



SMART AGRIFOOD

# **eVine2Wine: Sharing vineyard data with the wine value chain**

With the contribution of

**ELMIBIT**

**FIWARE - OPEN APIs FOR OPEN MINDS**

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## Background

Since September 2020, FIWARE has been leading **the successful [i4Trust project around Data Spaces](#)**, which has been receiving funding by the European Commission under the Grant Agreement of 951975. Thanks to the extraordinary collaboration of partners such as iShare and FundingBox, **32 selected solutions on Data Spaces have been awarded and funded**. With the first impacting results available, FIWARE has decided to publish a fine selection of Impact Stories **showcasing FIWARE-based solutions created by awarded and funded consortium of DIHs and SMEs**. This Impact Story gives insights into breaking “data silos” through sharing and re-using data across the wine production value chain “From Vine to Wine” and thus **contributing to the European Data Space strategy**.

## Challenge & Context

Wine traceability is today a desired and much-discussed topic in the industry due to its economic 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<sup>1</sup>. However, the concept of **providing full traceability from vineyard to bottle is still 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

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<sup>1</sup> Pomarci E., Sardone R., EU wine policy in the framework of the CAP: post-2020 challenges, Springer Open, 2020.

effective traceability system, namely, the wine [value chain](#)<sup>2</sup>. It includes many different stakeholders involved in growing, processing, and selling wine to the end consumers. The majority of wine [production actors in Europe](#)<sup>3</sup> are highly fragmented and work as a cooperation of several entities (grower, advisor, winery, marketing company, distributors) to bring the final product, the 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 this multi-actor environment.

With the existing information technology solutions, wine traceability can be implemented to a wider or 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, and finally to sales. Current practice shows that 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 rather gaining ground in larger wineries while we don't see a lot of traceability information about the wine or the bottles from small producers or on wines produced from grapes that were purchased from [smaller growers however being the ones producing a large share of wine in Europe](#)<sup>4</sup>.

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<sup>2</sup> Goncharuk A., Wine Value Chains: Challenges and Prospects, Research Gate, 2017. Stranieri S., Cavaliere A., Banterle A., The determinants of voluntary traceability standards. The case of the wine sector, in Wine Economics and Policy - Elsevier, 2018.

<sup>3</sup> Cafaggi F., Iamicelli P., Inter-firm Networks in the European Wine Industry, European University Institute - Department of Law, 2019.

<sup>4</sup> EUROSTAT, Vineyards in the EU - statistics, 2022.



## Solution

To enable wine traceability of products coming from small wine producers that act in multi-actor wine value chains, an [eVine2Wine solution](#)<sup>5</sup> was developed and piloted within the EU-funded project [i4Trust](#)<sup>6</sup> coordinated by [FIWARE Foundation](#)<sup>7</sup>. Especially in multi-actor value chains, trust is extremely important. For example, guaranteeing trust from grape to glass, **is significant from the perspective of food safety, avoidance of fraud**, or the perspective of **providing terroir information**, which the winery can use to **optimise wine quality** through appropriate winemaking processes, and consequently elevate the value of the final product, the wine. While trust between consumers (e.g. traders) and grape producers are vital, especially if they **follow organic or sustainability values**, it can be increased if **end customers** (individual) can verify the winegrower's claims. Winegrowers can achieve this by increasing transparency and following the concept "the greater transparency, the greater trust."

eVine2Wine enables just that: data sharing in a trusted and controlled way by using Digital Twins of the vineyard areas, with [iSHARE](#) providing the identity and access control mechanisms. Throughout the wine value chain, stakeholders can thus access relevant, secure, and voluntarily shared data from the vineyard. These stakeholders

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<sup>5</sup> eVine2Wine proposes to share vineyards' relevant grape production data with the entire value chain to provide superior product and better customer experience and higher trust.

<sup>6</sup> i4Trust has been building a sustainable ecosystem where companies are able to create innovative services by means of breaking "data silos" through sharing, re-using and trading of data assets. As part of its scope, 32 bottom-up experiments involving at least 150 SMEs and 32 Digital Innovation Hubs are contributing to the digital transformation of industrial value chains across multiple domains, such as Smart Cities, Smart Mobility, Smart Manufacturing, Smart AgriFood, Smart Energy, Smart Water, Smart Health, and Smart Logistics.

<sup>7</sup> FIWARE Foundation is the legal independent body providing shared resources to help achieve the FIWARE mission by promoting, augmenting, protecting, and validating the FIWARE technologies as well as the activities of the FIWARE community, empowering its members including end-users, developers and rest of stakeholders in the entire ecosystem. FIWARE Foundation is open: anybody can join contributing to the transparent governance of FIWARE activities and rising through the ranks based on merit. FIWARE Foundation is a non-profit organization that drives the definition and encourages the adoption of open standards (implemented using Open Source technologies) that ease the development of smart solutions across domains such as Smart Cities, Smart Energy, Smart AgriFood, Smart Industry, or Smart Water, based on FIWARE technology.

can be wine consumers, cellar personnel, viticulture advisors, marketing companies, or any other stakeholder active in the wine value chain.

The eVine2Wine solution **was developed and piloted in cooperation with four operative organisations** from three European countries. One use case with the eVine2Wine solution shows how a vineyard manager of [JoJo's Vineyard at Chiltern Hills Farm \(from the UK\)](#) gets enabled to share relevant data from the vineyard management software **system** ([eVineyard by ELMIBIT from Slovenia](#)) used with different stakeholders in the respective wine value chain. He shares one set of vineyard data **with his viticulture advisor** [Vinescapes \(UK\)](#) to advise him on agronomic matters. In contrast, a different set of vineyard data is shared with **the award-winning winery Langham Wine (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 (e.g., traders, individuals) he also shares a set of vineyard data with the **marketing company** [Digital Stories \(Germany\)](#), which helps him display traceability information to the end customers (e.g., traders, individuals).

## How it works

The solution created for data sharing relies on trusted and secure technology together with a simple, accessible way of how to present the information. Therefore, the eVine2Wine solution 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**. This data can then be 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, the vineyard consultant, or end consumers (e.g, individual). The following components have been used:

- **FIWARE KeyRock<sup>8</sup>**  
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<sup>9</sup>**  
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<sup>10</sup>**  
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;
- **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 consumers and end consumers thus enabling access to traceability information of wine based on the concept "From Vine to Wine";
- **eVine2Wine data sharing module**  
as part of the eVineyard app, this is an additional module for sharing and visualising vineyard data. It enables vineyard owners to share a selected set

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<sup>8</sup> Keyrock is the FIWARE component responsible for Identity Management. Using Keyrock (in conjunction with other security components such as PEP Proxy and Authzforce) enables to add OAuth2-based authentication and authorization security to services and applications.

<sup>9</sup> FIWARE Context Broker allows to manage the entire lifecycle of context information including updates, queries, registrations and subscriptions. It is an NGSIv2 server implementation to manage context information and its availability. Using the Orion Context Broker, one is able to create context elements and manage them through updates and queries. In addition, one can subscribe to context information so when a specific condition occurs (e.g. the context elements have changed) the user receives a notification. These usage scenarios and the FIWARE Context Broker features are described in this documentation.

<sup>10</sup> iSHARE is a trust framework that allows APIs to seamlessly integrate with each other and communicate in a trusted way and only share data when authorized. For developers, it's key to understand the basic principles of iSHARE prior to starting the development of connectors based on FIWARE technology.

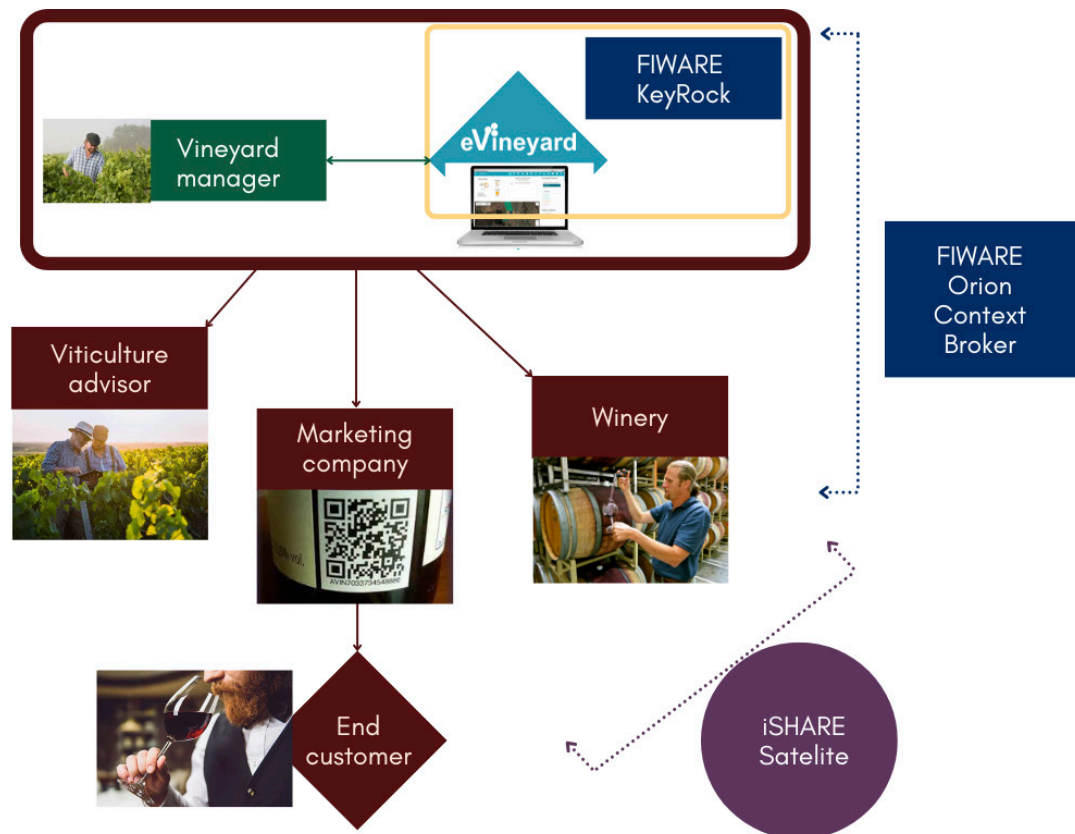


Figure 1 - eVine2Wine solution diagram

of vineyard data with selected stakeholders (winery, viticulture advisor, or 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.

## 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<sup>11</sup>.

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 across their value chain in a secure way;
- facilitate the improvement of the wine quality by giving wineries and viticulture advisors a better insight into wine growing conditions;
- provide traceability records to the rest of the value chain players with multiple goals, above all the increased 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;
- 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 thanks to the support delivered by the i4Trust project are expected to have a positive impact on eVineyard software's interoperability capabilities in return, indirectly resulting in new business potentials:

- increase of eVineyard service subscription value through new functionality that were added (expected value increase contribution of ca. 5%);
- development of a new offering, resulting from the collaboration of eVineyard

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<sup>11</sup> This information is supported by details coming from expositors of "[Future Drinks Expo](#)" and [other stakeholders](#).



and other experiments in the project, directly impacting the ability to generate a new subscription value (expected value increase contribution of ca. 15% for both partners together);

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

Besides that, also partners with a less technical focus and involvement in the consortia have an interest in commercialising the solution, generally facilitating an even greater level of business increase in favour of the overall project consortia.

## Added value through FIWARE

**Already since 2015, FIWARE components have been used to different extents by the eVineyard software team.** By providing Open Source components, as well as by facilitating the creation of an ecosystem of software vendors, a giving access to a scientific and business driven community and common Open Standards and APIs, FIWARE helped Elmibit provide standardised interfaces for data sharing without the need to reinvent the wheel (or propose new standards). This has significantly brought down the time to market and the costs of the vineyard data sharing interface.

Within the i4Trust project, which **combines FIWARE components and the iSHARE Trust Framework, the eVineyard team developed an innovative service for its customers' value chain in the Smart AgriFood sector.** Providing tools and support for the creation of Data Spaces enables a trustworthy and effective data sharing with emphasis on an Open and Standard way, and creates additionally the following values:

- **Standardisation of data models for vineyard-related data** that are being shared by eVineyard with the rest of the **value chain through NGSI-LD interfaces using FIWARE Context Broker to make standard data exchange possible.** Usage of these common data models to not only help share data in a more standard way but to also welcome more vendors, both competitive and complementary to the Data Spaces

that customers create. This improves proper data sharing, as well as enables easier collaboration between multiple parties in a common Data Space and based on trust and data sovereignty.

- **Usage of FIWARE Context Broker component** in combination with iSHARE Data Space enabling technologies as **a standardised approach: allowing eVineyard customers to easily define which data they want to share** with which organisations and/or individuals (companies, employees).
- Definition of the **vineyard block's Digital Twin and usage of standardised iSHARE and FIWARE components, protocols, and procedures**: allowing 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 eVineyard and its technical partners have the ability to participate and offer their services.

## References

- Goncharuk A., Wine Value Chains: Challenges and Prospects. Journal of Applied Management and Investments. p. 6, 11-27, 2017.
- Eurostat. Vineyards in the EU – Statistics. 2022.
- 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).
- Cafaggi F., Iamicelli P., Inter-firm Networks in the European Wine Industry, European University Institute – Department of Law, 2019.
- Stranieri S., Cavaliere A., Banterle A., The determinants of voluntary traceability standards. The case of the wine sector, in Wine Economics and Policy – Elsevier, 2018.

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## Categories

**Domains (s)** Smart AgriTech, Smart AgriFood

**User (s)** Vineyard Manager, Viticulture Advisor, Winery, Company (Wine)

**Key words** Agriculture, AgriFood, AgriTech, Data Sharing, Sustainability, Traceability, Value Chain, Vineyards

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