27-29 May 2024

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International conference on **M**arine **D**ata and **I**nformation **S**ystems

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VLIZ pioneer in marine science

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International conference on Marine Data and Information Systems

ir. Marc Portier, VLIZ

Functional «Semantic Web» Practice in the marine domain

about stuff that works

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Partners, projects and co-authors

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Reading one book ⟶ querying one database

The experience of browsing the web

is like reading a single book…

The Semantic web promise is to similarly explore the web of data

like querying a single database…

Why is that not happening?

the technology stack is too complex !

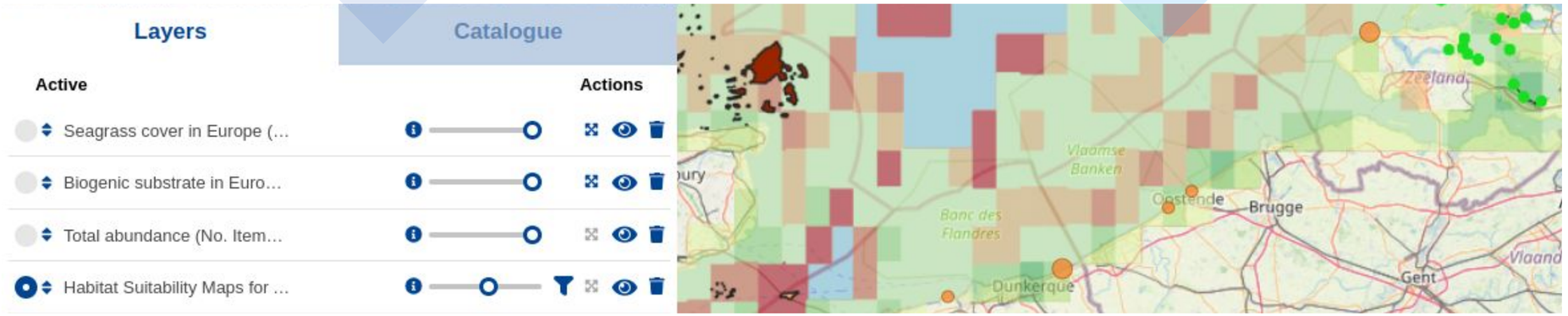
(but is it?)

Classic approach in Data Analysis

DataSet A
(group of Datapoints with)
Value X | At Place P | At Time T

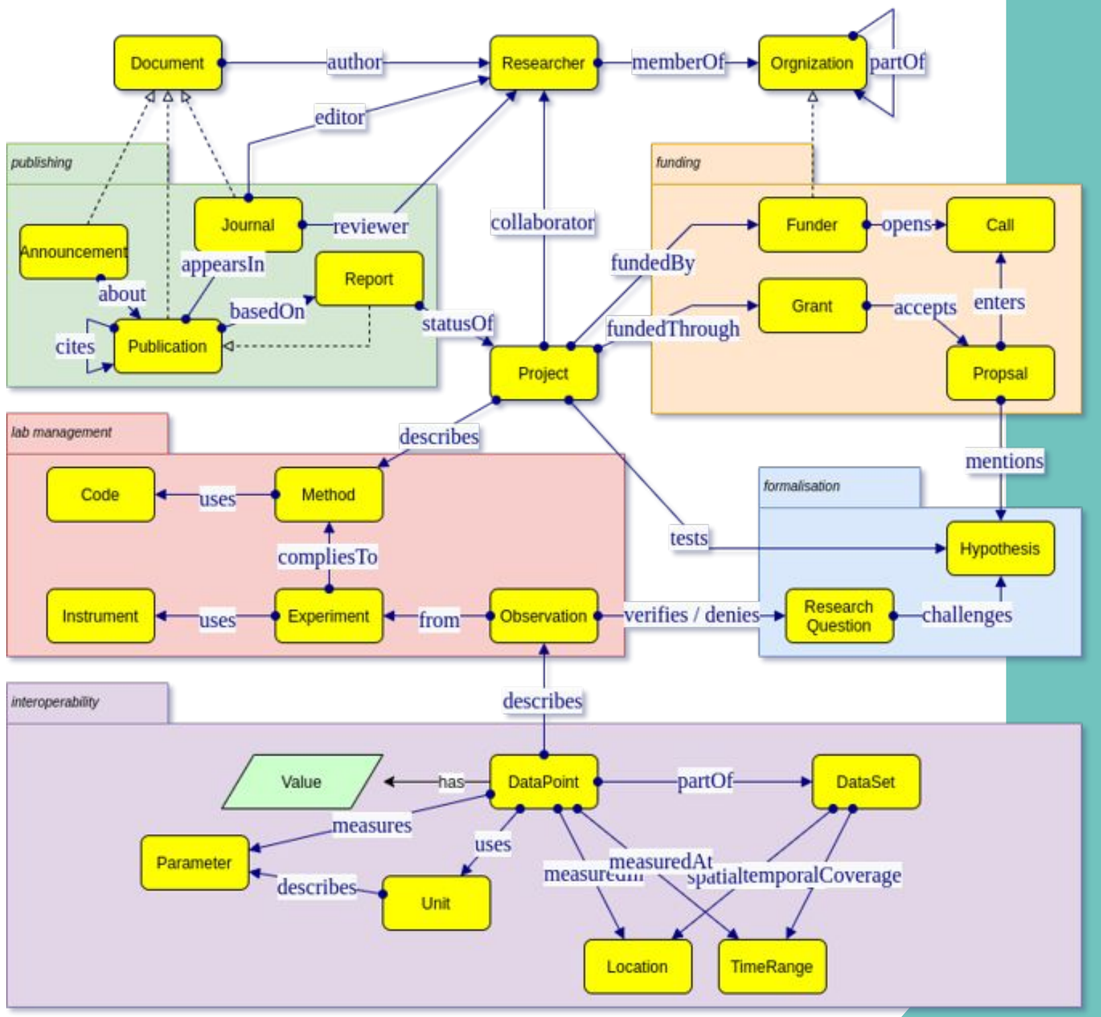
DataSet B
(group of Datapoints with)
Value Y | At Place P | At Time T

- Compare different values (like layers in a map)
  --> datapoints with some shared geo-temporal properties
- To discover some hypothesis connection / causal relation



Research Knowledge Graph

- Adding all aspects of observations:
  - Where, When,
  - Value, Unit, Instrument, Platform, Procedure,
  - Taxname, Class, Function, Attribute, Trait,
  - Maintenance, Storage, Lab, Datasets,
  - Question, Hypothesis,
  - Project, Funding, Grant, Organisation, Person...
- … and how they are connected



More opportunities for inference

- To extend the range of "coincidence" axes / dimensions
  - Not only geo-temporal (Where and When)
  - But along all conceivable links
- Enables: to detect more "connections"
- Feeds the Research Cycle:

  ⇝ [*Statistics*] ⇝ [*Coincidence*] ⇝ [*Hey, that's funny*] ⇝ [*Hypothesis*]

  ⇝ [*Causation*] ⇝ [*Knowledge*] ⇝ [*Policy*]
- … and thus achieve the "Open Ended" ambition ?
  - Supporting unpredictable rehashing, mashups, ...

RDF really *is* simple

"People think RDF is a pain because it is complicated. The truth is even worse. RDF is painfully simplistic, but it allows you to work with real-world data and problems that are horribly complicated. While you can avoid RDF, it is harder to avoid complicated data and complicated computer problems."

– Dan Brickley and Libby Miller
(in the foreword of the book "Validating RDF")

back to basics, make your life easy

- publishing Linked Open Data (LOD) is easier then publishing HTML
  - you don´t need a SPARQL backend ! *(it is not the equivalent of a SQL store)*
  - you don´t need a SPARQL backend ! *(forget endpoint - think startpoint)*
  - you don´t need a SPARQL backend ! *(more like graphql a client support API)*
  - you don´t need a SPARQL backend ! *(they still show bad uptime statistics)*

- publish first, craft models as you go
  - focus on the values ("nobody is interested in the types" – Michael Kay)
  - known property paths first ("as we may think" – Vannevar Bush)
  - don´t overengineer ontologies ("semantics is use" – Ludwig Wittgenstein)
    - required / first : semantics, clarity, no-ambiguity, standards & formatting fit
    - optional / later: logic, type-constraints, shacl, validation

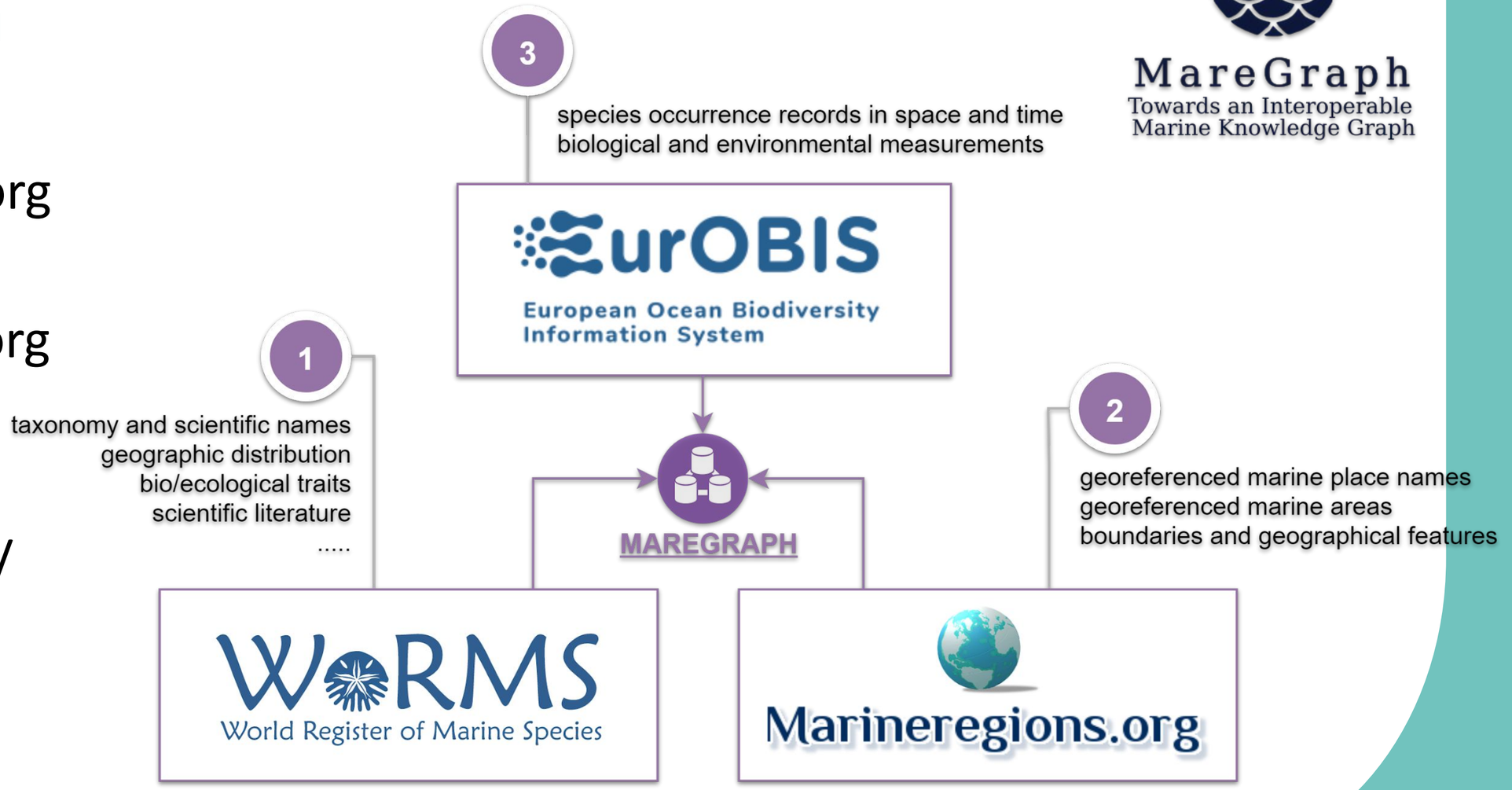
alternative road - keep it simple

- just produce RDF representations (<script> embed and/or linked),
  - static generators rule, convertors exist, own code will do too
- pay attention to well designed durable URI
  - that double as working URL (dereferenceable) + optionally support conneg
- reuse (popular) terms and vocabs
  - General: schema.org, dublin-core, void, dcat,
  - Research: ror.org, orcid.org,
  - Marine: vocab.nerc.ac.uk/ (bodc) - ODIS-Arch, OIH (IODE) - maregraph.eu - edmos edios, edmerp (SeaDataNet)
- use smart web-linking tricks like fair signposting
- consider change-feed : LDES (~RSS for data)

basically: just update your website to use modern web standards ! (not the looks)

maregraph.eu

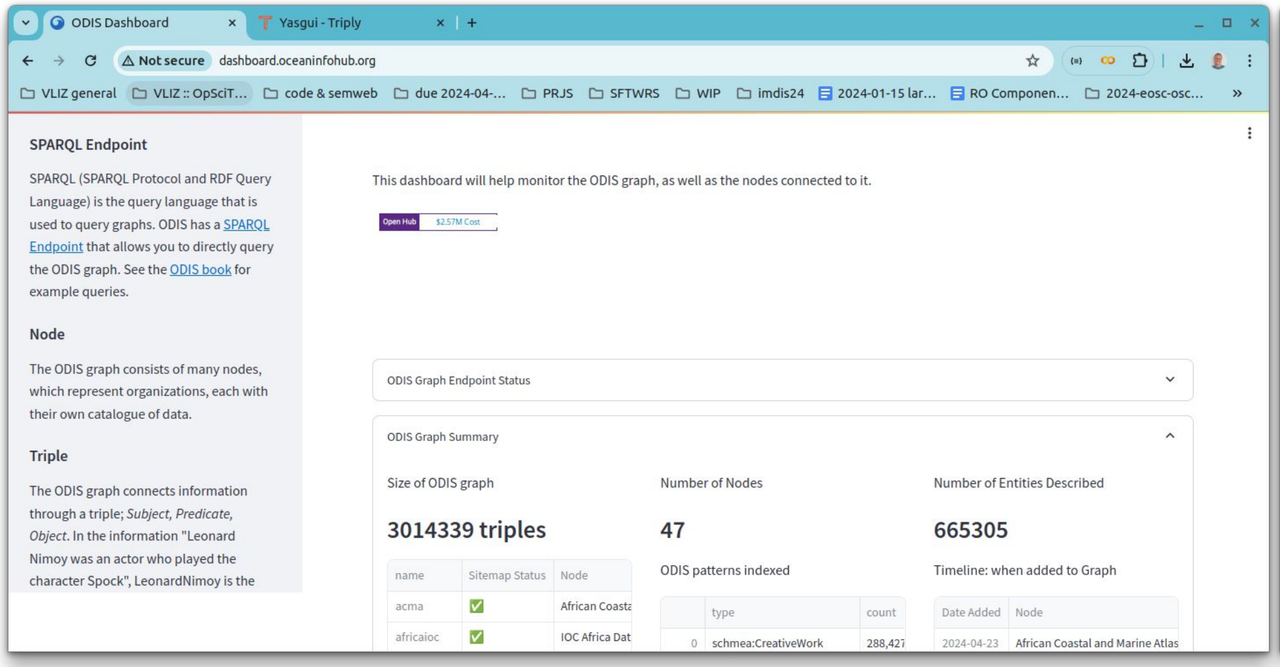
- marineregions.org
  → locations
- marinespecies.org
  → taxnames
- eurobis.org
  → occurrences / biodiversity

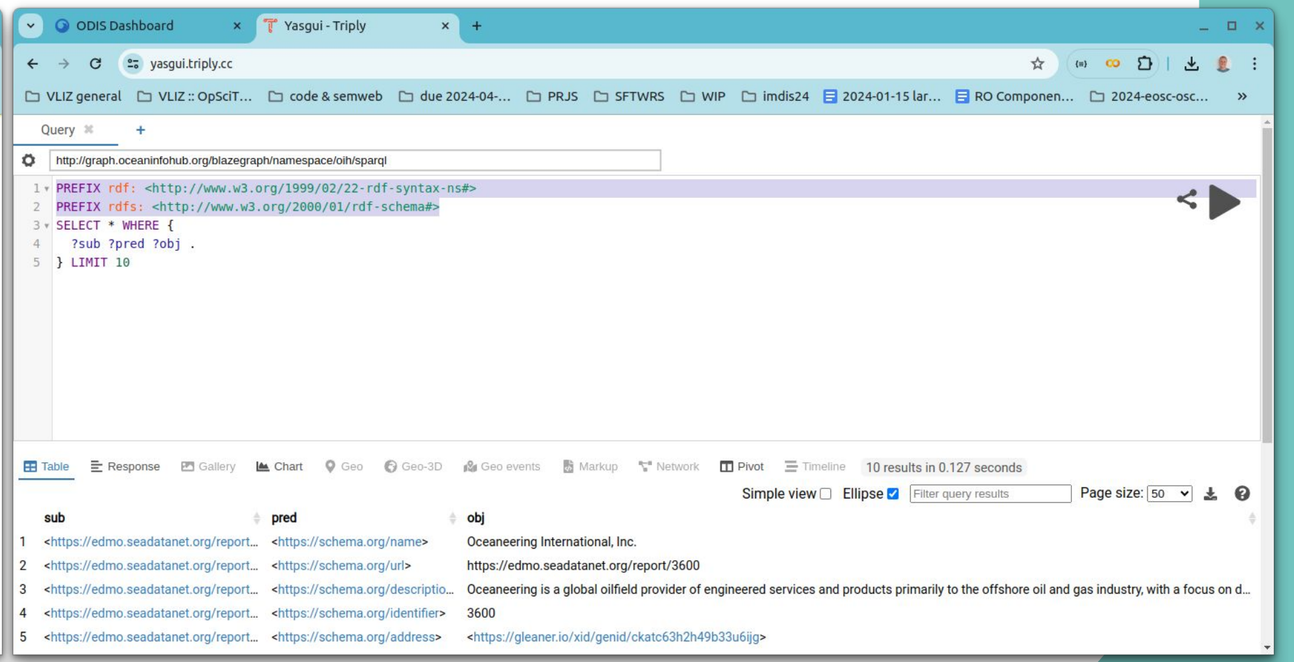


seeing the graph @work

Ocean InfoHub

- oceaninfohub.org | dashboard.oceaninfohub.org | SPARQL endpoint

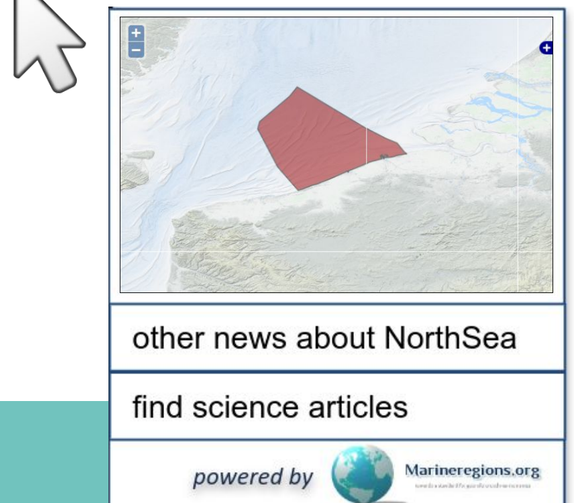




(upcoming – target release 2024)

Showcasing LOD benefits

- Vocab-Term-Lookup-Service: consistent retrieval of URI in DM edits
  - widget for lookup of URI based on available human labels
  - e.g. BODC measurements, marine-regions, marine-info person
  - Auto-updates on available external changes
- Marine-Info-Affordances: add inline context and explanation online
  - widget for augmenting references to marine-entities
  - e.g. some online text that mentions "the Belgian part of the North Sea"
    - also for person, publication, …
  - uses conneg and/or fair-signposting
- Knowledge Graph Analysis Platform (k-gap):
  - in practice:
    - linking usage statistics to "research knowledge graph"
    - reporting on the results



connecting research data through "semantic web done right"

- RDF is easy, it needs to be to allow solutions to complex issues
- the things to do and to not do
  - keep things simple and easy
    - up your web-standards game
  - let the complex stuff to later / to others
    - no sparql - no (new) ontologies / type -structures / reasoning rules /…
    - allow for innovation and prototypes into new directions
- here and now
  - simple showcases, not overselling
- more to come … "federated querying"
  - see you in next talk :)

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