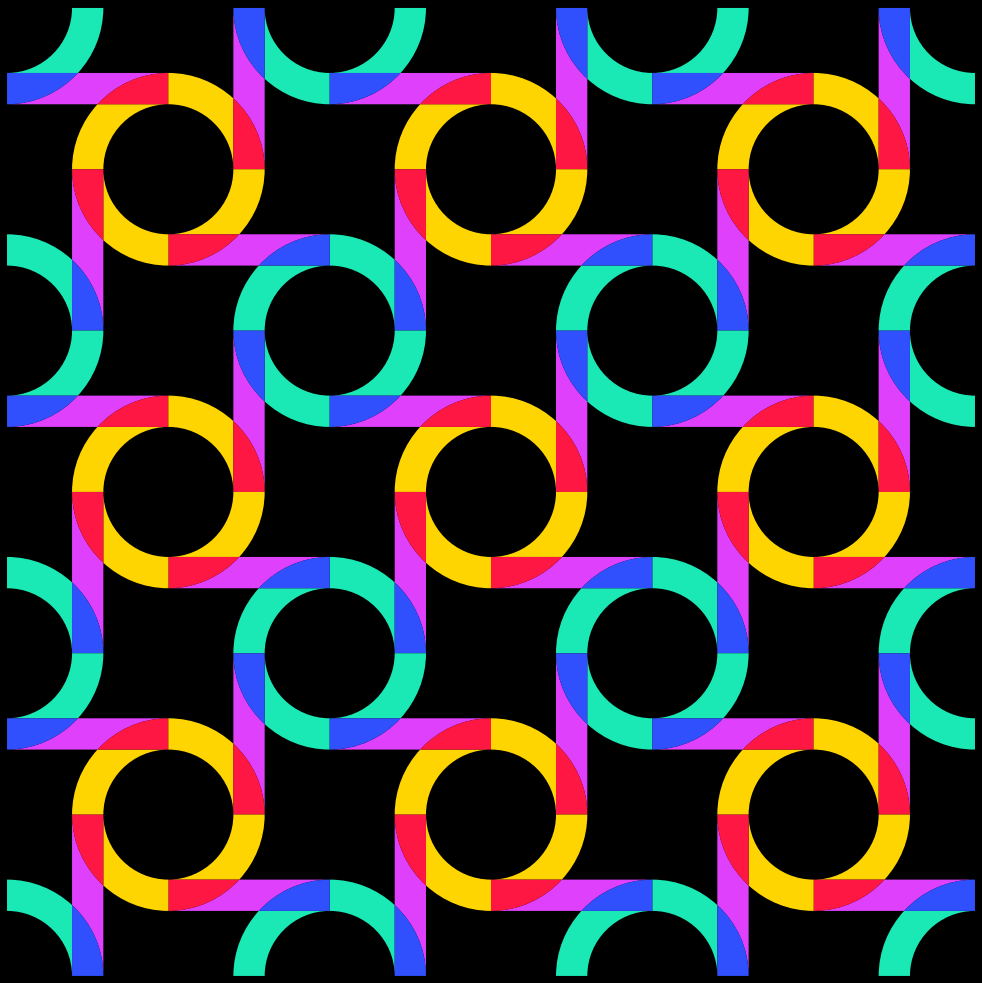
i4Trust



eVine2Wine

Sharing vineyard data with the wine value chain to provide a superior product and better customer experienceble and sustainable logistics value chain

i4Trust – Data Spaces for effective and trusted data sharing

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Smart Agrifood

eVine2Wine: Sharing vineyard data with the wine value chain to provide a superior product and better customer experience

With the contribution of:

- **ELMIBIT d.o.o.**

Challenge & Context

Wine traceability is today a desired and much-discussed topic in the industry due to its value in wine marketing and sales. Proper traceability of wine production conditions and conducted activities can also have a considerable effect on wine safety and quality. This was also recognized by the European Commission, which recently adopted a new regulation on wine policy to control the quality level of EU wines, strengthen the competitiveness of the wine sector, and ensure market stability that anticipates the traceability of wine products at all stages (Pomarici and Sardone, 2020). However, the concept of providing full traceability from vineyard to bottle is today implemented in a very limited number of wines we can find on the shelves.

There are two major reasons for that. On the one hand, the wine supply chain is and has always been very complex and fragmented, with distant suppliers and demanding customers, making it challenging to implement an effective traceability system (GS1, 2008). Namely, the wine value chain includes many different stakeholders that are involved in growing, processing, and selling wine to the end consumers. The majority of wine production actors in Europe are highly fragmented and work as a cooperation of several entities (grower, advisor, winery, marketing company, distributors) to bring the final product, wine, to the market shelves. For such a fragmented value chain, sharing data for traceability reasons, which can be used either for food safety, marketing purposes, or quality improvement, is considerably more difficult and today almost never applied in a multi-actor environment.

With today's information technology solutions, wine traceability can be implemented to a high degree only in single-organisation wine producers that use one information system or a small number of tightly integrated information systems for all stages of production: from grape growing through winery processing, all the way through bottling and distribution, to sales. The key is that in today's practice, such systems are used only in cases where all of the production stages are under the control of one larger entity (winery), which uses appropriate (or correctly integrated) information systems in order to provide traceability information on the bottle. The latter set-up is today still gaining ground in larger wineries and is the reason why we don't see a lot of traceability information about wine on the bottles from small producers and on

wines produced from grapes that were purchased from smaller growers, which produce a large share of wine in Europe.

Solution

To enable wine traceability for small wine producers that act in multi-actor wine value chains, an eVine2Wine solution was developed and piloted within the i4Trust, an EU-funded project. In multi-actor value chains, trust is extremely important. For example, the trust between vineyard and winery is important from (1) the perspective of food safety and (2) the perspective of providing terroir information, which the winery can use to optimise the quality of the wine by appropriate winemaking process, and consequently, elevate the value of the final product – the wine. While trust between end consumers and grape producers, especially if they follow organic or sustainable guidelines, is vital it can be increased if end customers can verify the winegrower's claims. By winegrower increasing his transparency and following the concept "the greater transparency, the greater trust."

And eVine2Wine enables just that - data sharing in a trusted and controlled way by using Digital Twins of the vineyard areas, with iShare providing identity and access control mechanisms. Through that wine value chain, stakeholders can access relevant, secure, and voluntarily shared data from the vineyard: be it wine consumers, cellar personnel, viticulture advisors, marketing companies, or any other stakeholder in the wine value chain.

The eVine2Wine solution was developed and piloted in cooperation with four real-world organisations from three countries in Europe. With the eVine2Wine solution, a vineyard manager of JoJo's Vineyard at Chiltern Hills Farm (from the UK) is able to share relevant data from the vineyard management software system (eVineyard by ELMIBIT from Slovenia) that he uses with different stakeholders in his wine value chain. Thus he shares one set of vineyard data with his viticulture advisor Vinescapes (from the UK), to advise him on agronomic matters. In contrast, a different set of vineyard data is shared with the award-winning winery Langham Wine (from the UK), to whom he supplies grapes so that the winery can produce better quality wine based on vineyard specifics and seasonal weather data. To differentiate his sustainably produced

wine on the market in the eyes of the end consumer, he also shares a set of vineyard data with the marketing company Digital Stories (from Germany), which helps him display traceability information to the end customers.

How it works

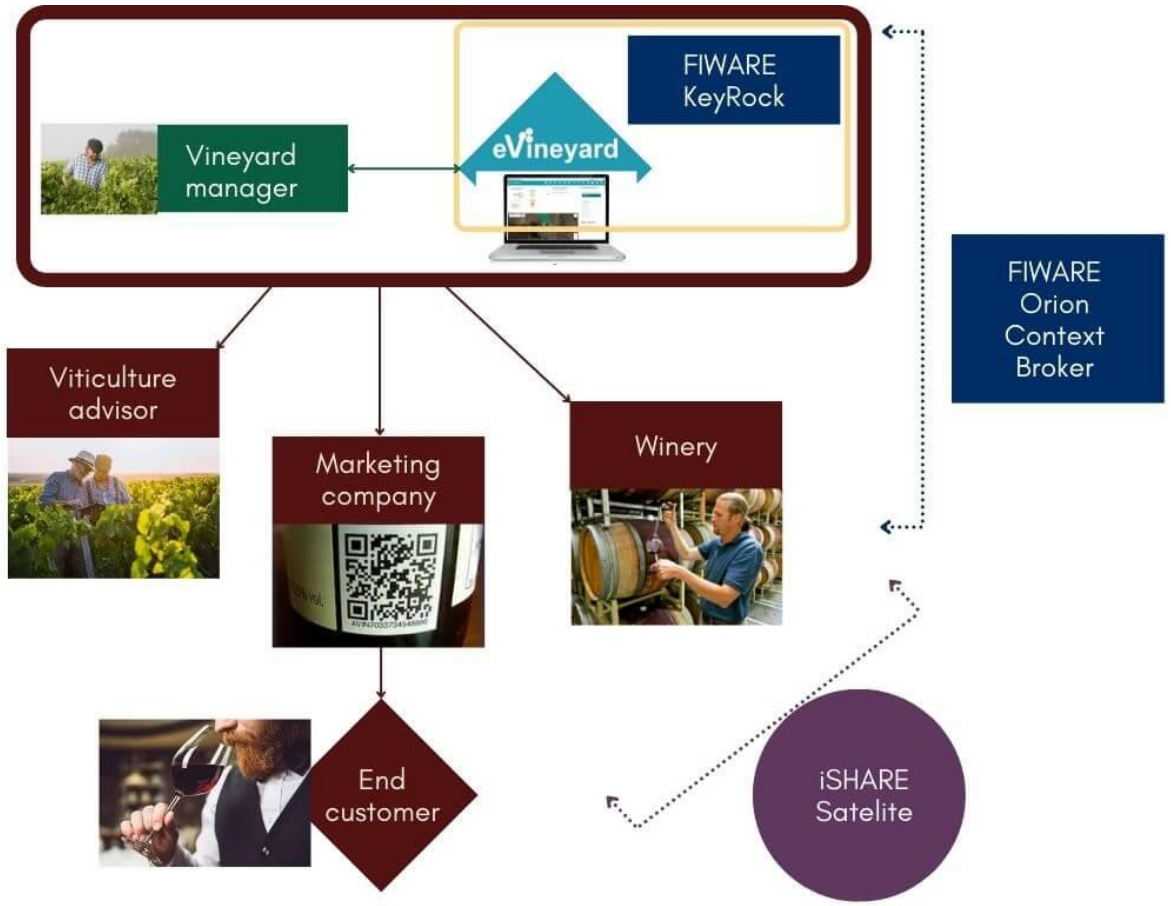
The solution created for data sharing relies on trusted and secure technology and a simple, accessible way to present the information. The eVine2Wine is based on the following pillars:

eVineyard app - a vineyard management software that helps winegrowers gather vineyard data in one place from different IoT devices, satellites, and vineyard management activities on a block level. Those data are then used to alert the winegrowers on any issue, such as disease onset or frost occurrence, and enable the automatic creation of compliance documentation to reduce the winegrower's workload. The winegrower can then share all or only certain sets of vineyard block data collected in the application with the winery, his vineyard consultant, and end consumers. To be able to do it uses the following components:

- **FIWARE KeyRock** - an Identity Provider was set up as a component of eVineyard's cloud services to enable eVineyard users to identify themselves as real eVineyard users and enable them to access other applications in the dataspace with their eVineyard identity.
- **FIWARE Context Broker** - holds the Digital Twin of the vineyard block data, relevant microclimatic data, activities done on the vineyard block, and more, which can be shared with all the stakeholders in the wine value chain.
- **iSHARE framework** - eVine2Wine solution uses the iSHARE Satellite service to store the rules about who can access vineyard block data (Digital Twin) that is stored in FIWARE Context Broker and under which conditions.
- **eVine2Wine WordPress plugin** - a small software application that enables vineyard owners to add vineyard block data to their WordPress website without coding to visually present data to the end consumers and thus enables access to traceability information of wine in a concept from "Vine to Wine."

- **eVine2Wine data sharing module -** within an eVineyard app, an additional module for sharing and visualising vineyard data has been developed. This enables vineyard owners to share a selected set of vineyard data with selected stakeholders (winery, viticulture advisor, and marketing company) and allows stakeholders to see the shared data in an organised and visually appealing way.

The architecture of the solution is presented in the diagram below from both the technical and user-perspective.



eVine2Wine solution diagram

Benefits & Impact

eVineyard, a globally recognized prominent vendor of vineyard management software solutions, provides services to hundreds of winegrowers in more than 20 countries around the world.

By developing the eVine2Wine product, eVineyard improved its vineyard management offer and enabled small grape producers, involved in the complex and fragmented value chain with demanding customers, to:

- share relevant vineyard data with its value chain in a secure way;
- facilitate the improvement of the quality of the wine by enabling wineries and viticulture advisors a better insight in vine growing conditions;
- provide traceability records to the rest of the value chain with multiple goals, most notably increasing the ability to ensure food safety in an easy way;
- build trust between wine value chain stakeholders;
- lower costs by minimising the advisory visits and optimising the link between winegrowers and viticulture advisory;
- and help them enhance the sustainability of the business and increase their customer base.

With more emphasis on transparency and trust, the solution provided by eVineyard enables vineyard owners to share their vineyard data with stakeholders in their wine value chain in an easy and secure way.

All of the capabilities that were developed through involvement in i4Trust are expected to have a positive impact on eVineyard software's interoperability capabilities, indirectly resulting in a new business potential on multiple aspects:

- increase of eVineyard service subscription value through new functionality that was added (expected value increase contribution of 5%);
- establishment of a new offering, resulting from the collaboration of eVineyard and DigitalStories in the project, directly impacting the ability to generate new subscription value (expected value increase contribution of 15% for both partners together);

- establishment of a new module in eVineyard allowing the company to better serve the winegrowing advisory market (expected value increase of 10%).

Besides that, also non-technical involved partners in the consortia see the interest in commercialising the solution, generally facilitating an even greater level of business increase on the level of the complete project consortia.

Added value through i4Trust

i4Trust, which combines FIWARE components and the iSHARE Trust Framework, has helped eVineyard to develop an innovative service for its customer's value chain in the Smart AgriFood sector. It provides tools and support for creating Data Spaces to enable trustworthy and effective data sharing with emphasis on an open and standard way. This resulted in value in multiple aspects, namely:

- Standardisation of data models that are being shared by eVineyard with the rest of the value chain to Smart AgriFood and Smart AgriTech data models, to which we also contributed with incubated data models during the project. Usage of those common data models not only helps us share data in a more standard way but also welcomes more vendors, both competitive and complementary, to the dataspaces that our customers will create. This improves data shareability, as well as enables easier collaboration of multiple parties in a common data space with trust and data sovereignty;
- Definition of vineyard block's Digital Twin and usage of standardised iShare and FIWARE components, protocols and procedures will allow for scalable data spaces and a higher number of data spaces around vineyard data to be deployed, directly increasing the number of ecosystems in which both technical partners will have the ability to participate and offer their services.

Additionally, i4Trust offered several opportunities and networking events to support and improve market offerings and business improvement. In addition, it proved to bebeneficial in terms of pushing our interoperability effort further towards completion.

References

- Goncharuk, Anatoliy. (2017). Wine Value Chains: Challenges and Prospects. Journal of Applied Management and Investments. 6. 11-27.
- Eurostat. Vineyards in the EU - statistics. 2022 (link)
- GS1. 2008. Wine Supply Chain Traceability, GS1 Application Guideline.
- Pomarici, E., Sardone, R. EU wine policy in the framework of the CAP: post-2020 challenges. Agric Econ 8, 17 (2020). https://doi.org/10.1186/s40100-020-00159-z

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Do you have questions or want to know more?

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Founding Partners

FIWARE FOUNDATION

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