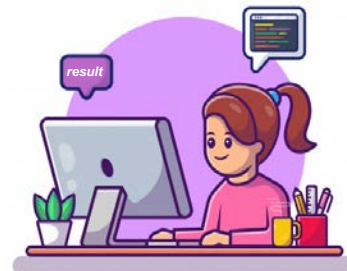


Towards new user-friendly interfaces

The importance of user-friendly interfaces

- Having a user-friendly interface is important to give users the best user experience. If they enjoy using the specific application, they will keep coming back
- For scientists of our community, it is very important to make their work easier, make results clear and show them what happens when they take specific actions



- With the final aim to ***speak a common language*** in our heterogenous, multidomain and multidisciplinary community and in order to help ***translating research questions into ICT requirements***, a template standard for modelling the different IJI validation cases has been designed and developed

Translating research questions into ICT requirements

LifeWatch ERIC workflow standard guidelines

1

WORKFLOW TITLE

Each workflow must have a well-explicative title that summarizes its main objective.



2

COLLABORATORS

Each workflow must specify the list of collaborators with the corresponding affiliation.



3

SCIENTIFIC QUESTIONS TO BE ANSWERED

Each workflow must specify the list the scientific questions that have to be answered.



4

SUMMARY

Each workflow must specify a summary list of inputs, adopted tools and expected outputs.



5

WORKFLOW DRAWING

For notation homogeneity, each workflow must use only the symbols provided in this guideline.



6




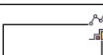
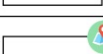
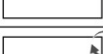
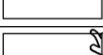

GLOSSARY




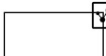
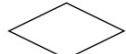



If needed, at the end of the workflow can be useful to provide a glossary of the used terminology.























Translating research questions into ICT requirements

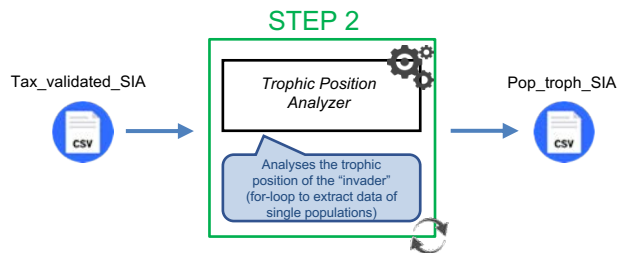
Workflow drawing

SYMBOL	SYMBOL TYPE	DESCRIPTION	EXAMPLE
1. Implemented task		A rectangle represents a process step like a basic task or an action.	Converter
2. Not yet implemented task		A dotted rectangle represents a process step like a basic task or an action that has not yet been implemented.	
3. Web service		A self-contained, modular, distributed application that allows different applications to talk each other and share data and services.	
4. Graph visualization task		A step that allows displaying information or more graphs.	
5. Map visualization task		A step that allows displaying information on a map.	
6. Cyclic task		A task that is performed in a cyclic manner to be useful to specify the criteria.	
7. Manual task		A task where a user is prompted to provide information manually.	
8. Timing task		A task that is performed in a timely manner to be useful to specify the criteria.	

SYMBOL	SYMBOL TYPE	DESCRIPTION	EXAMPLE
9. Purposely-developed algorithm		A rectangle with a wrench represents an algorithm that has been designed and developed for the specific purpose.	Relabeling
10. Literature-based algorithm		A rectangle with a paper and pencil represents a well-known literature-based algorithm.	SVM Classifier
11. Customized literature-based algorithm			
12. HPC task			
13. Decision			
14. Sequence flow			
15. Comment		comment	
16. Description of the aim			

SYMBOL	SYMBOL TYPE	DESCRIPTION	EXAMPLE
17. Input / Output data with a specific format	   	The icon with the specific format indicates the type of input / output data.	   
18. Input / Output data with a different format	 	The general icon for a document (or a group of documents) whose format is not listed before. <i>Please, specify the format.</i>	 
19. Open data		When the input data is open, this icon should be placed along with the input file icon with the specific format. <i>Please, provide reference.</i>	 (http://www.website.eu)
20. Private data		When the input data is private, this icon should be placed along with the input file icon with the specific format.	
21. Database		A list of information with a standard structure that allows for searching and sorting. It can be open or private.	
22. Input as output of another workflow		When the input of a task is the output of another workflow, this icon should be placed on the left of the input file icon with the specific format.	 → Task X Objective Task X

Translating research questions into ICT requirements



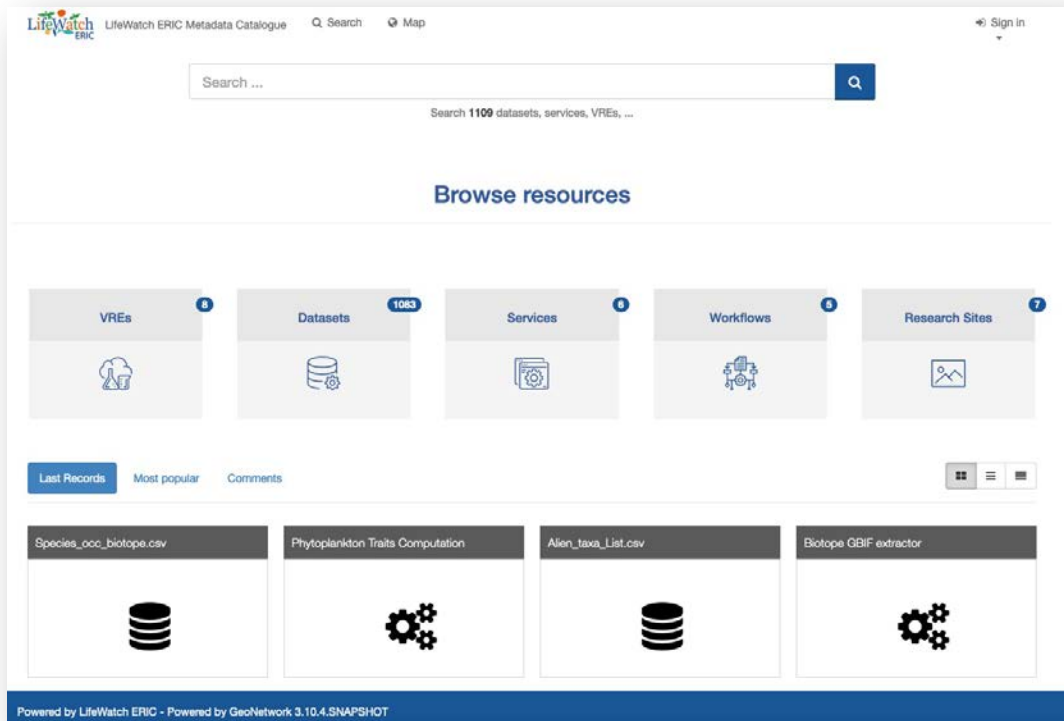
Workflow drawing
Example

- Step 2 of the Crustaceans validation case
- We have a web service, ***Trophic Position Analyzer***, that analyses the trophic position of the “invader” by using a Bayesian model to estimate the NA values of the trophic position that corresponds to the column 13 “TP” of the ""Tax_validated_SIA.csv"" file by means of a loop that allows extracting data of single populations.
- The service requires a specific input (Tax_validated_SIA.csv) and produces a given output (Pop_troph_SIA.csv)

Translating research questions into ICT requirements

- For each validation case we had **several meetings** with researchers and ICT staff to finely tune the diagrams including all the services with all required inputs and output files
- Naming homogeneity and **consolidation**: high relevant and crucial task
- Once defined the ingredients of each workflow → metadatation process for every single resource (workflows/services/datasets) by adopting the **LifeWatch ERIC metadata schemas**

LifeWatch ERIC Metadata Catalogue



LifeWatch ERIC Metadata Catalogue

- The LifeWatch ERIC Metadata Catalogue is a standard-based information management system based on GeoNetwork 3.10, designed and implemented to enable access to several resources from a variety of providers through descriptive metadata, enhancing and promoting the information exchange and sharing among organisations and research infrastructures
- The catalogue allows to manage descriptive metadata related to **datasets** (EML 2.2.0 standard), **research sites**, **services**, **Virtual Research Environments**, and **workflows** (ISO 19139 standard). Metadata attributes can be optional/mandatory and can require single/multiple values
- The catalogue allows (upon validation and verification) the creation of Digital Object Identifiers (DOIs) for resources that do not have it, by exploiting the GeoNetwork – DataCite connection.



LifeWatch ERIC Metadata Catalogue

Dataset Profile

Basic Information

Contact Information

License Information

Geographic Information

Temporal Information

Taxonomic Information

Technical Information

Data Table Information

Virtual Research Environment Profile

Basic Information

Constraint Information

Contact Information

Distribution Information

Service-related Information

Other Information

Service Profile

Basic Information

Constraint Information

Contact Information

Distribution Information

Operations Information

Classification Information

Other Information

Workflow Profile

Basic Information

Constraint Information

Contact Information

Distribution Information

Service-related Information

Other Information

Research Site Profile

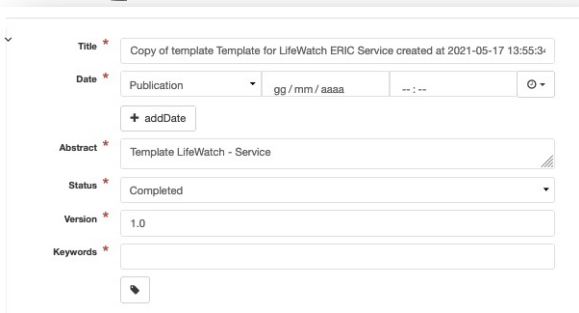
Basic Information

Contact Information

Technical Information



LifeWatch ERIC Metadata Catalogue



Title * Copy of template Template for LifeWatch ERIC Service created at 2021-05-17 13:55:30

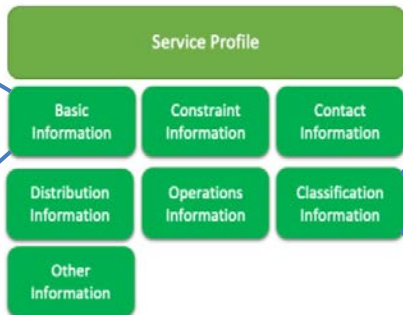
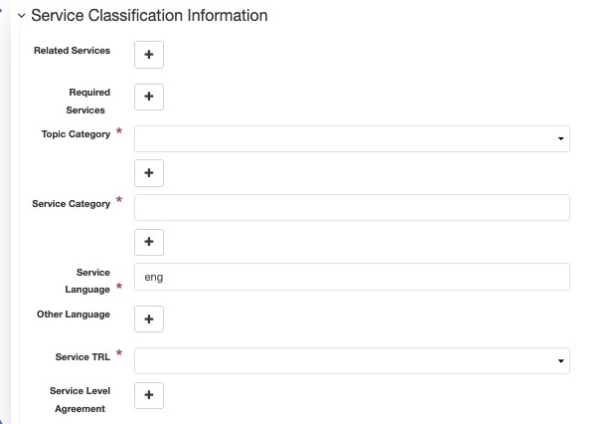
Date * Publication gg / mm / aaaa -- : --

Abstract * Template LifeWatch - Service

Status * Completed

Version * 1.0

Keywords *

Service Classification Information

Related Services +

Required Services +

Topic Category *

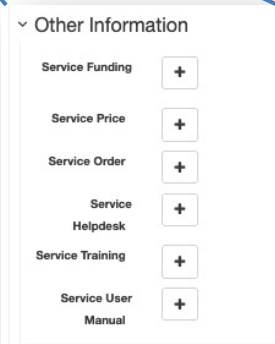
Service Category *

Service Language * eng

Other Language +

Service TRL *

Service Level Agreement +



Other Information

Service Funding +

Service Price +

Service Order +

Service Helpdesk +

Service Training +

Service User Manual +

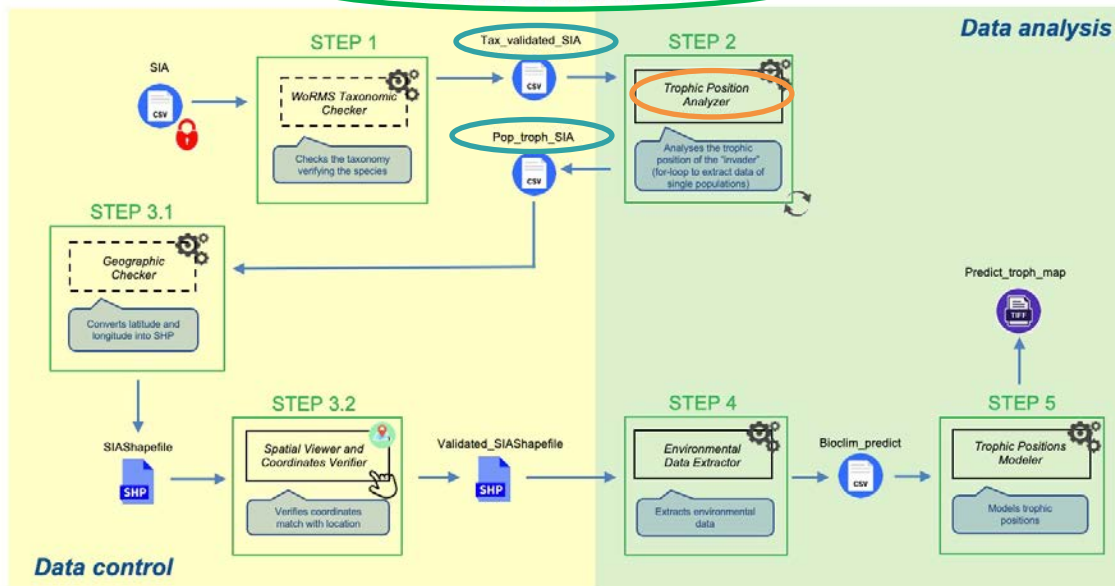
User-friendly interface.

Users are guided in the input process by means of:

- **tooltips** for the description of the specific field
- **drop down lists** with the appropriate values of the specific field
- multiplicity for multi-value attributes
- **markers** for optional / mandatory metadata (+ symbol or red asterisks)

LifeWatch ERIC Metadata Catalogue

Crustaceans Validation Case



Example

Step 2 of the Crustaceans validation case

We have three kind of resources:

- the workflow
- the service
- the two (input/output) datasets

LifeWatch ERIC Metadata Catalogue

Crustaceans Workflow - Functional biogeography of invaders: the case of two widely distributed omnivorous crustaceans

Biological invasions are to date acknowledged as significant environmental and economic threats, yet the identification of key ecological traits determining species invasiveness has remained elusive. One unappreciated source of variation concerns dietary flexibility and the ability to shift trophic position within invaded food webs. Trophic plasticity may greatly influence invasion success as it regulates resource availability as a functional constraint for introduced individuals; in addition, the impact of an invader might increase with its dietary plasticity since a greater proportion of the resident assemblage of species and multiple trophic levels are affected.

The validation case will focus on two invasive crustaceans widely distributed in marine and freshwater European waters, i.e., the Atlantic blue crab *Callinectes sapidus* and the Louisiana crayfish *Procambarus clarkii*. Key questions that will be addressed are:

- Does the trophic position of *C. sapidus* vary between invaded Mediterranean and native west Atlantic habitats, testifying the occurrence of significant post-invasion shifts in dietary habits?
- Does the trophic position of *P. clarkii* vary in invaded habitats, and which are the main ecological factors involved?
- Do bioclimatic drivers influence broad-scale spatial patterns of variation in the trophic position of *C. sapidus* and *P. clarkii*?



workflow

About this resource

Status	Under development / Pre operational
Version	1.0
Info page	https://www.lifewatch.eu/j/4-callinectes-sapidus

Contain Services

• Service 1

Name	Crustaceans WoRMS Taxonomic Checker
Description	A service that aims at verifying the species names (performing the taxonomy check) by using the input file SIA.csv. It represents the Step 1.
Reference	https://metadatalcatalogue.lifewatch.eu/en/catalog/search#?metadata=2c4fb61a-38ad-4ac7-4710-ef0d9c2b381e

• Service 2

Name	Trophic Position Analyzer
Description	A service that aims at analyzing the trophic position of the "invader" by using a Bayesian model to estimate the NA values of the trophic position that corresponds to the column 13 "TP" of the "Tax_validated_SIA.csv" file by means of a loop that allows extracting data of single populations. It represents the Step 2.
Reference	https://metadatalcatalogue.lifewatch.eu/en/catalog/search#?metadata=3fa5a24b-5912-48af-8244-bd001d77541

• Service 3

Trophic Position Analyzer

service

A service that aims at analyzing the trophic position of the "invader" by using a Bayesian model to estimate the NA values of the trophic position that corresponds to the column 13 "TP" of the "Tax_validated_SIA.csv" file by means of a loop that allows extracting data of single populations. It represents the Step 2 of the Crustaceans Workflow within the Internal Joint Initiative.

About this resource

Keywords	<ul style="list-style-type: none"> functional trait alien invasive species native species trophic position Crustaceans lar
Status	Under development / Pre operational
Version	1.0

Contain Operations

• Operation 1

Name	Tax_validated_SIA.csv
Website	http://metadatalcatalogue.lifewatch.eu/en/catalog/search#?metadata=460f37ac-4c92-433f-a213-b50553cae4f5
Description	It is an intermediate file of the Crustaceans workflow that contains the validated SIA file by identifying the native and invasive species.
Function	Input file

• Operation 2

Name	Step_troph_SIA.csv
Website	http://metadatalcatalogue.lifewatch.eu/en/catalog/search#?metadata=7677a318-6419-4838-526d-c15e0b6b1911
Description	It is an intermediate file of the Crustaceans workflow that contains the trophic position of the invader identified in Step 1 (Crustaceans WoRMS Taxonomic Checker) of the Workflow.
Function	Output file

Service Classification Information

Topic Categories	
Service Categories	Service Category: data analysis
Service TRL	TRL 4 – Technology validated in lab
Other Information	
Service Helpdesk	https://www.lifewatch.eu/help-desk

Tax_validated_SIA.csv

dataset

About this resource	Language: English				
Alternative Identifier	460f37ac-4c92-433f-a213-b50553cae4f5				
Creator	<ul style="list-style-type: none"> Creator 1 				
Organization Name	University of Salento				
Individual Name	<table border="1"> <tr> <th>First Name</th><th>Surname</th></tr> <tr> <td>Diego</td><td>Manfredi</td></tr> </table>	First Name	Surname	Diego	Manfredi
First Name	Surname				
Diego	Manfredi				
Position Name	Researcher				
Electronic Mail Address	diego.manfredi@unisalento.it				
Online URL	https://www.unisalento.it/people/diego-manfredi				
Metadata Provider	<ul style="list-style-type: none"> Metadata Provider 1 				
Organization Name	University of Salento				
Individual Name	<table border="1"> <tr> <th>First Name</th><th>Surname</th></tr> <tr> <td>Diego</td><td>Manfredi</td></tr> </table>	First Name	Surname	Diego	Manfredi
First Name	Surname				
Diego	Manfredi				

Step_troph_SIA.csv

dataset

About this resource	Language: English				
Alternative Identifier	7677a318-6419-4838-526d-c15e0b6b1911				
Creator	<ul style="list-style-type: none"> Creator 1 				
Organization Name	University of Salento				
Individual Name	<table border="1"> <tr> <th>First Name</th><th>Surname</th></tr> <tr> <td>Diego</td><td>Manfredi</td></tr> </table>	First Name	Surname	Diego	Manfredi
First Name	Surname				
Diego	Manfredi				
Position Name	Researcher				
Electronic Mail Address	diego.manfredi@unisalento.it				
Online URL	https://www.unisalento.it/people/diego-manfredi				
Metadata Provider	<ul style="list-style-type: none"> Metadata Provider 1 				
Organization Name	University of Salento				
Individual Name	<table border="1"> <tr> <th>First Name</th><th>Surname</th></tr> <tr> <td>Diego</td><td>Manfredi</td></tr> </table>	First Name	Surname	Diego	Manfredi
First Name	Surname				
Diego	Manfredi				

Link to access the dataset

Next steps

- The next deployment of the **Tesseract** user interface will include the *integration with the LifeWatch ERIC Metadata Catalogue*



— LifeWatch ERIC —
Tesseract

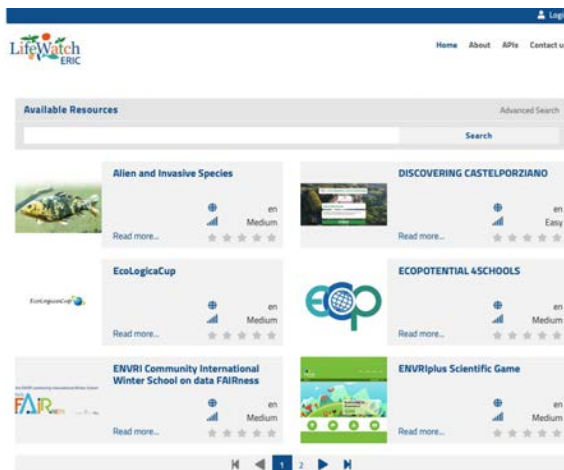


Metadata Catalogue

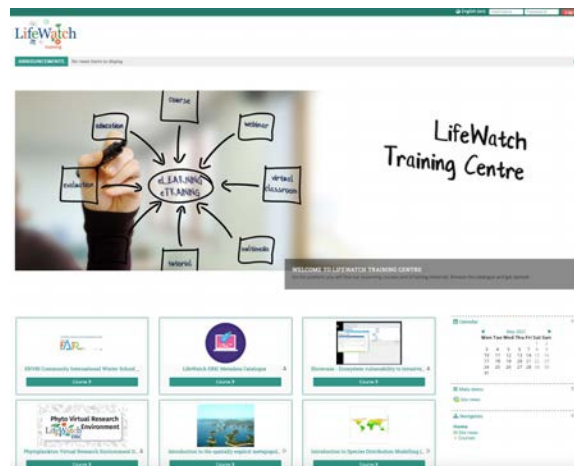
- This means that **Tesseract** will automatically include all the abstracts/descriptions for every single component of the workflows and will be possible to select “ingredients” directly from the Catalogue

Next steps

- **Step-by-step tutorial** describing in detail each step of each workflow and aimed at easing the communication between scientists and the ICT team.
- In the short/medium term it will be converted in a **training kit for use and knowledge** explaining how to use each tool, which kinds of files are needed, and what is needed to know in advance (e.g., assumptions, limiting factors, etc.) → **Training Catalogue** and **Training Platform**



<https://trainingcatalogue.lifewatch.eu>



<http://training.lifewatch.eu>

Thank you

Lucia Vaira | LifeWatch ERIC Service Centre | lucia.vaira@lifewatch.eu