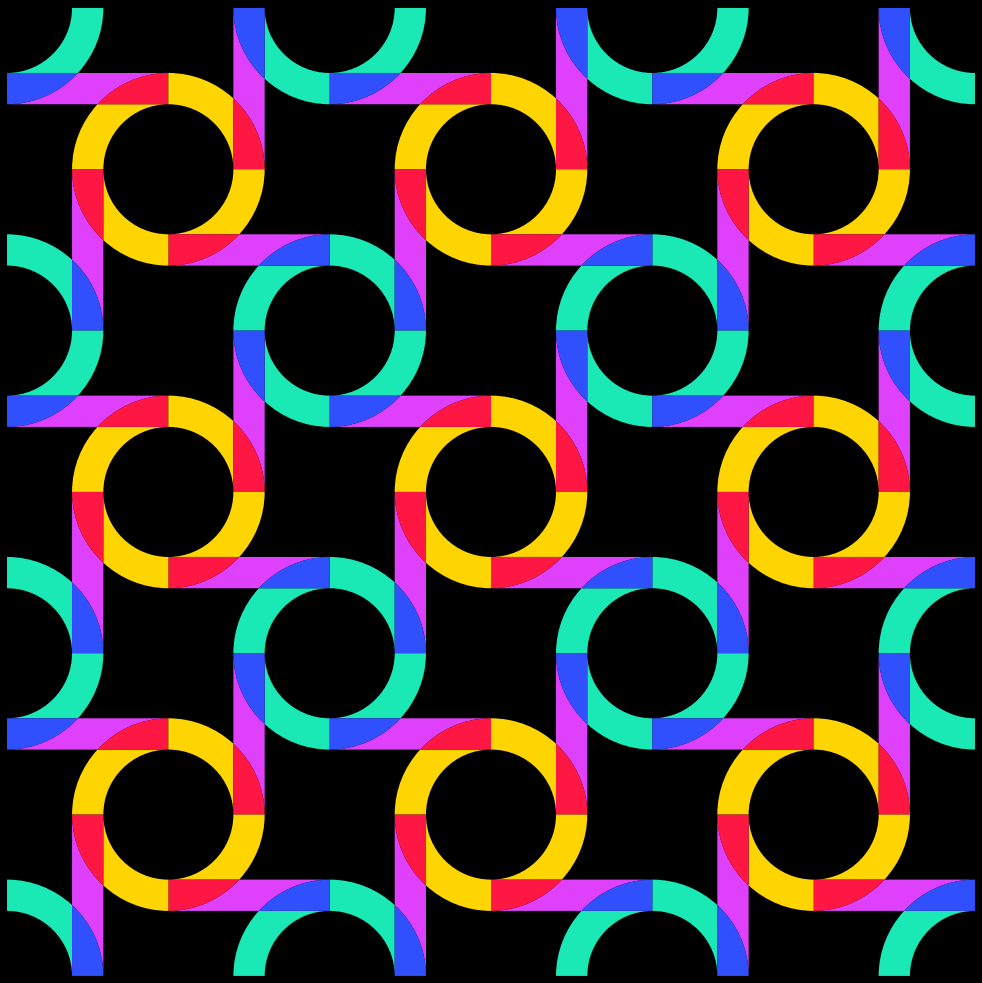
i4Trust



AgroTrust

Agriculture traceability for creating trust along the whole supply chain

i4Trust – Data Spaces for effective and trusted data sharing

www.i4trust.org

Smart Agrifood

AgroTrust improves the traceability and certification of agricultural products, comprising the interaction from the farm to the final consumer

Intro

Agriculture has been the latest billion-dollar industry to be digitized. One of the main problems that have hindered the spread of digitisation concerns the availability, management and transmission of data in agriculture.

The purpose of the **AgroTrus**t experiment is to satisfy the needs of European farmers and agrifood supply-chain stakeholders and provide them with a set of tools with which they can manage and track data along the whole supply chain, helping to advance faster in the digitisation process.

Challenge & Context

Managing data in agriculture could be a problem for the different levels of digitization of the operators and the heterogeneity of the data sources. Some data are even still managed through paper sources.

The different sources need to be fully digitized and able to communicate with each other and all data needs to be standardized to guarantee the flow of information along the supply chain. And this is exactly the aim of the AgroTrust experiment.

Solution

AgroTrust was inspired by the **DigitalTwin paradigm** for granting a secured and regulated data flow and a near real-time tracking of all the information collected on the

digital history of the product, to guarantee the certification of products quality and healthiness, despite falsification and imitations issues becoming increasingly common in the agri-food sector

At any time, any supply chain stakeholder (including the final consumer) can reach, with total transparency, the origins, the properties, and the entire agri-food chain of the selected product through its own smartphone (via QR Code reader), consulting all the real information gathered on the timeline along with the production and stored in a blockchain-based digital label that serves as the product's identity card.

AgroTrust aims to be a solution for transparent certification of authentic agricultural products, which reinforces the relationship of trust between the consumer and the entire food production chain, enhancing high-quality farmers and producers to guarantee food security for every citizen. At the same time, the tool allows the farmer to trace all technical information on the products used.

AgroTrust also exploits the EU Plant Catalog Opendata, and the national OpendaData on Pest Control and is able to provide traceability open data to the SupplyChain Stakeholders.

AgroTrust solves the problem of lack of trust in food chain data, involving the final consumer and other stakeholders in the evaluation of agro-industrial products, guaranteeing privacy, traceability, and origin of products and quality assessment of themselves.

How it works

EzLab srl, provider of AgTech software has developed, with help of FIWARE, the FINODEx project AgriOpenData, a powerful software platform that helps farmers in the traceability and certification of products using blockchain technology and the Context Broker.

The platform allows stakeholders to carry out safe and automatic operations along the entire production chain, allowing you to increase quality production (especially organic products), improve environmental sustainability, and ensure transparency and safety for the final consumer. AgriOpenData uses all the open data available from EU Catalogs, and national catalogs related to crops and pest protection products

ImageLine: provider of AgTech software: provider of QdC® - Quaderno di Campagna®, a software tool for compliance with the register of treatments compulsory for farmers. The software provides the following functions:

- managing company data, fields and crops;
- warehouse management, crop protection products, and warehouse register management of phytosanitary treatments defense weeding;
- checks on treatments;
- respect label registers;
- respect dosages of use, respect of the maximum dose per hectare per treatment and per year;
- print treatment register
- traceability: transfers and QR-Code

Riseria Campanini, Ricer Trasfromer, a prominent rice transformer that implements the most advanced traceability policies of his production to accomplish safety and perfect product management and user satisfaction. Riseria Campanini has its own warehousing method that distinguishes it from the other operators in the business. The raw material, paddy rice, is stored in a system of small silos so that the rice produced on every single farm can be processed separately from all the other batches. In this way, homogeneous cooking of the end product and traceability can be guaranteed. Processing of the rice follows past tradition, without any chemical treatment but under the most modern controls and in full compliance with the HACCP rules on food production.

Coppo e Garione Società Agricola from Vercelli, is a rice producer with a cultivated area of 1000 ha. It is one of the most prominent Italian rice producers that manages all data collected in the field with an internal ERP.

Finapp: innovative IoT provider for Agriculture that produces IoT appliances with high innovation such as the use of cosmic rays that continuously reach the earth's surface: from their interaction with the water molecules present in the soil, in plants, in the snow, a suspended "fog" of neutrons is formed. The CRNS probes (cosmic ray neutrons sensing) allow them to count these neutrons and therefore to determine the water content present in the soil, in the biomass. Both Soil Moisture and Biomass Water Equivalent depend strongly on the type of soil and the heterogeneity of the soil is such that, a few meters away, the water content available for growing crops can vary significantly. For this reason, having a datum averaged over a sufficiently large area to consider the whole spectrum of soil heterogeneity is of fundamental importance. In

addition, it is equally important to know the soil moisture not only at a surface level but also in-depth, up to where typically the roots of the crops settle.

Noima srls: User Interaction expert: provide a solution for Smart Labeling of Agricultural Products that closes the information gap from the farm to the consumer providing consumers with certified information about the product and feeding back information to the supply chain stakeholders.

FIWARE Innova iHUB is the designated DIH for the experiment with the ability to help facilitate the empowerment of cutting-edge technologies, successful entrepreneurial strategy, novel business models and sustainable development of solutions and infrastructures in urban and rural areas for transforming them into "Smart Lands" to create well-being for a better quality of life. FIWARE Innova iHub is an i4Trust DIHs Working Group member

The final objective of the AgroTrust Experiment is to collect data related to the production of rice along the supply chain with guarantees of trust thanks to the iSHARE paradigm and ease of integration thanks to the Context Booker.

AgroTrust exploits the notarization services via the use of already operational blockchain/ledger in the ArgriOpenData module. It will be ready to connect to The European Blockchain Services Infrastructure if needed when the EBSI is fully operational.

Added value through FIWARE

In the proposed experiment COPPO E GARRIONE, using the data collected by scouting operation on the fields and from their internal ERP, in an automatic way feeds the ImageLine platform “QdC” where the agronomist manage all the data about the pest protection products used in the fields.

ImageLine feeds the data to the AgriOpenData platform of EZLAB, where is notarized in the internal blockchain and makes available to ricce transformers/packagers, like Campanini, that receive this data about the provenance of the rice and manage the tracking of the rice produced throughout the transformation process. Then, it feeds back the information to the AgriOpendata platform from where Noima get the data related to a single lot from the Context Broker to re-construct the full storytelling presented in a suitable way to the final consumer that accesses that story with a QR code inserted in

the Product Packaging. Noima optionally collect feedback from consumers and feedback data to the Agriopendata Context Broker.

The system will use a public permissionless blockchain Algorand to register the events log, in the form of hashes of json event descriptors managed by a rest API gateway provided by EzLab. The use of the API Gateway will render possible a future change of the blockchain type if needed.

The experiment operates two instances of the Orion-LD Context Broker; one for the AgriOpenData Platform,which provides access to the agronomical history of a cultivated field, and the other is managed by Riseria Campanini, the transformer that tracks all the Transformation Operations

The access to the Context Broker is protected by the FIWARE API Umbrella component implementing PEP (Policy Enforcement Point) Proxy and PDP (Policy Decision Point) functions.

The communication between the two Context Brokers is based on Notifications resulting from Subscriptions to the context of the Cultivated Field and Produced Lots.

The Identity components are checking incoming notifications for proper access rights based on iSHARE-compliant policies stored in Authorisation Registries.

CoppoGarrione installs a Finapp IoT CosmicRays sensor that by means of his own ML model feeds the inferred data into the EzLab Context Broker.

The data collected by the IoT will update values of attributes of the monitored field as proof of the correct use of pesticides and fertilizers, and the data is notarized in a blockchain system by EzLab. During the experiment, we will evaluate if the produced storytelling information will be available under policies based on iSHARE specifications, which are issued to the different retailer organizations. A web application is provided by Noima that enables end-customers to access the storytelling related to a specific package of rice and based on iSHARE-compliant policies and OpenID Connect technology, the final customer will be able to leave feedback on the product.

All the data transfers are made as NGSI-LD requests, creating a digital twin representation of the cultivated fields and produced rice lots. The Keyrock Identity Provider instances components may be validated against iSHARE Satellite whether the requesting organizations are trusted participants of the data space.

Disclaimer: In accordance with our Guidelines concerning the use of endorsements and Impact Stories in advertising, please be aware of the following: Impact Stories appearing on the i4Trust site and partner's site or in other digital or printed materials. It is possible to hand in text, audio or video submissions. They are individual experiences, reflecting real life experiences of those who have used our technology and/or services in some way or another. We do not claim that they are typical results that customers will generally achieve. i4Trust partners reserve the right to revise the contents, make them shorter and adapt them as required.

i4Trust

AgroTrust

Agriculture traceability for creating trust along the whole supply chain

Do you have questions or want to know more?

CONTACT US

Founding Partners

FIWARE FOUNDATION

iSHARE

FundingBox

i4Trust has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement no 951975.

i4Trust – Data Spaces for effective and trusted data sharing

www.i4trust.org