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Implementing an inclusive European Open Science Cloud

EOSC SYMPOSIUM 2021

A Common Approach to Data Ecosystems and Data Spaces: Implications for EOSC Architecture

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Swirling Terms and Technologies

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Can we make sense of them all?

data sharing space

Data Sharing Domain

INTERNATIONAL DATA SPACES ASSOCIATION

IHAN

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Open Data Ecosystem

X-ROAD

gaia-x

DAWEX

FIWARE

Data Exchange Approach (DEA)

A Unifying Concept

Data Exchange Approach: defined as

- a set of (1) organizational policies and roles and
- (2) technical specifications,
- required to enable the trustworthy exchange of data between two parties.

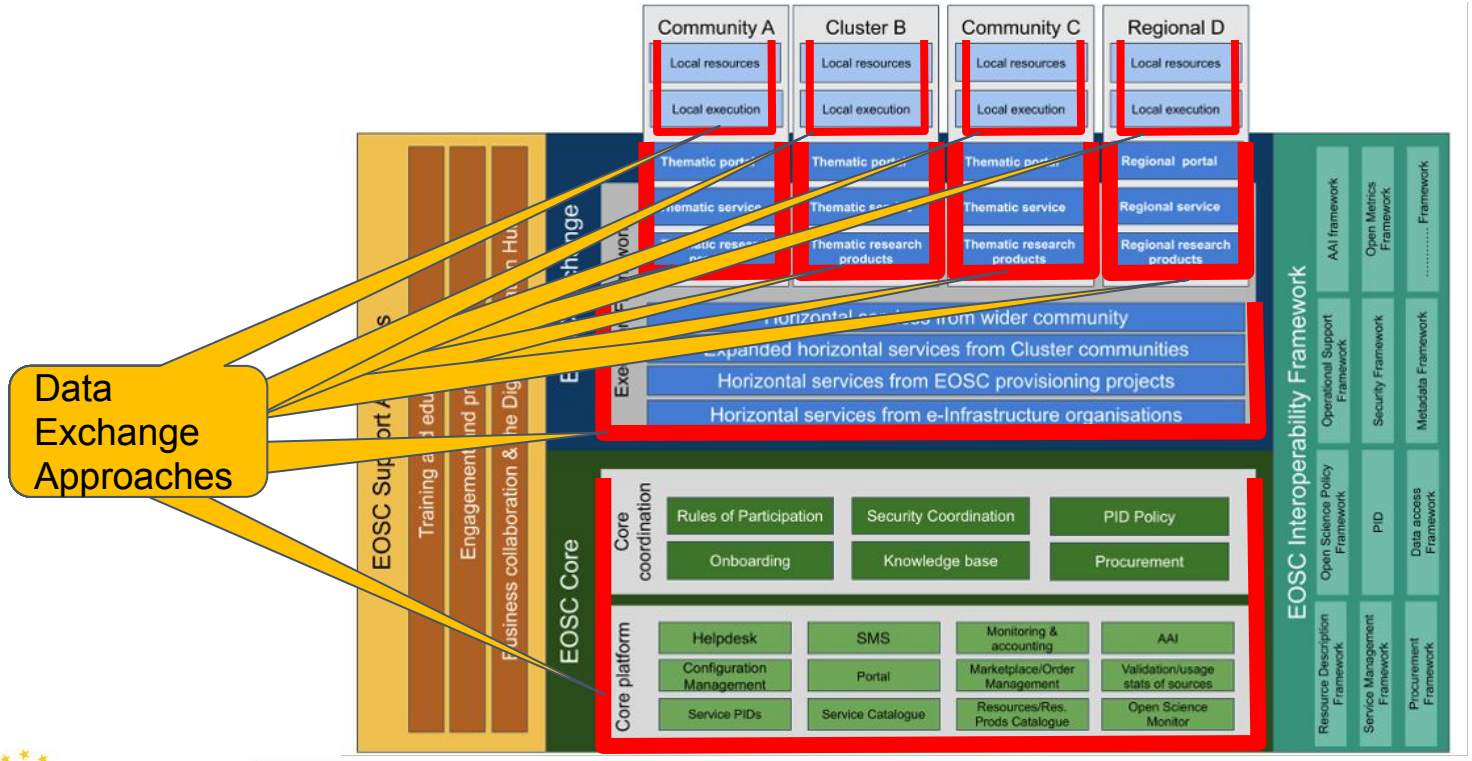
Data Ecosystems and Data Spaces are types of DEA.

DEAs can flexibly describe different characteristics of exchange structures.

- E.g. the **visibility** of data, which can be limited or controlled:
  - exposure to only one other party
  - combined exposure of metadata and data to limited groups
  - public exposure of both data and metadata

How does this concept map to EOSC?

We Need To Respect Distinct Data Exchange Approaches



Data Ecosystems, Data Space are types of DEA

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Data Ecosystem: *a purposeful collaboration or partnership consuming, producing and providing interoperable data and related resources*.

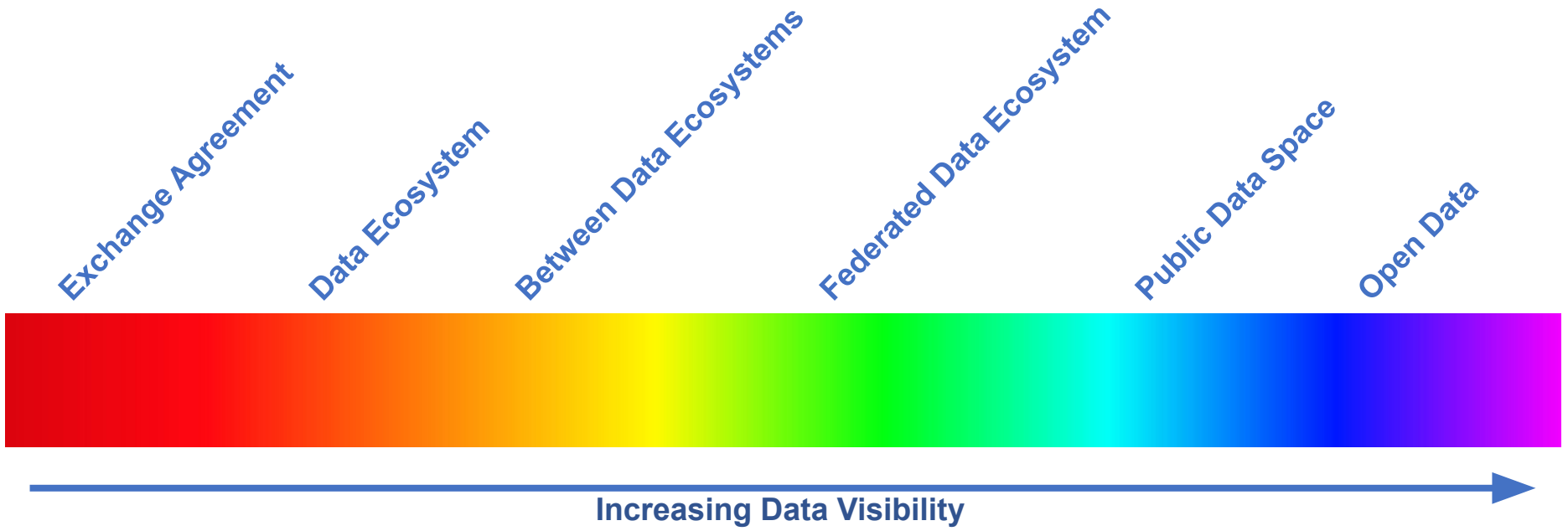
- Multiple data ecosystems possible -- they already exist:
  - E.g. in agriculture: Djust Connect, API-Agro, DKE Agrirouter, JoinData, Agrimetrics, Aladin.farm, DataConnect
  - "Science communities" in different areas of research

Data Space: *a collection of FAIR*, quality data and related resources consumed, produced and provided by identified participants, each respecting societal values and operating within an explicit framework of trust and governance*.

- EC refers to **Public** Data Space
  - Does not identify any collaborating actors or a community
  - Is not "purposeful"
- EC aspires to a "single common European data space"
- Domain Data Spaces, collecting data and data-services relevant to a domain or sector.

Data Ecosystem = Private Data Space + Community + Purpose

Spectrum of DEAs



Research → Already Provides Public Data Spaces

many examples in both research and industry

IS-ENES / ESGF

GBIF

SeaDataNet

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Applying DEAs to 3 Use Cases: GBIF, IS-ENES, SeaDataNet

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Global Biodiversity Information Facility

GBIF

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Free and open access to biodiversity data: numbers as of 31/03/2021

Species occurrence records

1,667,617,812

Datasets

57,432

Country Participants **61**

Organizational Participants **39**

Data-publishing institutions

1,659

Peer-review papers using data

5,658

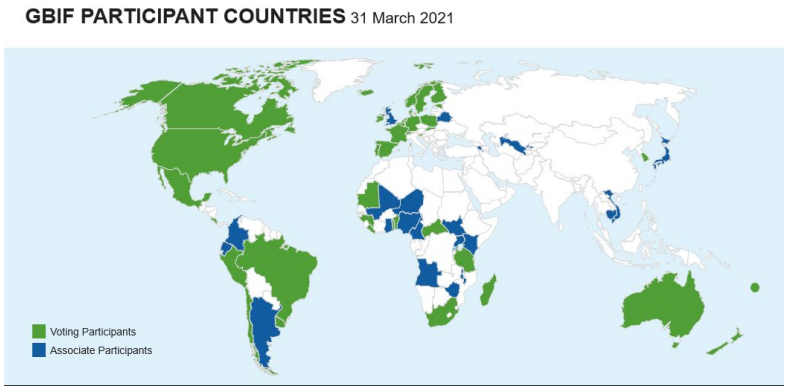
Avg records downloaded per month (2021)

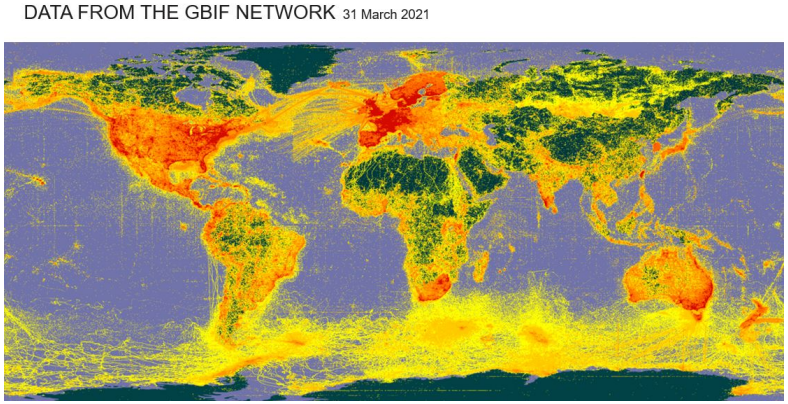
85.6 billion

FAIR, Free and Open Access to Biodiversity Data

Data: biological species occurrences, species check-lists, sample based datasets

- Findable?
  - Indexed: data & metadata
  - Standardized: data & metadata
- Interoperable?
  - Inside network: full
  - Outside network: limited
  - SPARQL endpoint: no
- Accessible?
  - Cached: yes
  - Downloadable: yes
  - Visualizations: yes
- Reusable?
  - Downloadable: yes
  - Licenses schema: yes
  - DOIs for datasets & downloads
  - UUIDs for records: uneven implementation





Federated data infrastructure for climate model data

is-enes INFRASTRUCTURE FOR THE EUROPEAN NETWORK FOR EARTH SYSTEM MODELLING

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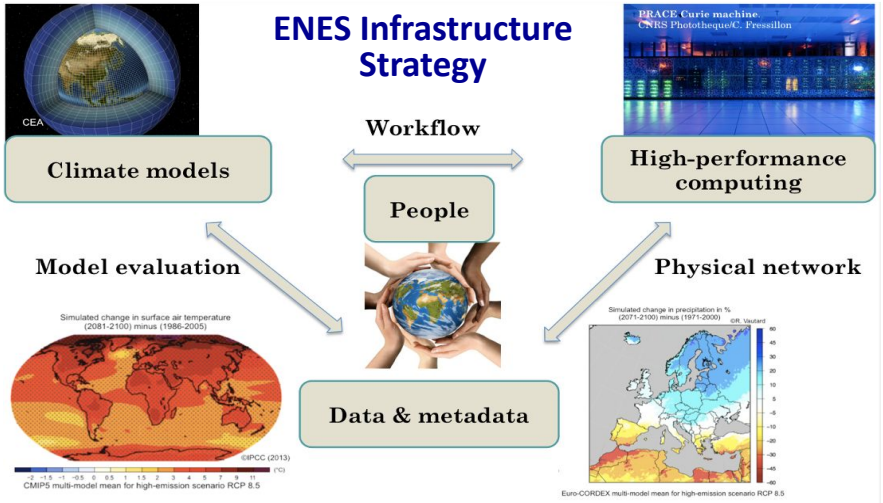

Services

Data access and publication
Citation & PID, Statistics
Long-term archival and replica
Climate4impact portal
Evaluation and diagnostics
Compute services
Service on data & metadata standards, CF convention & Data Request, Model documentation

Download Statistics

ESGF: 8 M datasets
23,4 PB (w/o replica 12,7)
CMIP6: 7 M datasets
16,1 PB (w/o replica 9,3)
CMIP5: 5,3 PB (1,5)
ca 15 000 registered users

Earth System Grid Federation ESGF

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EGI-ACE

EOSC-hub

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Climate Change Service

opernicus Europe's eyes on Earth

Easy access to climate model (open) data for analysis needs

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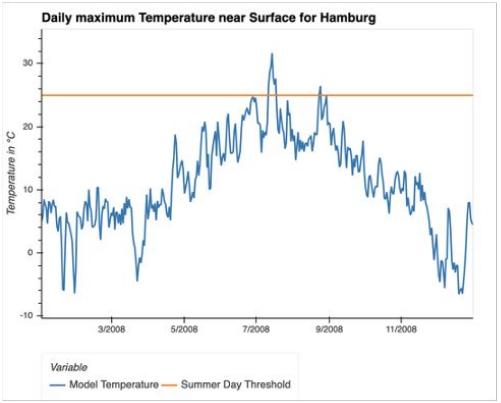
ESGF Data download and publication metrics

31	162	24	11,929,956	560,381,850	22,76
Projects	Countries	Data nodes	published datasets	files downloaded	PB downloaded

Climate data analysis use cases



IS-ENES Compute services

is-enes
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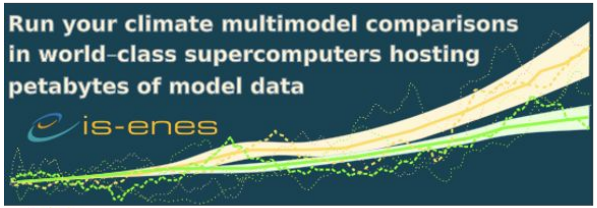

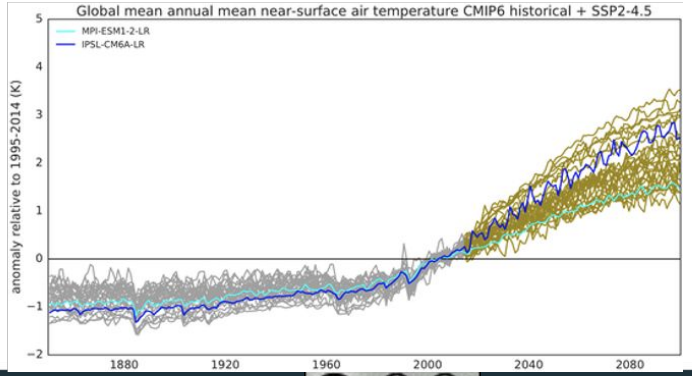

Major European Aggregator/Manager of Marine Data SeaDataNet

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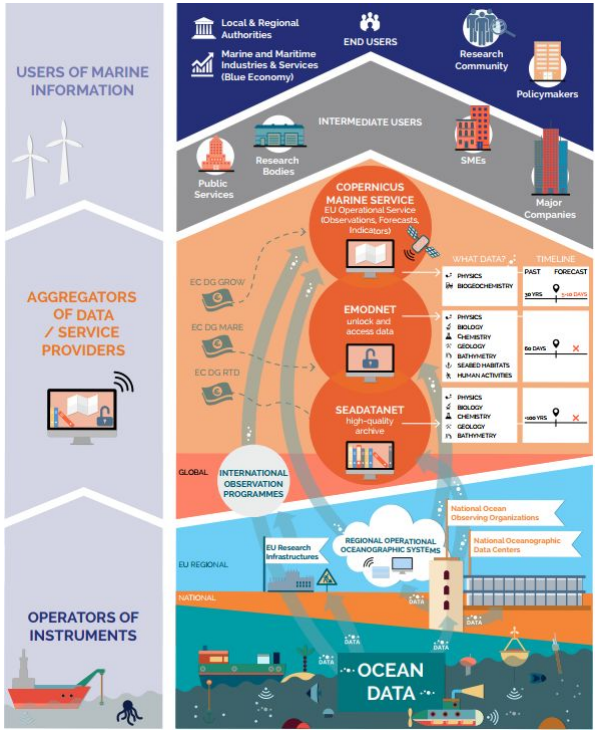
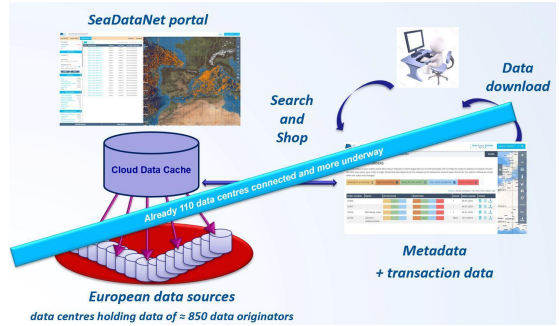
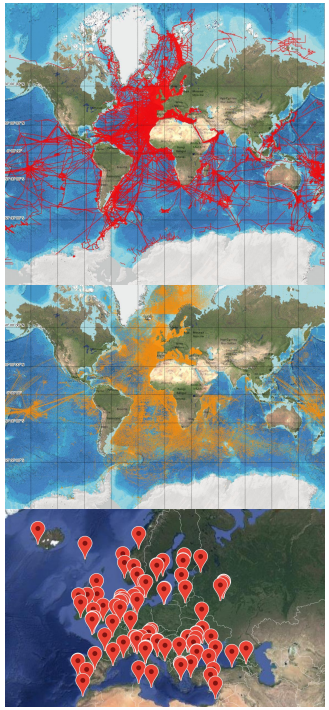
SeaDataNet - pan-European network of NODCs



- Network of marine data centres for curation and long term archiving
- Developing and promoting standards, tools & services for ocean and marine data management
- Controlled vocabularies and European directories
- Giving access to data sets from 110 data centres and more than 850 data originators





webODV: Web Ocean Data View

SeaDataNet

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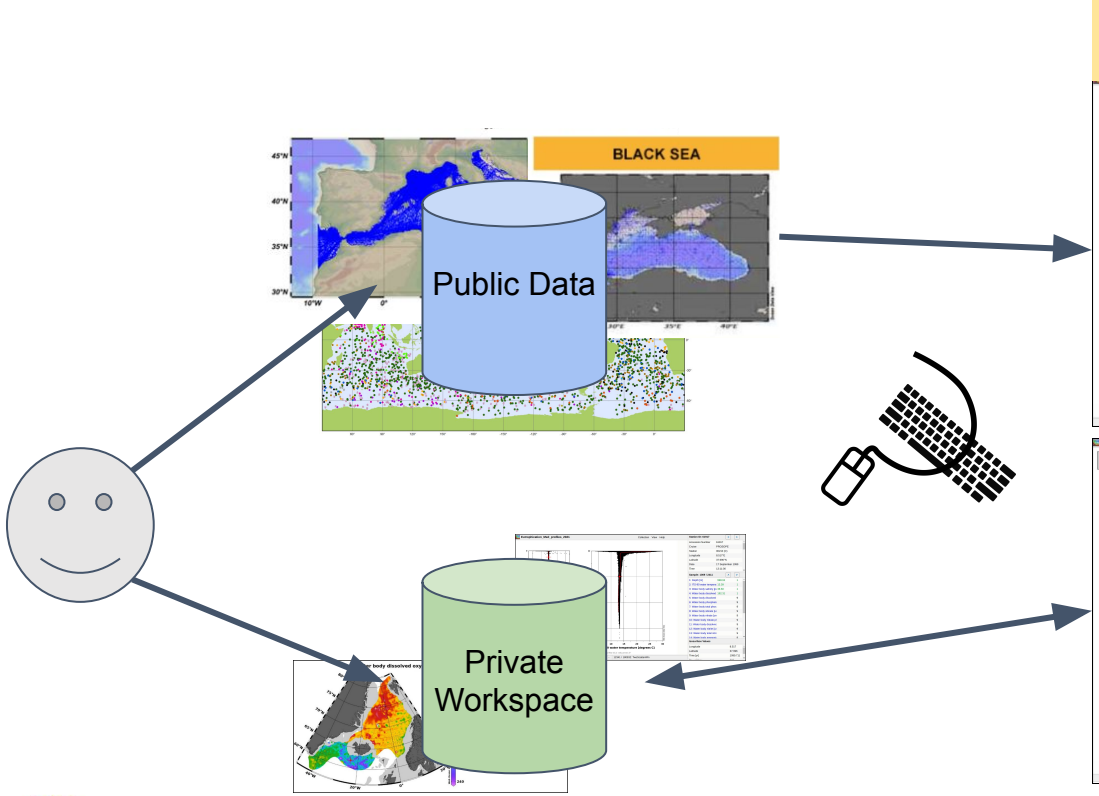
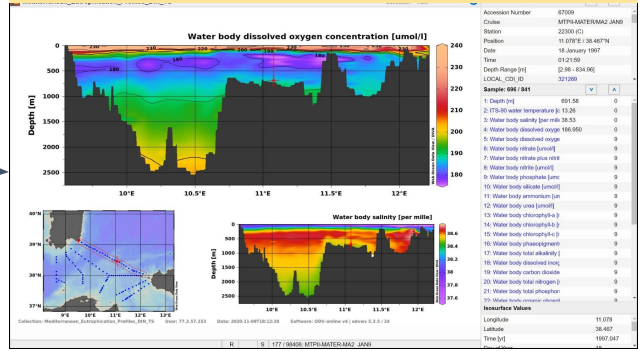
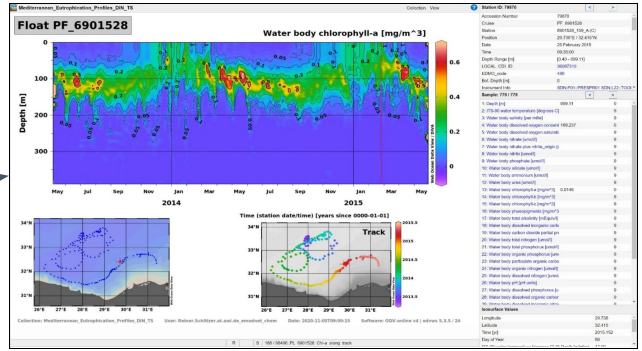
Interactive online analysis of marine data from 110 data centers and 34 countries



Explore, Extract, Analyze, Visualize





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H-CLOUD

EGI-ACE

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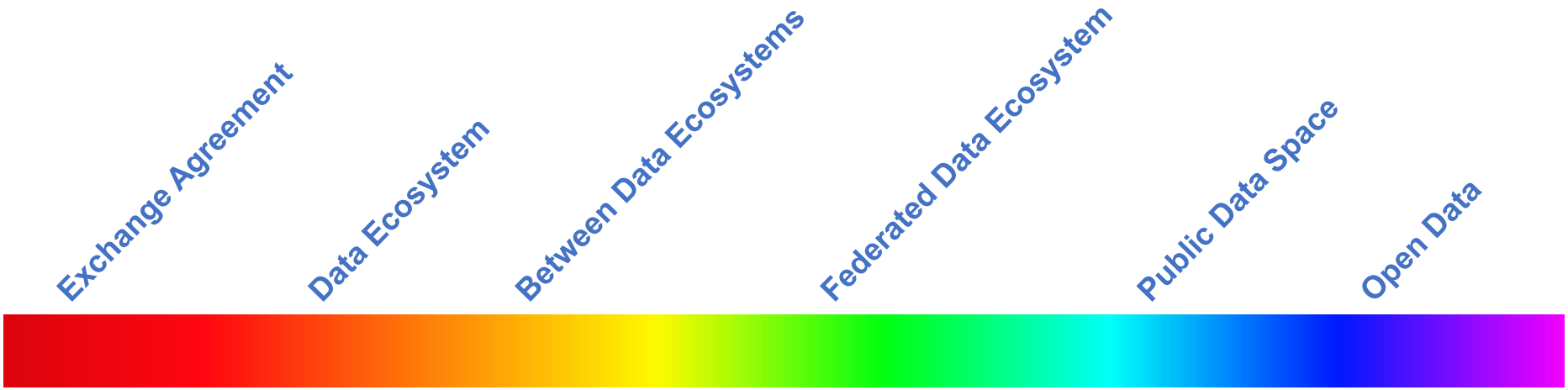
Specific DEAs along the Spectrum



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many examples in both research and industry

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