



Using a linked data approach to aid development of a metadata portal to support Marine Strategy Framework Directive (MSFD) implementation

Chris Wood (chwood@bodc.ac.uk) & Alexandra Kokkinaki; British Oceanographic Data Centre, UK



British Oceanographic Data Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

Background

MSFD

- The aim of MSFD is to protect the marine environment, prevent its deterioration, and restore it where practical, while using marine resources sustainably
- EU Member States are mandated to achieve or maintain 'Good Environmental Status' by 2020
- Member States were required to prepare and submit initial assessments, monitoring programmes, and programme of measures inline with the EU's implementation framework (Fig. 1)
- As MSFD implementation is dependent on transboundary co-operation, 10 Regional Sea areas have been drawn up



Figure 1: MSFD implementation timeline

The Celtic Seas

- The Celtic Seas (Fig. 2) has been designated as one of the MSFD Sea regions
- It is home to a wide range of marine habitats that supports a diversity of marine wildlife and major fish stocks, and are also important for both livelihoods and well-being of the local populations
- However, there is ever-increasing pressure on the Region, affecting both the biodiversity and marine economy
- The Celtic Seas Partnership has been formed to support and inform interested stakeholders on MSFD implementation within the Region
- A key output of the Partnership is the development of a web-based portal to disseminate relevant data, metadata, and documentation



Figure 2: Celtic Seas MSFD Region

Architecture

Linked Data

- In order to manage the large number of datasets and associated documentation relating to MSFD within the Celtic Seas Region, a metadata database has been created to store the information
- All of the information in the database is exposed via a SPARQL endpoint, using the D2RQ architecture
- D2RQ allows ontologies to be mapped (using the standard turtle format) against an existing RDBMS, and dynamically transforms SPARQL queries to SQL. This allows the data to be queried as if it were stored in a native triplestore, thereby allowing the data to be publicly exposed (Fig. 3)
- Elements from the relevant ontologies (Table 1) have been mapped to metadata items to enable intuitive searching of the database

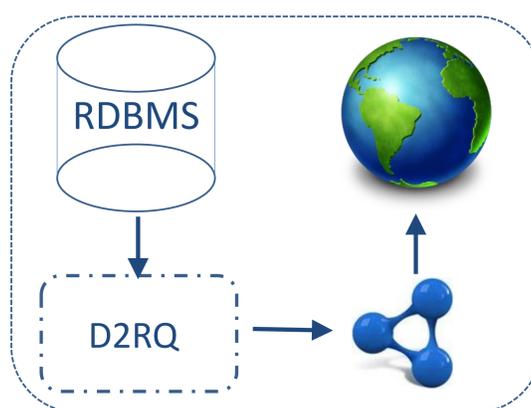


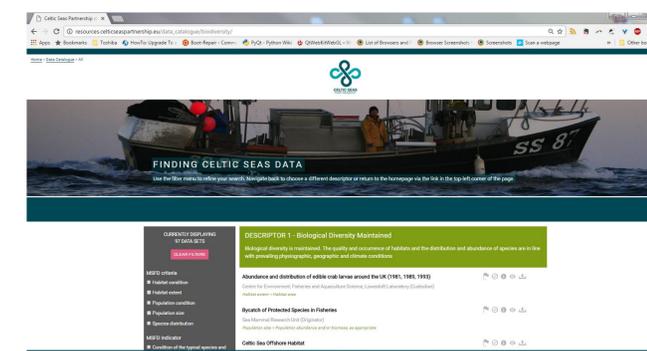
Figure 3: simple schematic of system architecture

rdf	dc	dcat	dcterms	owl
foaf	prov	skos	org	odo

Table 1: ontologies used in the database

Information Portal

- To help stakeholders, users of the marine environment, policy makers, other interested parties, and to provide a service to the wider marine and data science communities, a GUI has been built to act as a simple signposting service to the full range of resources and datasets relating to MSFD
- The portal has been built on top of the D2RQ implementation, thereby using the SPARQL endpoint as an API and preventing the need for additional server-side data extraction methods to be written
- The portal allows users with no knowledge of linked data or SPARQL the ability to query, sort, and filter the metadata held in the triplestore, and provides links to the full metadata records and data holding, if available online
- The portal is hosted at <http://resources.celticseaspartnership.eu>, and was formally launched at the Celtic Seas Partnership Project Workshop in Dublin in September 2016



Examples

Implementation

- Relatively simple SPARQL queries can be used to retrieve metadata from the triplestore about datasets relevant to the Celtic Seas region (Fig. 4)
- As with traditional SQL, more complicated queries can be constructed that can refine the data that is retrieved
- This work is progressing BODC towards compliance with the 5* linked data initiative for all of its sign posting services, and hosted data and metadata

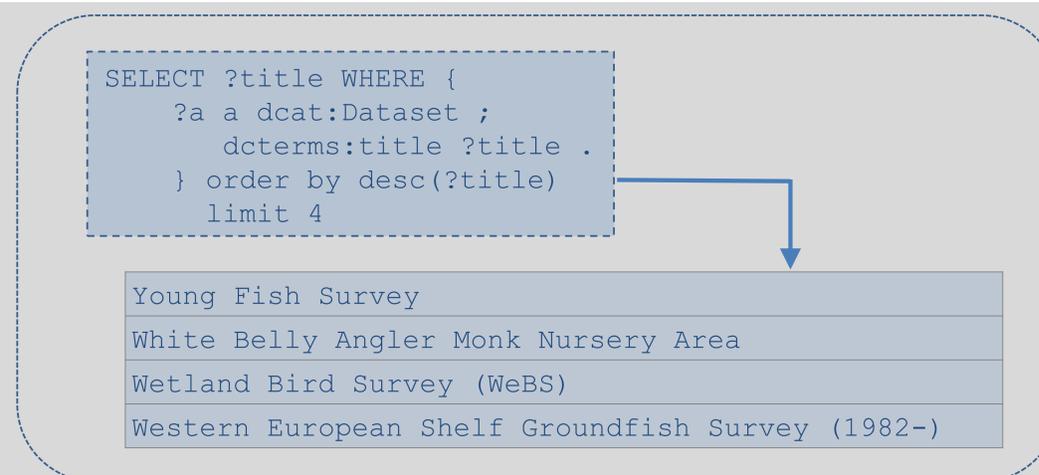


Figure 4: example of simple query and results set

"The Celtic Seas Partnership aims to draw people together from across the Celtic Seas to set up collaborative and innovative approaches to managing their marine environment. We want to put the people that use the sea at the heart of management and offer them the opportunity to influence how their marine environment will be managed in the years to come"

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