



Virtual Lab Integration

Deliverable D6.6

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BESTMAP

**Behavioural, Ecological and Socio-economic Tools for Modelling
Agricultural Policy**



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Preface

The outcomes of BESTMAP, including the results of biophysical models, agent-based models at local scales, and upscaling at the European level, are consolidated within the dashboard.

Dashboards for data visualization and decision-making serve as indispensable information management tools that visually present, analyze, and provide metrics of data, enhancing decision-making processes and understanding.

Dashboards offer critical reporting of spatialized data and associated metrics, playing a vital role in displaying model results, guiding decisions, and facilitating navigation through complex landscapes.

To achieve maximum dissemination, BESTMAP aims to promote the dashboard by integrating it into other environments, such as LifeWatch ERIC. The dashboard architecture has been designed to facilitate this sharing seamlessly.

Summary

This deliverable provides a comprehensive overview of the dashboard's architecture, detailing how it can be seamlessly integrated into diverse environments. The procedure outlined here encompasses the steps involved in incorporating the dashboard into the LifeWatch ERIC catalogue, thereby extending its reach and accessibility to a broader audience.

1. BESTMAP Dashboard architecture

As explained in Deliverable 2.3 (Dashboard prototype) BESTMAP dashboard was designed by the consortium members and subsequently co-designed with end-users (stakeholders and decision makers). The codesign development of the dashboard has been focused on functional requirements that have been transformed into functional characteristics. As a remarkable feature, the dashboard is not designed as a presentation of statistical numbers and graphs, but it is map-oriented, allowing easy interaction and comparison of policy alternatives by visualising geospatial distributions of the positive and negative impacts on each case study at a glance. The dashboard is available at <https://www.ogc.grumets.cat/bestmap/>.

The data architecture that includes the project dashboard is composed of 4 components (Figure 1). First, the GeoNetwork provides a Metadata Catalogue and also stores the data. Models run in a virtual environment using GeoNetwork data as inputs and its output results are data sources for the GeoServer (WMS / WFS). All possible scenarios are precomputed as possible results. Complex indicators are also precomputed and stored in the GeoNetwork. The GeoServer provides responses to the dashboard queries that are presented to the users as graphical or numerical values. Simple indicators such as statistical summaries are computed directly on the dashboard.

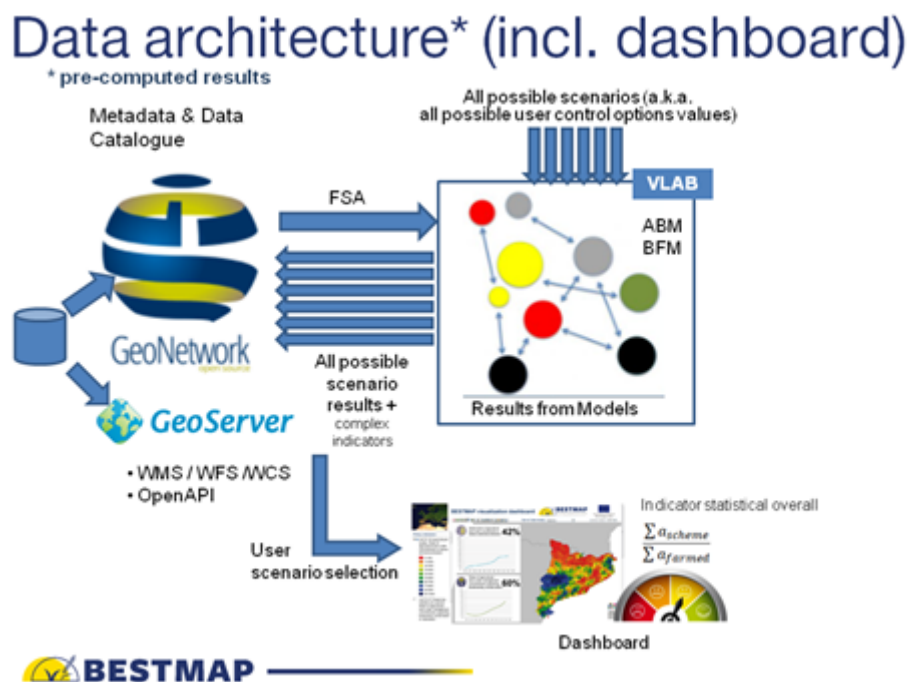


Figure 1: Data architecture including dashboard

The dashboard is based on HTML5 and JavaScript, and also uses web standards that allow for a distributed processing platform and OGC, W3C and ISO TC211 standards as data visualisation and access protocols. The JavaScript client is able to combine AJAX, binary arrays and the WMS/WMTS protocol. The JavaScript code interprets a config.json file that configures all aspects of the browser in a declarative way, including distribution of the elements in the screen as well as the list of data layers and services shown. These services can be queried from other platforms, such as LifeWatch ERIC.

2. LifeWatch-ERIC Virtual Lab and Catalogue

LifeWatch ERIC (European Research Infrastructure Consortium) is a European infrastructure initiative that aims to integrate biodiversity data and provide researchers with access to a wide range of biological and ecological information. Within LifeWatch ERIC infrastructure, there are two different ways of tool integration: the Virtual Lab and the Catalogue. Both serve distinct but complementary purposes within the LifeWatch ERIC infrastructure.

The LifeWatch ERIC Virtual Laboratory (Virtual Lab) is an online platform and collaborative environment designed to facilitate biodiversity and ecosystem research within the LifeWatch ERIC network. It serves as a digital workspace where researchers can access a suite of tools, datasets, and analytical resources to conduct scientific investigations and analyses related to biodiversity, ecology, and environmental science.

The LifeWatch ERIC Catalogue refers to a centralized repository or database that houses various resources, tools, datasets, and services offered by the LifeWatch ERIC infrastructure.

The LifeWatch ERIC Catalogue serves as a comprehensive inventory of available resources within the LifeWatch network, including data repositories, analytical tools, modeling frameworks, and other scientific services related to biodiversity research and environmental monitoring. Researchers can access the Catalogue to discover, browse, and utilize these resources for their research projects.

The Catalogue plays a crucial role in promoting collaboration and facilitating access to biodiversity data and research tools across Europe and beyond. It provides a centralized platform for researchers to find and access the resources they need to address complex scientific questions and challenges in biodiversity conservation, ecosystem management, and environmental sustainability.

Overall, the LifeWatch ERIC Catalogue is an essential component of the LifeWatch infrastructure, supporting the integration, dissemination, and utilization of biodiversity data and research resources to advance scientific understanding and decision-making in the field of biodiversity and ecosystem research. Complementary, the Virtual Lab offers a digital workspace to execute tools.

3. BESTMAP dashboard into LifeWatch-ERIC

Building upon the implemented policy dashboard, BESTMAP has collaborated with LifeWatch ERIC to incorporate the dashboard into their catalogue and pilot it within the Virtual Lab. In September 2023, BESTMAP initiated discussions with LifeWatch ERIC's ICT e-Infrastructure Technical Offices in Spain to outline the integration process.

Initial discussions focused on presenting the architecture of the BESTMAP dashboard to LW-ERIC IT for evaluation regarding its potential integration within their environment. Subsequently, LW-ERIC proposed the inclusion of the dashboard in their metadata catalogue. To facilitate this integration, various pieces of information were exchanged between BESTMAP and LW-ERIC. The metadata fields shared include:

METADATA FIELD	DESCRIPTION	TYPE	MULTIPLICITY	REQUIRED
Basic information				
Title	The title of the service.	String	1	Mandatory
Date	The date in which the service has been created/published/revised, which is available in the following formats: date and time, year and month, year.	Date	Multiple	Mandatory
Abstract	The brief description of the service.	String	1	Mandatory
Status	The status of the service defined among the following options: Completed, Historical archive, Obsolete, Ongoing, Planned, Required or Under development.	List of controlled values	1	Mandatory
Version	The current and last version of the service.	String	1	Mandatory
Keywords	The keyword(s) describing the service, very important for discoverability purposes. Each keyword field should contain one and only one keyword and the use of singular form is recommended.	String	Multiple	Mandatory
Constraint information				
Access constraints	The access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the service (possible values: Copyright, Intellectual property rights, License, Other restrictions, Patent, Pending patent, Restricted, Trademark).	List of controlled values	1	Mandatory
Use limitation	The limitation affecting the use of the service. It is recommended to provide a link to a license type (e.g., http://creativecommons.org/licenses/by/4.0), a website or a document containing the necessary information.	String	1	Mandatory
Other constraints	Other restrictions and legal prerequisites for accessing and using the service.	String	1	Mandatory
Contact information				
Organization name	The organisation's name of the contact person (i.e., the affiliation).	String	1	Mandatory
Individual name	The full name of the contact person (name and surname).	String	1	Mandatory

Electronic mail address	The email address of the contact person.	String	1	Mandatory
Role	The role of the contact person defined among the following options: Associated party, Author, Creator, Custodian, Distributor, Owner, Point of Contact, Principal Investigator, Processor, Publisher, Resource Provider, User (here the definition of the different roles: https://geonetwork-opensource.org/manuals/3.10.x/en/annexes/standards/iso19139.html#role-code).	List of controlled values	1	Mandatory
Distribution information				
Protocol	The connection protocol to be used (e.g., DOI, Web address (URL), File for download, etc.).	String	1	Mandatory
Linkage	The location for online access (i.e., the URL).	URL	1	Mandatory
Name	The title of the online resource (e.g., DOI, Download page, etc.).	String	1	Mandatory
Operation information				
Operation name	The title of the operation contained in the service.	String	1	Mandatory
Web site	The link to the website of the operation.	URL	1	Optional
Description	The short description of the operation.	String	1	Mandatory
Function	The main purpose of the operation.	String	1	Mandatory
Classification information				
Related services	The service(s) associated to the service.	String	Multiple	Optional
Required services	The service(s) required to run the service.	String	Multiple	Optional
Topic category	The high-level classification scheme to assist in the grouping and topic-based search of available services. A correct categorisation is very important to help users to search and find the resources they are looking for. Options are provided with a codelist (https://inspire-geoportal.ec.europa.eu/theme_selection.html?view=qsTheme).	List of controlled values	Multiple	Mandatory
Service category	The category(ies) of the service. A correct categorisation is very important to help users to search and find the resources they are looking for.	String	Multiple	Mandatory
Service language	The main language of the service.	List of controlled values	1	Mandatory
Other languages	The potential other languages of the service.	List of controlled values	Multiple	Optional
Service TRL	The Technology Readiness Level of the service from 1 (Basic principles observed) to 9 (Actual system proven in operational environment).	List of controlled values	1	Mandatory
Service Level Agreement	The SLA associated to the service.	String	1	Optional
Other information				
Service Funding	The potential funding source of the service.	String	1	Optional
Service Price	The price of the service (if it is not free).	String	1	Optional
Service Order	The email address or the web page to the Order of the service.	String	1	Optional
Service Helpdesk	The reference to the Help Desk of the service (URL or email address).	String	1	Optional
Service Training	The link(s) of the available resources related to the service for training purposes.	String	Multiple	Optional
Service User Manual	The link to the user manual of the service.	String	1	Optional

As a result of this collaboration, the BESTMAP dashboard is now part of the LifeWatch ERIC Metadata Catalogue (Figure 2 and Figure 3).

The link to the item is the following:

<https://metadatalogue.lifewatch.eu/srv/eng/catalog.search#/metadata/2f9acdbc-11fd-48d1-8f9e-9ec6140ef5fe>

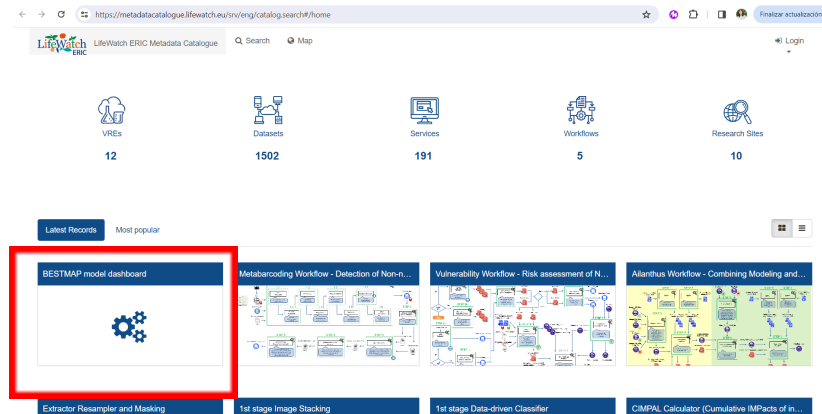


Figure 2. BESTMAP is listed in the metadata catalogue

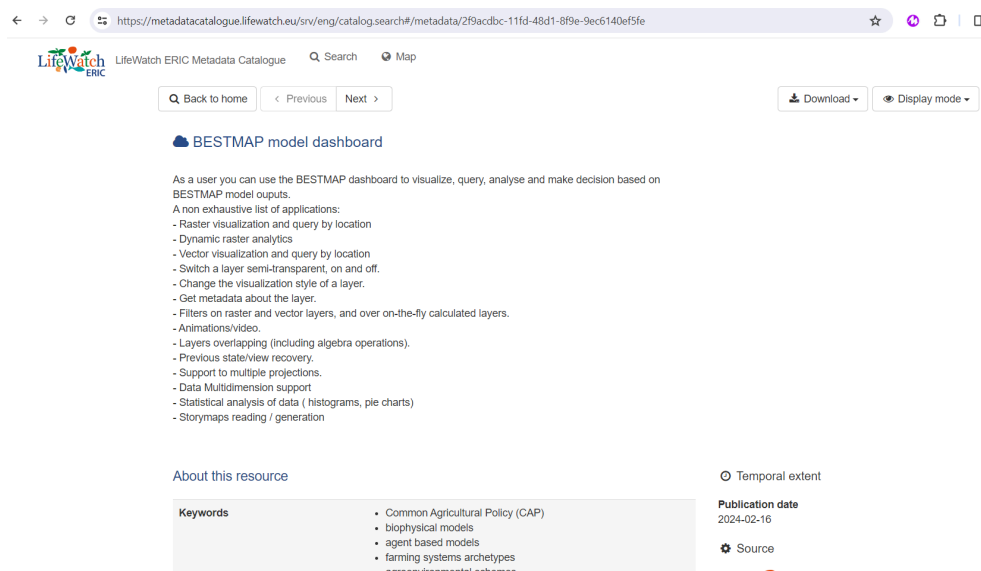


Figure 3. Details of the metadata included for the dashboard.

Subsequently, the integration of the dashboard as a new service for the VirtualLab was discussed.

The integration of a new service into LW ERIC VL involves several steps to ensure seamless compatibility with the existing infrastructure. It's essential to align the service with the technical specifications, standards, and requirements of the Virtual Lab. Configuration setup, functionality verification, and post-deployment performance monitoring are also crucial aspects of the integration process

LifeWatch ERIC has shown a keen interest in integrating the project's models into the Virtual Lab, along with the analytical functionalities of the dashboard. However, this undertaking demanded significant effort from LifeWatch ERIC, raising concerns about its feasibility by the project's end in February 2024.

For now, the integration of the dashboard into the Virtual Lab is still under discussion between BESTMAP and LifeWatch ERIC.