



DIGITISATION: ECONOMIC AND SOCIAL IMPACTS IN RURAL AREAS

D5.4 KNOWLEDGE INFRASTRUCTURE TECHNOLOGY REPORT

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Executive Summary

Deliverable 5.4 Knowledge infrastructure technology report provides details about the two digital tools designed and developed in WP5 during the DESIRA project.

Two applications have been developed namely:

- “Gnomee” Knowledge Base web application: An online Knowledge Base of Digital Tools relevant to the agricultural, rural and forestry domains and
- Living Lab Modeler web application: a tool that facilitates and organizes the operation of Living Labs offering a digital representation of them.

It details the concept, functionality, architecture, and sustainability plans for both and provides the links required for exploiting them.

This is an accompanying report to the actual operational applications that are deployed together with their user manual to facilitate their exploitation and usage.

1 Introduction

The DESIRA project aims to improve the capacity of society and political bodies to respond to the challenges that digitalisation generates in agriculture, forestry, and rural areas. Towards this goal, it worked on various directions and produced a set of clear messages:

- Technology development can (and should) be steered.
- Sustainable digitalisation needs ad hoc rural focused strategies.
- Digitalisation strategies should be centred around problems.
- Digitalisation strategies should be coordinated with other rural policies.

The DESIRA project organised and operated 20 Living Labs across Europe, representing communities from agricultural, rural and forestry domains. Each Living Lab focused on a focal question and tried to identify solutions by incorporating digital solutions. Living Labs acted as the main instruments for working on identifying and promoting project's main messages.

Two digital applications have been designed and developed in the context of WP5 to support two of the main activities of the project:

- “Gnomee” Knowledge Base web application: An online Knowledge Base of Digital Tools relevant to the agricultural, rural and forestry domains.
<https://www.gnomee.eu>
- Living Lab Modeler web application: a tool that aims to facilitate and organize the operation of Living Labs offering a digital representation of them.
<https://www.livinglabmodeler.eu>

The following sections focus on the above digital applications and provide concrete details about their functionality, architecture, sustainability, and conclusions.

2 Gnomee Knowledge Base

2.1 Concept

Gnomee knowledge base is the main output of T5.3 “Digital Game Changers Knowledge Base Tools Implementation” and is an online inventory of digital solutions relevant to the agricultural, rural and forestry domains and could act as “Digital Game Changers” for these domains. It has been built on top of WP1 activities: the taxonomies developed to represent important fields for these areas and the results of the survey run to collect existing digital solutions for these domains [1].

It offers search and filtering options to easily identify concrete digital solutions, browse functionality to navigate through the complete inventory and a dashboard with interactive visualisations providing details on how the content of the inventory is distributed based on the different taxonomies and classifications.

The application is accessible by any user, while it also offers the option to authenticate a user through external authentication providers and become a member of Gnomee allowing him / her to suggest a new tool to become part of the knowledge base.

2.2 Functionality

Gnomee is an easy-to-use tool, open to any interested user to find digital solutions relevant to the three main domains and classified using a set of taxonomies (metadata) that facilitate their uptake and further exploitation.

The main functionality of Gnomee is summarised below:

- Full text search through the data.
- Filtering support using a set of taxonomies.
- Browse functionality.
- Interactive visualisations on top of the available data and their classification.
- Authentication using external AAI providers.
- Option to suggest new Digital Tools to become part of Gnomee and monitor their acceptance status.

2.3 Target Users

Gnomee can be exploited by researchers working on the field of digitalization in the agricultural and rural areas, innovator facilitators aim to assist farmers and other stakeholders in solving their problems by embedding digital tools in the proposed solutions, farmers and agronomists interested in identifying digital tools ready to be used by them and digital providers willing to identify gaps in these domains and provide a new solution.

2.4 Architecture

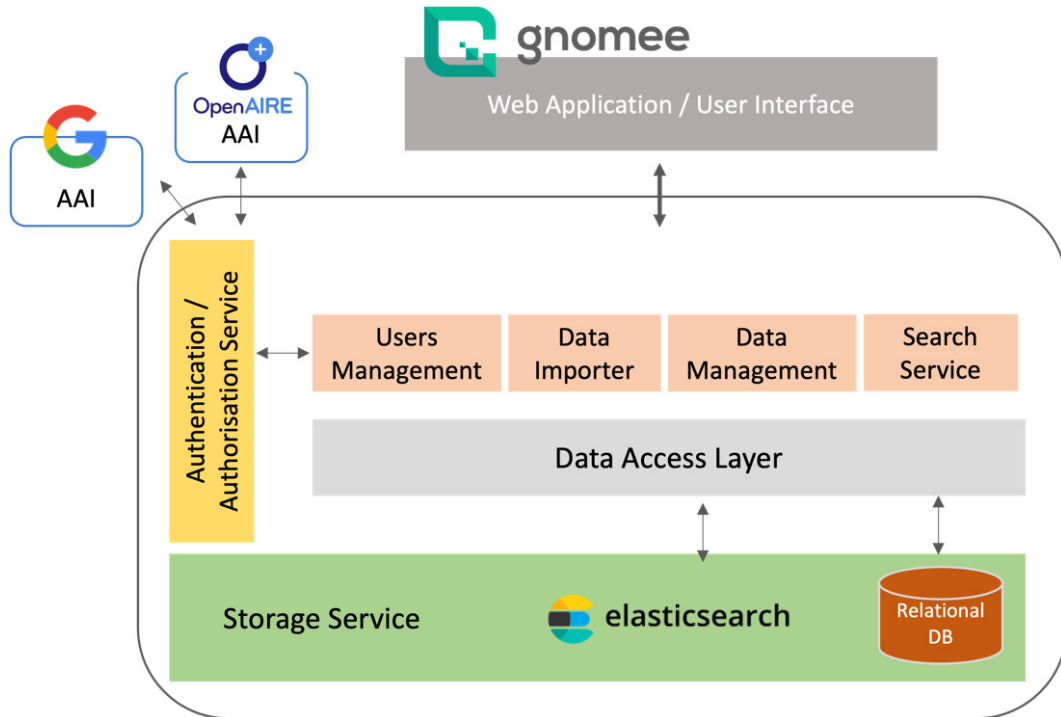
The web application has been designed and developed as a multi-tier application, separating the business logic from the front-end application. Gnomee offers authentication through external providers including Google and OpenAIRE [3]. Using OpenAIRE, users can be authenticated and become members of Gnomee by using their academic institution account, or ORCID, or LinkedIn and Google.

Elastic search [2] is the core component, where the metadata and information for each Digital Tool is stored. By deploying this open-source solution we ensure high search and filtering performance.

The block diagram below highlights the architecture of the system and its main components.

Gnomee will be further disseminated after the end of the project to ensure awareness of its existence and how it can be exploited by the target users. Offering external authentication and the option to allow any user to propose a new Digital Tool, Gnomee aims to ensure that its knowledge base will be continuously updated to include new solutions that are relevant to three main domains.

Fig. 1: Gnomee block diagram.



2.5 Sustainability

Gnomee will be further disseminated after the end of the project to ensure awareness of its existence and how it can be exploited by the target users. Offering external authentication and the option to allow any user to propose a new Digital Tool, Gnomee aims to ensure that its knowledge base will be continuously updated to include new solutions that are relevant to three main domains.

On the other hand, automated mechanisms have been put in place for identifying digital tools that are part of Gnomee but may not be active anymore. Using these mechanisms, we can update the knowledge base to remove obsolete, not valid data and ensure that our users are receiving accurate information.

Finally, ATHENA RC responsible for the design and development of the tool aims to link Gnomee with other concrete communities and create dedicated knowledge bases by exploiting the core mechanisms of Gnomee, while adopting the classifications used to classify the actual data.

Finally, and for increasing its visibility and possible further use, the tool will be onboarded to the EOSC Marketplace, through which it can be made available to interested research communities, individual researchers, and innovators.

2.6 Additional Information

Field	Value
Web address	https://www.gnomee.eu
User Manual	https://drive.google.com/file/d/1pCBHUx2TrQlyOa_rdxDTi8nDS74gMAII/view?usp=share_linka
Demo video	https://www.youtube.com/watch?v=tlxxf7THAMk

3 Living Lab Modeler

3.1 Concept

Living Lab Modeler tool is the main output of the task T5.4 Socio Economic Impact Assessment Tool Implementation and is a tool that facilitates and organizes the operation of participatory processes and more specifically of Living Labs (LL). The organisation and operation of 20 Living Labs across Europe has identified a gap in how a LL can ensure the engagement of its participants, organise its activities and easily disseminate and raise awareness of its outcomes facilitating the adoption of them. DESIRA worked on filling this gap through the design and development of the Living Lab Modeler tool.

It offers a digital representation of a Living Lab, visualises the available information and automatically produces assessments based on the information provided. It thereby facilitates the exchange of information and cooperation between participants, the dissemination of the results of the LL to external bodies, streamlines processes, and supports the coordinators of the LL in their operation facilitating the achievement of its objectives.

3.2 Functionality

Living Lab modeler provides a straightforward way for users to login and create a digital representation of their Living Lab. It guides them through a simple User Interface on providing all the relevant information of their LL and publish it through the application.

It offers the option to make a LL either public and accessible to anyone who visits the application or private and accessible only to authenticated users who are members of this specific LL.

For each Living Lab the following information can be provided and be published:

- General Information, including the name and description of the LL.
- The focal question being discussed in the LL.
- The Domain, sub-domain and application scenario relevant to this LL. These taxonomies have been identified during the DESIRA project focusing on Agriculture, Rural areas and Forestry.
- The Digital Technologies being or planned to be used by this LL.
- The relevant Sustainable Development Goals (SDGs).

- A visualization of the Socio-Cyber-Physical system.
- The activities organized during the LL operation.
- The main outputs and outcomes of the work performed in the LL.

A web view for each available Living Lab is available to the user. In addition, the members of a LL have the option to download the material in a pdf report.

3.3 Target Users

The main users of Living Lab Modeler are on the one hand the facilitators and organisers of Living Labs who aim to create the digital representation of their LL and facilitate their operation. On the other hand, all Living Lab participants can visit the tool and be informed about the activities and plans of the LL they participate. Finally, any user interested on finding out about existing Living Labs and any useful outcome they have produced and further engage with them.

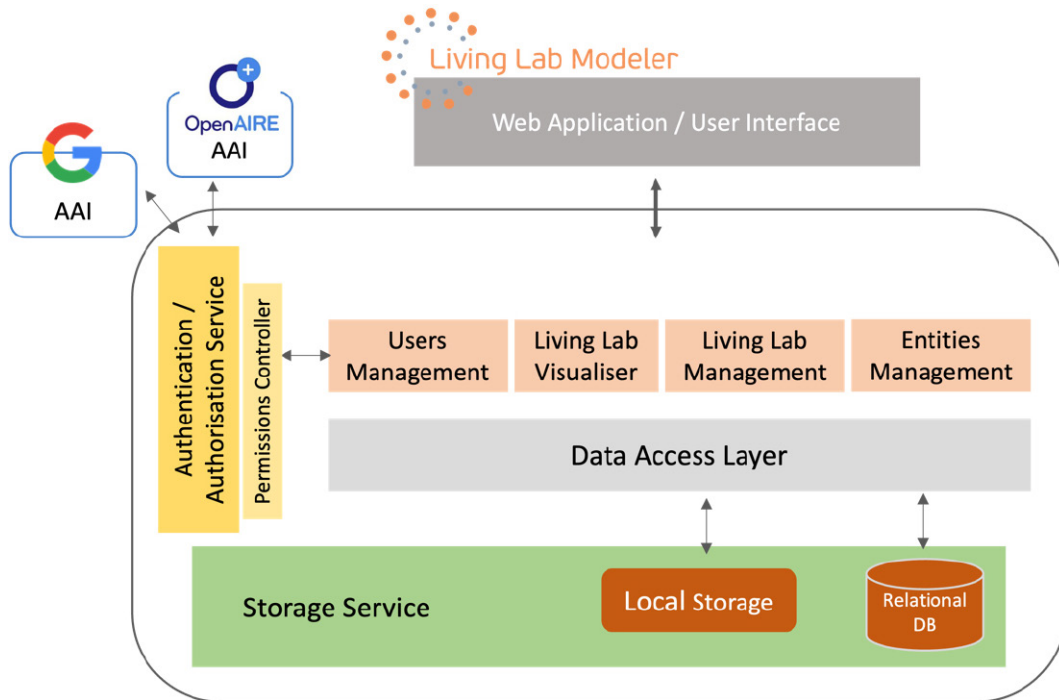
3.4 Architecture

Living Lab Modeler has been designed as a multi-tier application. The back-end services implement the business logic of the application. They are responsible for the creation; management of the LLs and they serve their data to the front-end application for visualising them. A dedicated access - permissions system has been implemented to support a fine-grained authorisation system, where LL are owned by their creators, can be managed by facilitators, and can have multiple members for viewing their information.

In addition, authenticated users can access their own data, but can also request to become members of published Living Labs. To facilitate the authentication process, the application exploited external well known authentication providers including Google and OpenAIRE AAI services.

Living Lab data are isolated from each other, while entities concerning involved stakeholders and Socio-Cyber-Physical entities can be shared among the different LLs only when the application's administrator has approved an entity as shareable.

Fig. 2: Living Lab Modeler block diagram.



3.5 Sustainability

Living Lab Modeler is a tool that can be used by anyone interested in creating a digital representation of his Living Lab to engage its participants while making available to the public its outcomes and work done. Nowadays, LL is a very popular methodology for co-creation and co-development processes and the tool can further facilitate their operation. Currently the tool focuses on thematic LLs from agriculture, rural areas, and forestry but the agile methodology applied for the development and deployment of the tool, allows it to support Living Labs from various domains and to extend its usage and exploitation ensuring its sustainability over the years.

In addition, at the time this deliverable is submitted the ATHENA RC team has submitted a proposal to organise a workshop at the OpenLivingLabsDays 2023 [4] event organised by the European Network of Living Labs (ENOLL) to present the tool to Living Lab professionals, facilitators, changemakers and stakeholders and further expand its adoption, while exchanging ideas for future developments.

Finally, and for increasing its visibility and possible further use, the tool will be onboarded to the EOSC Marketplace, through which it can be made available to interested research communities, projects that operate Living Labs, and innovators.

3.6 Additional Information

Field	Value
Web address	https://www.livinglabmodeler.eu
User Manual	https://drive.google.com/file/d/1ag95Zp3Itxy0c9vwB0XB5lcAyP3x9RiA/view
Demo video	https://www.youtube.com/watch?v=neLgwqRpnTU

4 Conclusions

The two developed applications aimed to fill the gap in two different categories the DESIRA project dealt with. In both applications, we applied the RRI principles for developing them, working to initially identifying the gap (what is missing), mapping the target users and discussing with them (either through surveys or directly through the 20 Living Labs) and finally co-designing the 2 solutions towards on filling this gap and by targeting a wider exploitation of each tool.

ATHENA RC as the owner of these tools aims to further enhance and develop them, ensuring their sustainability as described above in the dedicated sections and enlarge the users' base.

5 References

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