

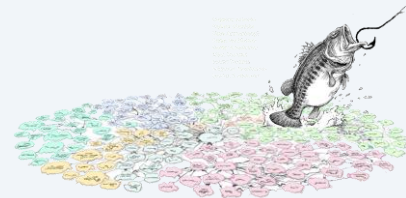


## MarineTLO: A Top Level Ontology for the Marine Domain

### Overview

One of the main characteristics of biodiversity data is its cross-disciplinary feature and the extremely broad range of data types, structures, and semantic concepts which encompasses. Moreover, biodiversity data, especially in the marine domain, is widely distributed, with few well-established repositories or standard protocols for their archiving, access, and retrieval. Queries like *“Given the scientific name of a species, find its predators with the related taxon-rank classification and with the different codes that the organizations use to refer to them”*, cannot be formulated (and consequently nor answered) by any individual source. To formulate such queries we need an expressive conceptual model, while for answering them we also have to assemble pieces of information stored in different sources.

To fill this gap, ISL has designed and implemented a top level ontology, called **Marine Top Level Ontology** (for short **MarineTLO**).

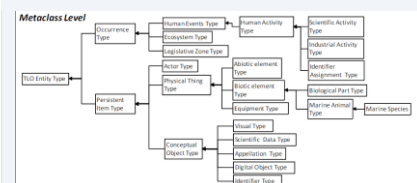


### Target Domains

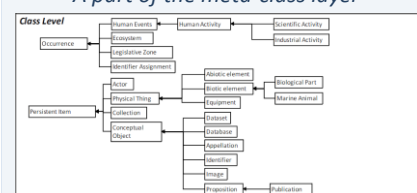
MarineTLO can be used for integrating information from the marine domain. Just indicatively some scenarios are: (a) for publishing Linked Data, (b) for supporting mash-up applications and semantic post-processing of search results and (c) for enabling complex query services over integrated marine data.

### Description

MarineTLO is a top level ontology, generic enough to provide consistent abstractions or specifications of concepts included in all data models or ontologies of marine data sources and provide the necessary properties to make this distributed knowledge base a coherent source of facts relating observational data with the respective spatiotemporal context and categorical (systematic) domain knowledge. It can be used as the core schema for publishing Linked Data, as well as for setting up integration systems for the marine domain. It can be extended to any level of detail on demand, while preserving monotonicity. For its development and evolution we have adopted an iterative



A part of the meta-class layer

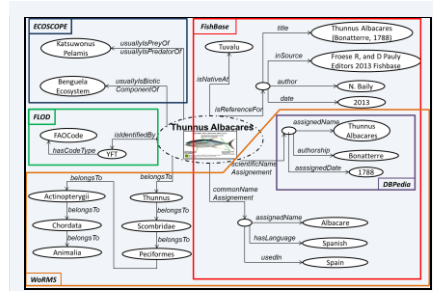


A part of the class layer

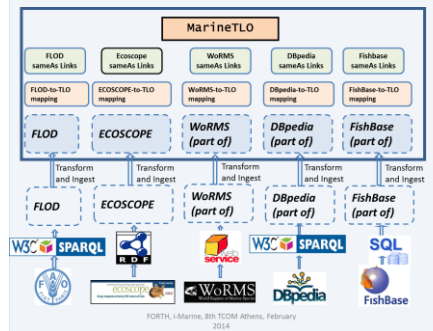
and incremental methodology where a new version is released every two months. For the implementation we use OWL 2, and to evaluate it we use a set of competency queries, formulating the domain requirements provided by the related communities.

The current version of MarineTLO contains 91 classes and 51 properties and it is organized in two abstraction levels: model (schema) and metamodel (metaschema). The metamodel aims at providing a method for classifying the schema level in meaningful abstractions, which can be exploited not only for expressing cross-categorical knowledge but also for aiding the formulation of generic queries. Another form of connecting the classes between the model and the metamodel is expressed using the instanceOf relationship.

MarineTLO is the conceptual backbone of the MarineTLO-based warehouse, a warehouse that integrates information coming from FishBase, WoRMS, ECOSCOPE, FLOD and DBpedia. It currently contains information ( $\approx 3M$  triples) about marine species ( $\approx 40,000$ ), ecosystems, water areas, vessels, etc. The warehouse is already in use by various services offered by iMarine.



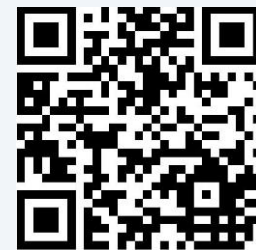
Assembling information about "Thunnus Albacares"



An Overview of the MarineTLO-based warehouse

## Additional Information

More information about MarineTLO (documentation, evolution process, releases) can be found at <http://www.ics.forth.gr/isl/MarineTLO/>.



MarineTLO website

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