

The Ocean Data and Information System

A light-weight foundation for an ocean digital ecosystem for and beyond the Ocean Decade



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HELMHOLTZ
METADATA COLLABORATION



unesco

Intergovernmental
Oceanographic
Commission



International
Oceanographic
Data and Information
Exchange

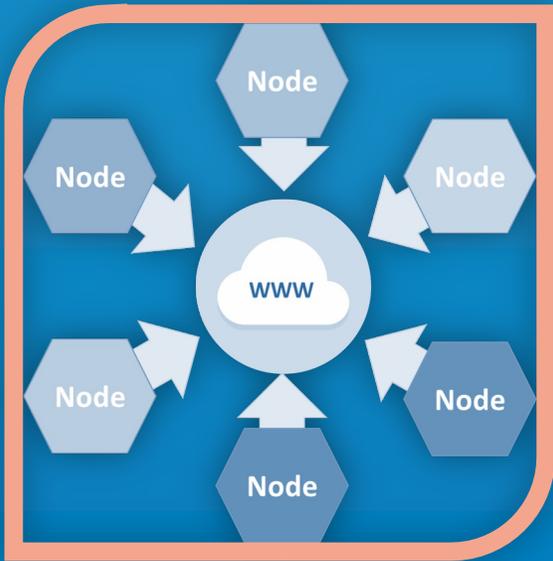


Flanders
State of the Art

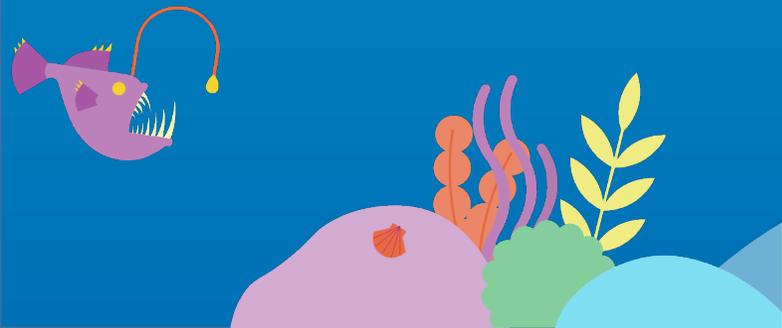


The ODIS/OIH Mission

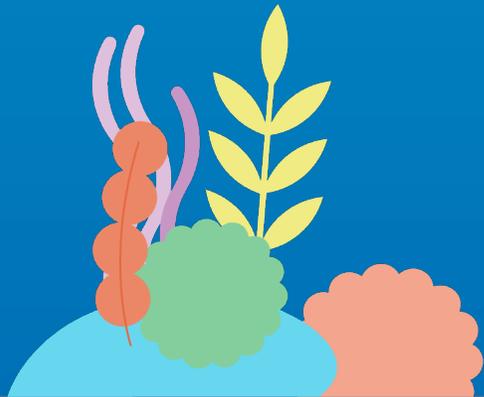
To build a sustainable, interoperable, and inclusive digital ecosystem for all ocean stakeholders



- Connect independent digital initiatives to form a diverse, but interoperable and inclusive, Ocean Data and Information System
- Improve discovery and interoperability of existing information systems across sectors (private, public, etc)
- Link and anchor a network of regional and thematic nodes that will share the metadata that they choose to expose;
- Provide capacity building to support contributors and end-users of the global OIH



- Alignment of strategy and implementation with other relevant and long-term initiatives is key to further interoperation.
- Real interoperation brings use, which brings relevance and guides growth
- Protects against building a sparkly fountain with a plumbing system no one can connect to



Implementation Plan

The United Nations
Decade of Ocean Science
for Sustainable Development
(2021-2030)

2021 United Nations Decade
of Ocean Science
2030 for Sustainable Development

The cover of the 'Implementation Plan' features an aerial photograph of a sandy beach with numerous colorful fishing boats pulled up on the shore. The ocean waves are visible on the right side. The title 'Implementation Plan' is written in large white letters at the top. The United Nations logo and the text 'The United Nations Decade of Ocean Science for Sustainable Development (2021-2030)' are at the bottom.

**Ocean Decade
Data & Information
Strategy**

The United Nations
Decade of Ocean Science
for Sustainable Development
(2021-2030)

2021 United Nations Decade
of Ocean Science
2030 for Sustainable Development

The cover of the 'Ocean Decade Data & Information Strategy' features an underwater photograph of several stingrays swimming over a sandy ocean floor. The title 'Ocean Decade Data & Information Strategy' is written in large white letters at the top. The United Nations logo and the text 'The United Nations Decade of Ocean Science for Sustainable Development (2021-2030)' are at the bottom.

Pilot regions

Three regions have participated in designing the project and are taking a lead on **pilot projects to test interoperability** between existing information hubs.



**Latin America
and the Caribbean**



Africa



**Pacific Small Island
Developing States**



35+ partners currently integrated



The ODIS (Ocean Data and Information System) architecture has been developed, tested and fully documented to enable **interoperability** with local, regional and thematic infrastructures



Indexed in the OIH graph

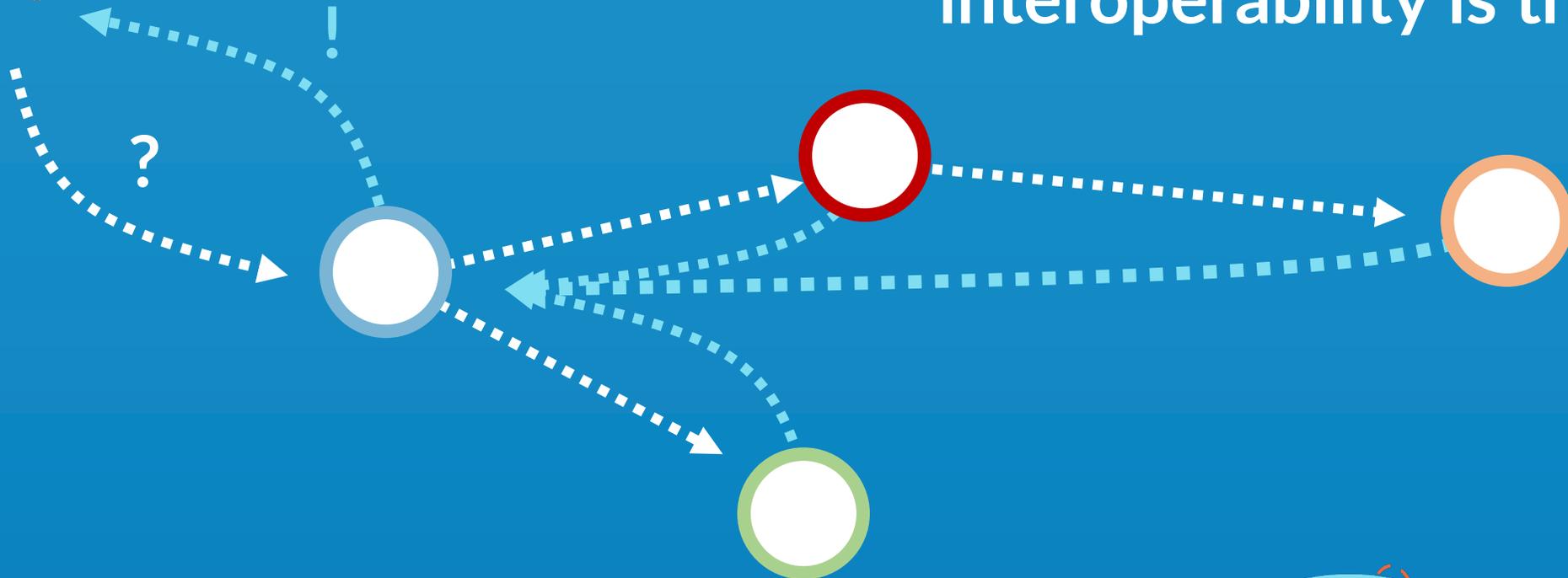


Partners, with development work ongoing

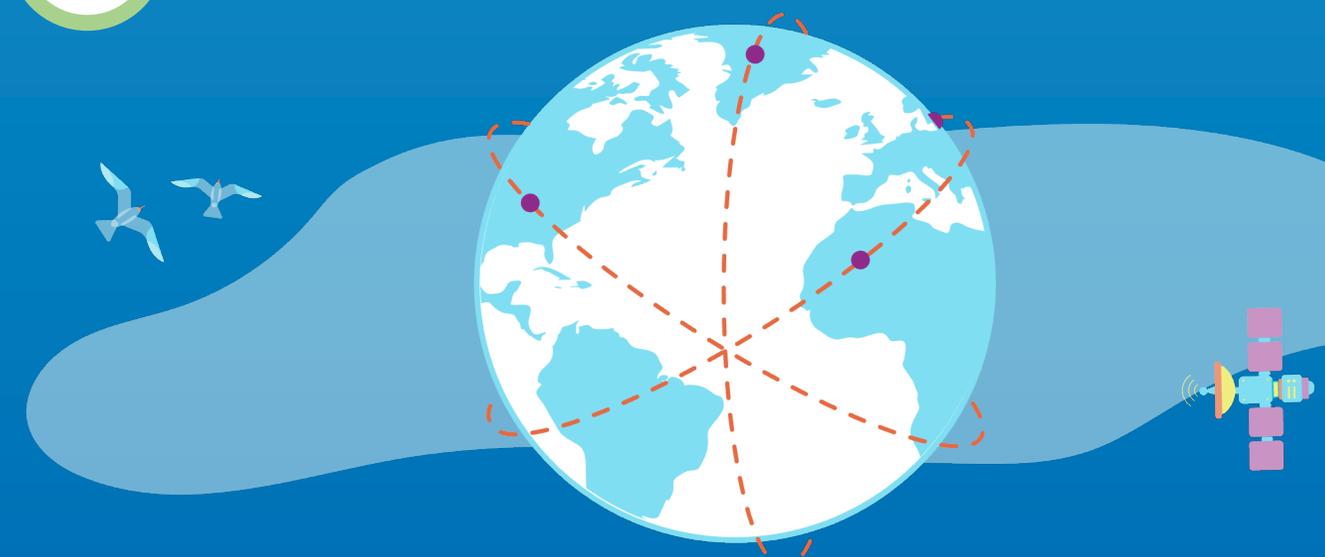
In total, we are working **80+** implementation partners so far (co-design)

International Coastal Atlas Network	El Salvador Ministry of Environment	NOAA / Open-GTS / GOOS Observations Coordination Group	MARISMA Project	Strait of Georgia Data Centre
Marinettraining.eu	Caribbean Marine Atlas	Ocean Best Practices system (OBPS)	University of California San Diego, SCRIPPS	Protected planet
OceanExpert	CORDIO / MASPAWIO	Ocean Biodiversity Information System (OBIS)	Anthropocene Institute	BCC data portal (Benguela Current Convention)
EMODnet	Nairobi Convention (clearinghouse)	Aquadocs	WIO Symphony project	CCLME Eco-viewer
EUROCEAN	MarCoSouth	SARGASSUM Hub	Marine Institute Data Catalogue	OBON (Ocean Biomolecular Observing Network)
INVEMAR	SPC Pacific Data Hub	CLME+ training portal	Tsunami programme	IUCN (International Union for Conservation of Nature)
Argentina, NODC	SPREP Pacific Environment Portal	SeaDatamet	Indonesian NODC	Canadian Integrated Ocean Observing System
Colombia DIMAR NODC	Blue Planet / BIOPAMA (RCMRD)	POGO / OceanScape	POLDER	ODINAFRICA (Ocean Data and Information Network for Africa)
Colombia National Natural Parks	UNEP (UN Environment Programme)	VLIZ Flanders Marine Institute	OpenOceanCloud	METS RCN - Marine Ecological Time Series RCN

Robust and flexible
interoperability is the key



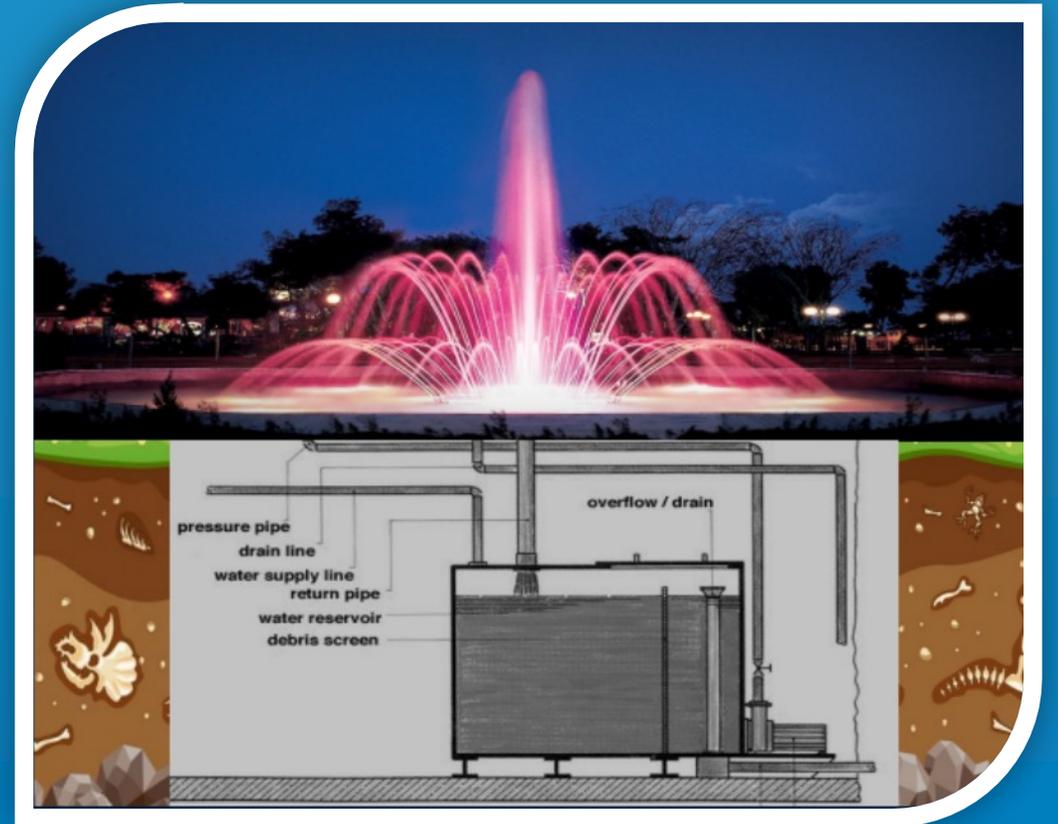
One-stop-shops need
global supply chains



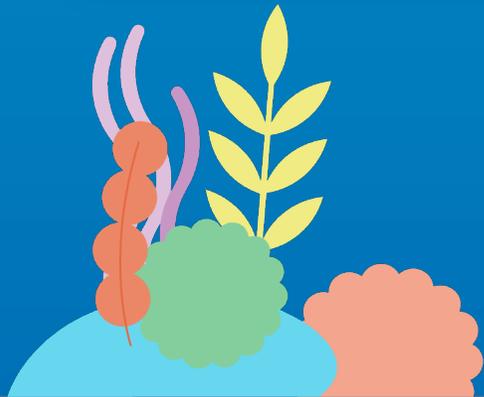
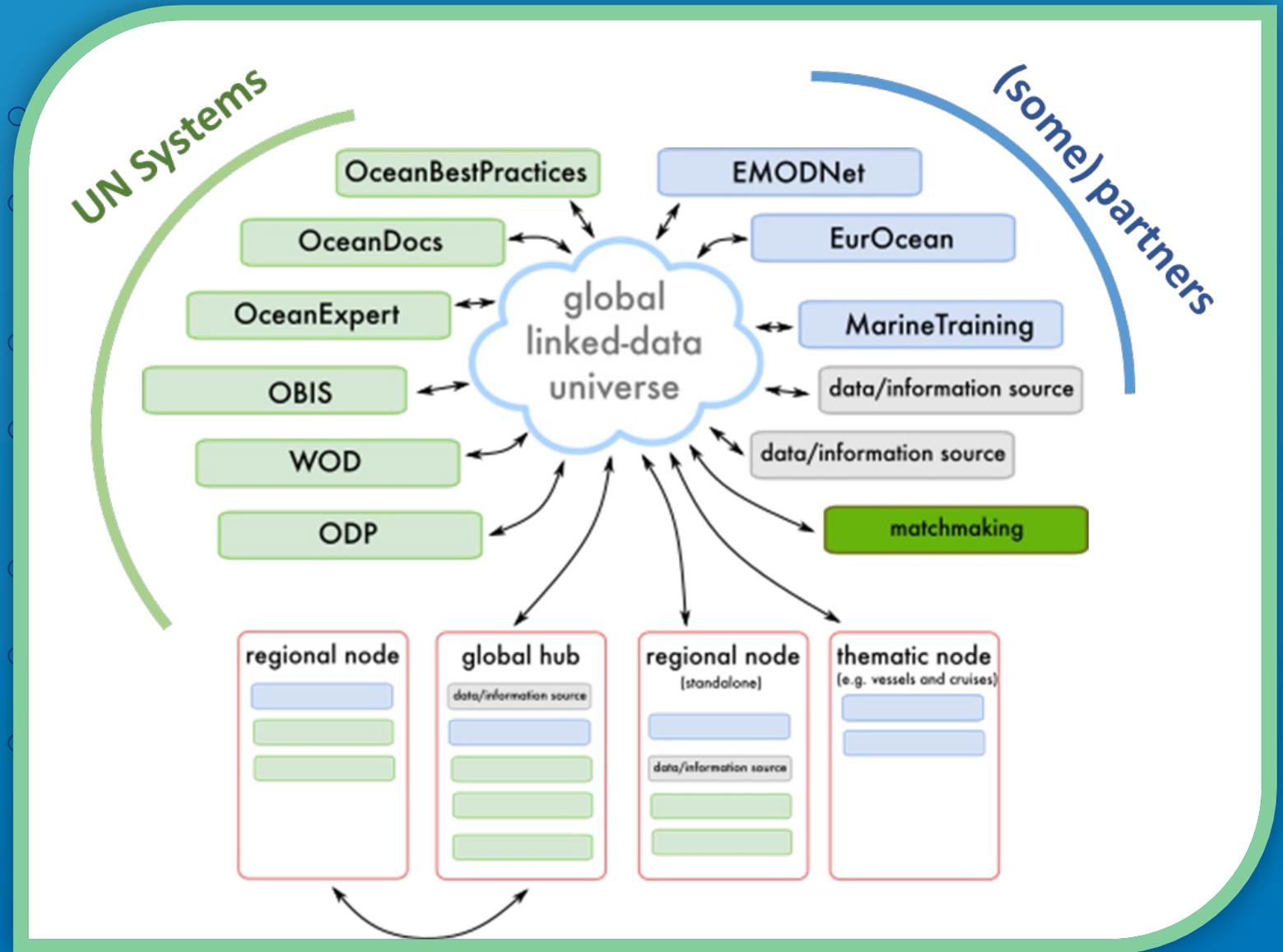
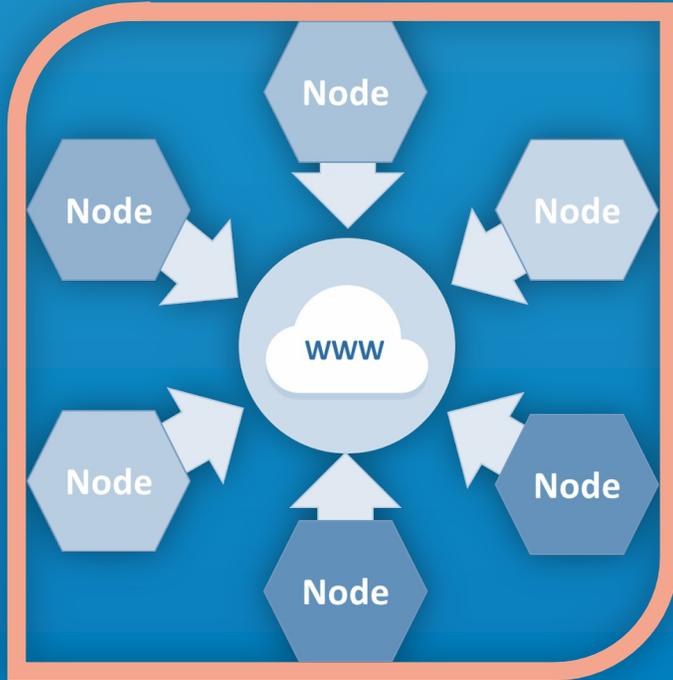
“Sparkly fountains need robust plumbing systems”

– Terry McConnell

G7 International Digital Twins of the Ocean Summit



The Ocean InfoHub & ODIS



The Global Search Hub: demonstration of the system

The screenshot displays the Global Search Hub interface. At the top, navigation tabs show counts for various categories: Documents (203), Experts (18), Institutions (23), Datasets (513), Training (4), Vessels (0), Projects (9), and Spatial Data (409). Below these are search filters for Type (set to JSON), Provider, Variable Measured, and Keywords, with a CLEAR button. The main content area shows a map of the Gulf of Mexico with a search result highlighted. A tooltip for this result reads: "BOEM Sperm Whale Seismic Study (SWSS) MPS sperm whale trackings 2004-2005". To the right of the map, a detailed record for this study is displayed, including its name, name, same as URL, license, citation, version, keywords, data catalog, temporal coverage, and distribution. A note below the map states: "Note: Geometries that are larger than the map display area will not be displayed. Search results corresponding to the map area show below." The bottom of the interface shows a title "Ecotypic variation and predatory behavior among killer whales (Orcinus orca) off the eastern Aleutian Islands, Alaska" and an identifier "Id: oai:aquadoocs.org:1834/25551".

203 Documents 18 Experts 23 Institutions 513 Datasets 4 Training 0 Vessels 9 Projects 409 Spatial Data

Type Provider Variable Measured Keywords CLEAR

Total results found 409

BOEM Sperm Whale Seismic Study (SWSS) MPS sperm whale trackings 2004-2005

Name: BOEM Sperm Whale Seismic Study (SWSS) MPS sperm whale trackings 2004-2005
Same As: http://ipt.env.duke.edu/resource/r=zd_912
License: This work is licensed under a Creative Commons Attribution (CC-BY) 4.0 License
Citation: Epperson, D. 2013. BOEM Sperm Whale Seismic Study (SWSS) MPS sperm whale trackings 2004-2005. Data downloaded from OBIS-SEAMAP (<http://seamap.env.duke.edu/dataset/912>) on yyyy-mm-dd.
Version: 2021-04-24T11:04:51.000Z
Keywords: Observation Occurrence Occurrence,Vessels,S...
Data Catalog: <https://obis.org>
Temporal Coverage: 2004/2005
Distribution: http://ipt.env.duke.edu/archive.do?r=zd_912

Note: Geometries that are larger than the map display area will not be displayed. Search results corresponding to the map area show below.

Ecotypic variation and predatory behavior among killer whales (*Orcinus orca*) off the eastern Aleutian Islands, Alaska
Id: [oai:aquadoocs.org:1834/25551](https://oai.aquadoocs.org/1834/25551)

OIH Dashboard

This dashboard will help monitor the OIH graph, as well as the nodes connected to it.

OIH Graph Summary

Size of OIH graph

12645827 triples

Number of Nodes

34

Number of Catalogues

100512

Sitemap s

- name
- africaioc
- aquadocs
- bebop
- benguelacc
- caribbeanmar
- cioos
- edmerp
- edmo
- eurocean
- eurocean

 **Graph SPARQL Endpoint is up**

OIH Graph Summary

Size of OIH graph

24978034 triples

name	Sitemap Status	Node
africaioc		IOC Africa Data Portal
aquadocs		AquaDocs
bebop		Better Biomolecular Ocean
benguelacc		Benguela Current Convention
caribbeanmar		Caribbean Marine Atlas catalogue
cioos		CIOOS
edmerp		European Directory of Marine Environmental Research Pr

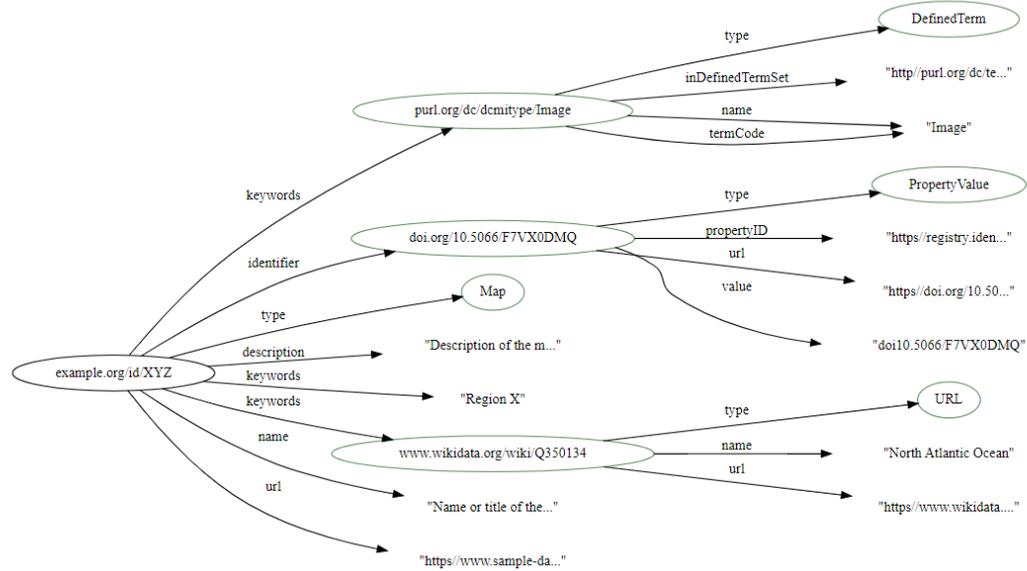
Towards a concrete monitoring framework for ocean data exchange

Demonstrating and validating FAIRness across the ODIS Federation

https://schema.org/CreativeWork	46,135
https://schema.org/Dataset	4,733
https://schema.org/ResearchProject	3,620

The ODIS-architecture

```
1 {  
2   "@context": {  
3     "@vocab": "https://schema.org/"  
4   }  
}
```



```
"name": "North Atlantic Ocean"
```

ODIS links nodes through a JSON-LD+schema.org based, decentralized interoperability architecture (ODIS-Architecture).

Partners aligned to ODIS-Arch are also discoverable by Google, Microsoft, Yahoo, YANDEX, et al.

The ODIS-architecture

The screenshot displays two GitHub issues. The top issue, 'New pattern: hazards and disasters #110', is open and was created by pbuttigieg on August 25. The bottom issue, 'JSON-LD Pattern for Protected Areas #101', is also open and was created by vzett on August 11. A comment from vzett on August 11 provides a starting point for a subclass of the Spatial Pattern, listing suggested high-level attributes and types of potential area IDs. The right sidebar shows the issue's metadata, including assignees, labels (pattern development), projects (ODIS-Arch), milestones, and development information.

New pattern: hazards and disasters #110
Open pbuttigieg opened this issue on Aug 25 · 9 comments

JSON-LD Pattern for Protected Areas #101
Open vzett opened this issue on Aug 11 · 3 comments

vzett commented on Aug 11 · edited

Likely a subclass of the Spatial Pattern. Here's a start!

Suggested high level attributes:

Types of potential area IDs:

- Management Authority area ID
- National area ID
- IUCN WDPa ID
- ProtectedSeas Navigator ID

Common Information:

- Area Name
- Area Type (MPA, OECM, Tribal/Indigenous, LMMA)
- Area Management Authority (ie Nation Park Service, Florida Fish and Wildlife Conservation Commission, ...)
- Area Management Authority Type (National, Subnational, Local, Tribal/Indigenous, ...)
- Area Sub-National Unit
- Area National Unit (ie National, Subnational, Community/Local, Tribal, ...)
- Area Designation (National Park, State Marine Reserve, Marine Sanctuary, ...)
- Area Website
- Year of Establishment

Spatial Characteristics:

- Coastal (yes / no)

Assignees: No one—assign yourself

Labels: pattern development

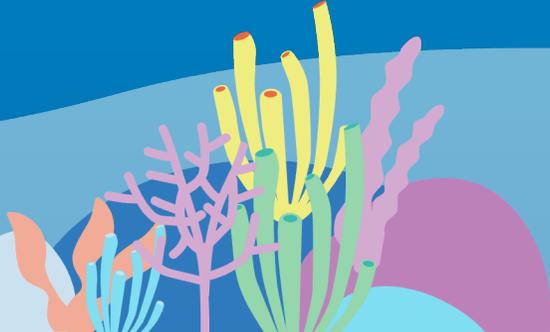
Projects: ODIS-Arch (Awaiting triage)

Milestone: No milestone

Development: When branches are created from issues, their pull requests are automatically linked. 101-json-ld-pattern-for-protected-areas iodepo/odis-arch

Notifications: Unsubscribe

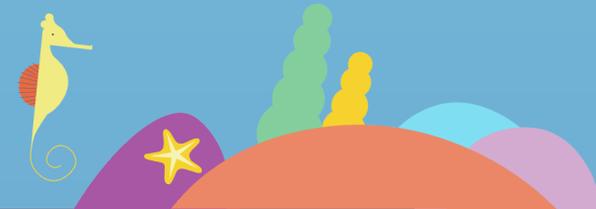
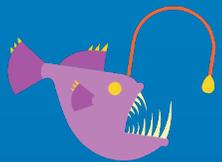
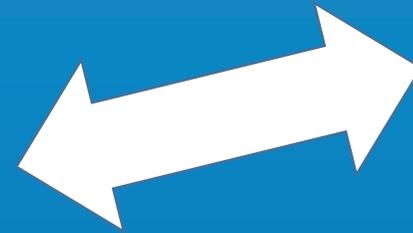
Consolidating data flows to make EOv (and potentially other EV) data flows transparently and generically





2021 United Nations Decade
2030 of Ocean Science
for Sustainable Development

An exchange architecture to bridge Decade Actions



WorldFAIR

WorldFAIR Project (D11.1) An assessment of the Ocean Data priority areas for development and implementation roadmap

Buttegieg, Pier Luigi

Editor(s)

Hodson, Simon; Molloy, Laura

Deliverable 11.1 for the WorldFAIR Project's Ocean Science Work Package (WP11). This report provides a synoptic overview of how cross-domain interoperability may be built from within WorldFAIR's Oceanography case study (Work Package 11). After an introduction to the Intergovernmental Oceanographic Commission of UNESCO's Ocean Data and Information System (ODIS), the report summarises an evaluation of FAIR Implementation Profiles and FAIR Enabling Resources compiled in WorldFAIR's WP2. It then summarises and synthesises supplementary insights obtained through a survey distributed across WorldFAIR partners, and identifies a pathway to implement sustainable cross-domain (meta)data flows to inform and support the development of the Cross-domain Interoperability Framework (CDIF).

The WorldFAIR case studies on biodiversity, disaster risk reduction, chemistry, and cultural heritage were identified as focus points to bridge with ODIS, being complementary to the strategic priorities of marine science and sustainable ocean management and offering clear socio-technical interfaces compatible with ODIS's own interoperability approaches. The high-level roadmap in Section 4 of this report outlines the general approach that will be pursued in the remaining tasks in WP11, namely the expansion of ODIS interoperability conventions to interface with those prevailing in the target use cases alongside the implementation and testing of (meta)data exchanges with independent stakeholders from the target domains.

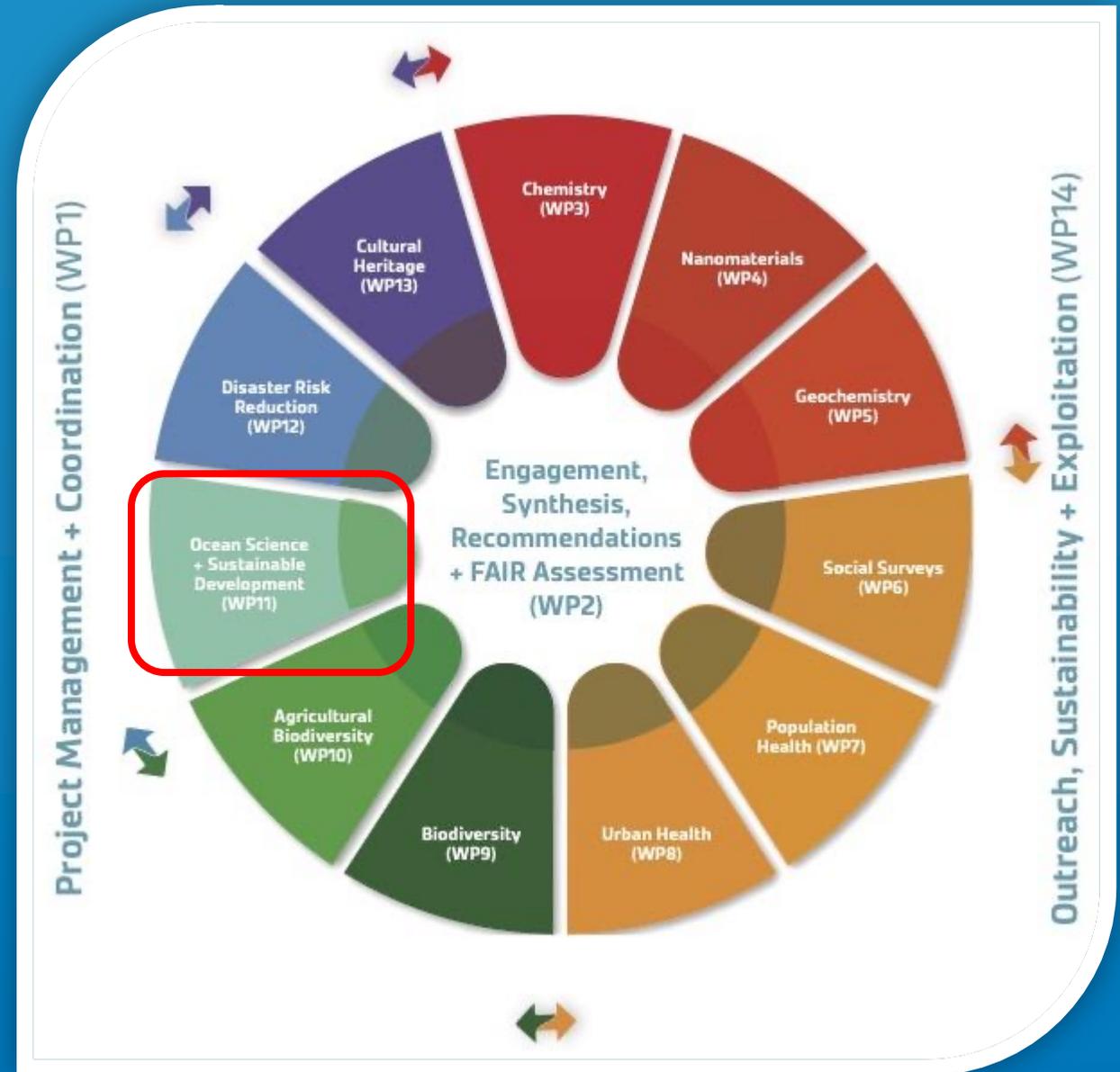
zenodo

<https://doi.org/10.5281/zenodo.7682399>



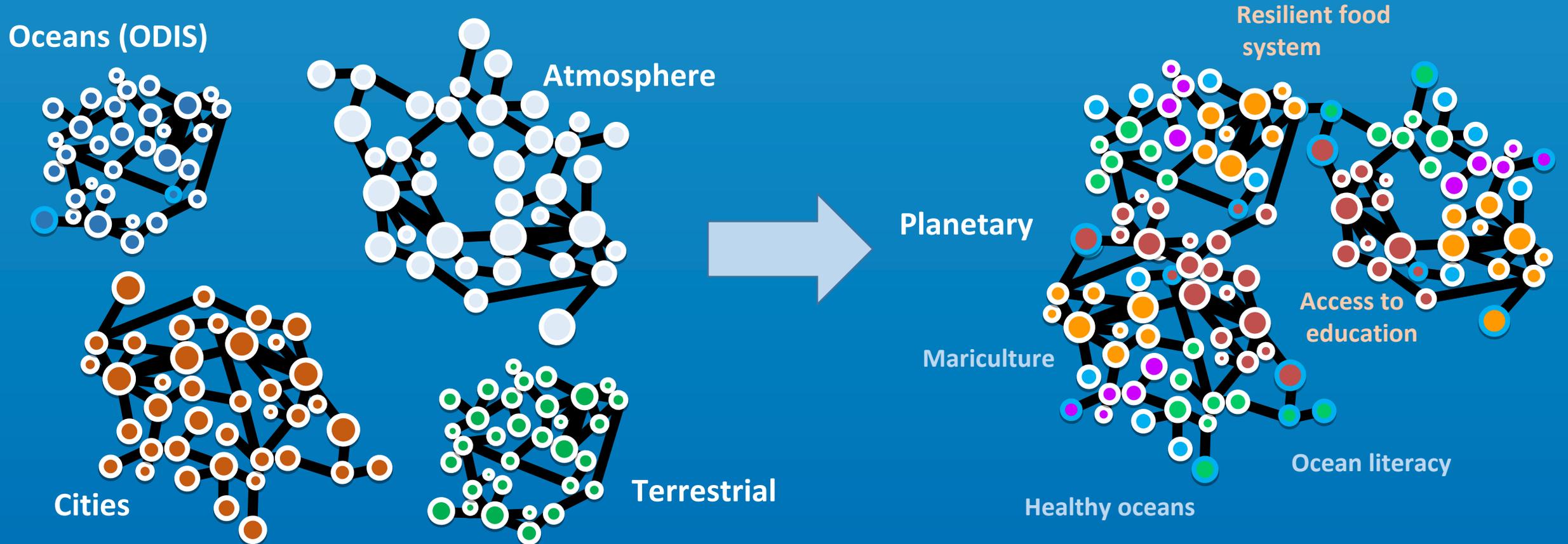
Priority areas

- Develop cross-domain interoperability along existing IOC priority areas
 - Biodiversity
 - Hazards and disasters
 - Chemicals and pollutants
 - Cultural data and knowledge
- Continuous alignment and integration
 - Create a domain-neutral form of ODIS-Arch
 - Align to the emerging CODATA Cross-domain interoperability framework (CDIF)
- Move towards an integration-on-demand data space



From digital ecosystems to the digital biosphere

The digital ocean ecosystem is just one of many in a “digital biosphere” needed to address the SDGs and their successors



The Ocean InfoHub Project is helping to address:

- Challenges related to trust that may hamper data sharing
- Challenges related to differing capacity across regions and institutions (focus on data equity, not sophistication of the system)
- Awareness of projects and opportunities within regions, and globally
- Awareness of the existence of digital resources (from local to global scale)
- Improved access to global information resources

