

Interoperability

Metadata & Ontologies

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Metrics



Earth and environmental sciences



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Improving ecological (meta)data FAIRness through semantic services: integration of EcoPortal in LifeWatch Italy new platforms

Overview

LifeWatch Italia is a distributed hub for LifeWatch's ERIC infrastructure and contributes significantly to ERIC functionality. LW Italia enhances **data sharing, integration, and analysis through its data portal and metadata catalog**. Recent efforts, to improve FAIRness, include the integration of EcoPortal, a semantic artifact catalog, with the Data Portal and Metadata Catalog. **EcoPortal supports the scientific community in managing semantic artifacts in ecology using the Ontology FAIRness Evaluator (O'FAIRe) tool for FAIRness assessment**. Challenges include improving the annotation of metadata with FAIR semantic artifacts. Expected impacts of integration between EcoPortal and the new data portal and metadata catalog include easier discovery of ecological data, annotation, machine-usable metadata, and a push toward Linked Open Data.

Context and objectives

LW ITA provides **the Data Portal and Metadata Catalogue**, both of which are under evaluation. The Data Portal is a data repository, based on DSpace, that provides FAIR data and metadata. It helps scientists share their own (meta)data and reuse the data of others. **The data schema is based on the Darwin Core standard and controlled vocabularies**. The schema associated with each dataset is the LifeWatch profile of the Ecological Metadata Language.

The metadata catalog is an information management system based on GeoNetwork 4.2.2, designed to provide access to diverse resources from a variety of providers through descriptive metadata, promoting information exchange among organizations and researchers. The catalog acts on the basis of two main standards: the ISO 19139 (VRE, services, workflows and research sites) and the EML 2.2.0 (datasets).

Metadata is organized into sections that reflect the core information of each specific resource. Each section contains optional and mandatory metadata elements. One of the goals of the latest implementation was to provide a new version of the data portal and metadata catalog and to integrate both with EcoPortal.

EcoPortal uses an advanced version of OntoPortal technology, developed and tested in collaboration with FAIR-IMPACT.

Recent updates to EcoPortal have improved the metadata schema (MOD 2.0) associated with semantic artifacts and aligned it with other catalogs and repositories (Tarallo et al., 2024). In addition, **the integration of the Ontology FAIRness Evaluator (O'FAIRe) tool enables the assessment of the FAIRness level of semantic artifacts** through an automatic metadata-based FAIRness assessment methodology (Amdouni et al., 2022).

Contributors



Ilaria Rosati
(Consiglio Nazionale delle Ricerche)



Enrica Nestola
(Consiglio Nazionale delle Ricerche)

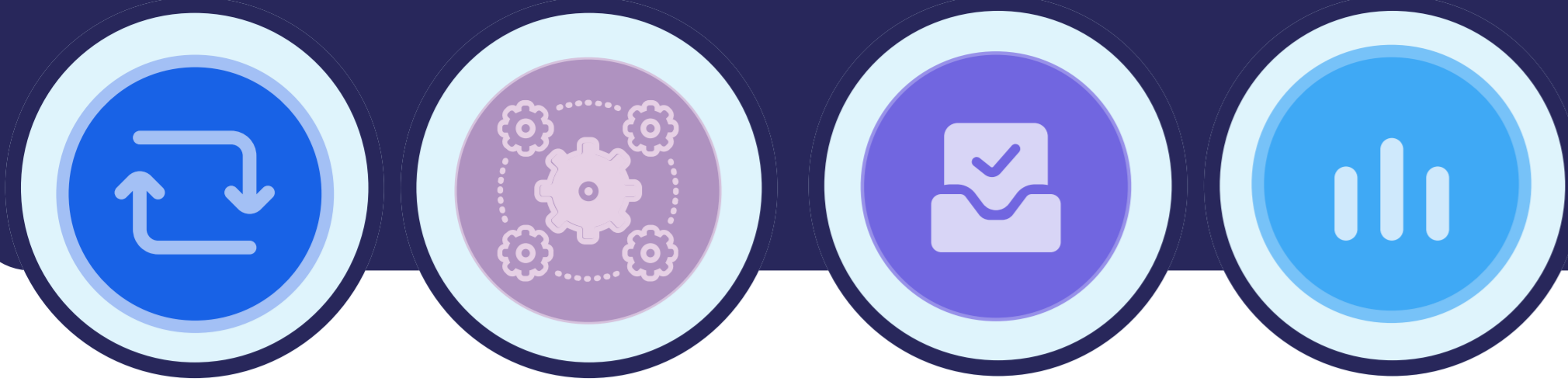


Martina Pulieri
(Università del Salento)

Reference Materials

Metadata-based Automatic FAIRness Assessment for Ontologies and Semantic Resources. International Journal of Metadata, Semantics and Ontologies, Advancements in EcoPortal: Enhancing functionalities for the ecological domain semantic artefacts repository, LifeWatch ERIC Application Profiles (Version 1).

Key topic



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Scientific domain



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Leading organisation



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Challenges and implemented solutions

One of the challenges is to harmonize metadata and data across our platforms using semantic artifacts, making them FAIR so that others, human or machine, can find, access, interoperate, and reuse them.

Integration, which includes the implementation of a REST API connector, **allows users to select the value of attributes for the metadata schema directly using semantic artifacts published within EcoPortal**, thereby facilitating autocompletion. Interaction with EcoPortal consists of searching for concepts/classes within the editing interface and subsequent retrieval of information such as label, definition, URI, etc. **This process facilitates the annotation of unique metadata (in the portal and catalog) with concepts and classes from FAIR semantic artifacts.**

In the semantic annotation flow within the Data Portal, the attribute "Keywords" is followed by others such as "Software" and "Protocol." Users can access and search for concepts and classes from the semantic artifacts published within EcoPortal. They select concepts and classes that are then reported, with their URI, within the "Keywords" element.

The same is done for attributes in the data table, but it differs from the previous one because the definition of the concepts or classes is also retrieved and returned within the element set.

The process of obtaining semantic annotation occurs within the metadata catalog. **Users can search for concepts and classes directly in the element set and in the search box.** These fields can be configured by administrators to retrieve data from external resources (e.g., EcoPortal) by enabling the autocomplete function and connection to EcoPortal, which allows searching for controlled terms. **By starting to evaluate the field, as text is typed, the list of occurrences is filtered and the possible value is suggested in the field.**

Expected/ measured impacts

The main impacts we expected to generate thanks to the integration of semantic artefacts with LifeWatch Italy Data Portal and Metadata Catalogue are:

- **Make ecological** (meta)data discovery more easy;
- **Make annotation of ecological** (meta)data easy and quick to perform for users;
- Make **meta(data) machine-actionable and machine-interpretable**;
- **Push towards Linked Open Data.**

The use of semantic artefacts for the annotation of meta(data) promotes their harmonisation and integration.

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(Università del Salento)

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