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The Blue-Cloud Journey
from Pilot Project to a Strategic Marine Node for the EOSC Federation

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The Journey Began Before the Destination Was Clear

When the Blue-Cloud pilot project began under H2020, the EOSC Federation as we discuss it today was still a distant vision

Initial challenge

The **European marine data landscape was powerful, but deeply fragmented**. Data from different Research Infrastructures, satellite missions, and monitoring programs existed in different formats, with different access methods.

Goal

Could we prove the feasibility of a thematic cloud that federates these resources and, most importantly, brings the users to the data?

Implementation

Five real-life scientific demonstrators ranging from fisheries to aquaculture and environmental monitoring. These weren't just theoretical; they were hands-on Virtual Laboratories where researchers could work with combined data sources in a unified environment.

Results

This model of **outsourcing marine services to a thematic infrastructure** was not only feasible but essential for advancing collaborative ocean science.

Our Foundation: A Lesson in Sustainability

A critical lesson from our pilot, and a core piece of advice for any new project, is not to reinvent the wheel.

Our success and stability were built by **leveraging the D4Science Digital Infrastructure**, a mature, production-quality European e-infrastructure

- This wasn't just about servers and storage.

D4Science

- provided **a rich, pre-existing catalogue of services**: a federated AAI, data science tools like JupyterHub and RStudio, workflow management systems, and data hosting capabilities.
- saved us years of development effort.

More importantly, it answers the question of **sustainability**

- By using an operational infrastructure with a long-term roadmap, we could **guarantee service continuity beyond the project's temporal and financial limits**. This builds the trust with users that is paramount for any successful service.

The Evolution: Blue-Cloud 2026 as a Node Builder

With Blue-Cloud 2026, our mindset had to evolve.

No longer just a pilot testing a concept

- we were now an **active contributor to the EOSC build-up phase**: adopt the role of a "Thematic Node" as defined in the EOSC Federation Handbook.

This required a strategic shift.

- We moved from building demonstrators to **focusing on open standards, FAIR principles, and deep interoperability with the wider EOSC ecosystem**.
- It meant actively **engaging with the EOSC governance, contributing to policy discussions, and aligning our technical architecture** with the emerging requirements of the Federation.

We are building our part of the plane while it is flying

- Both a challenge and a tremendous learning experience.

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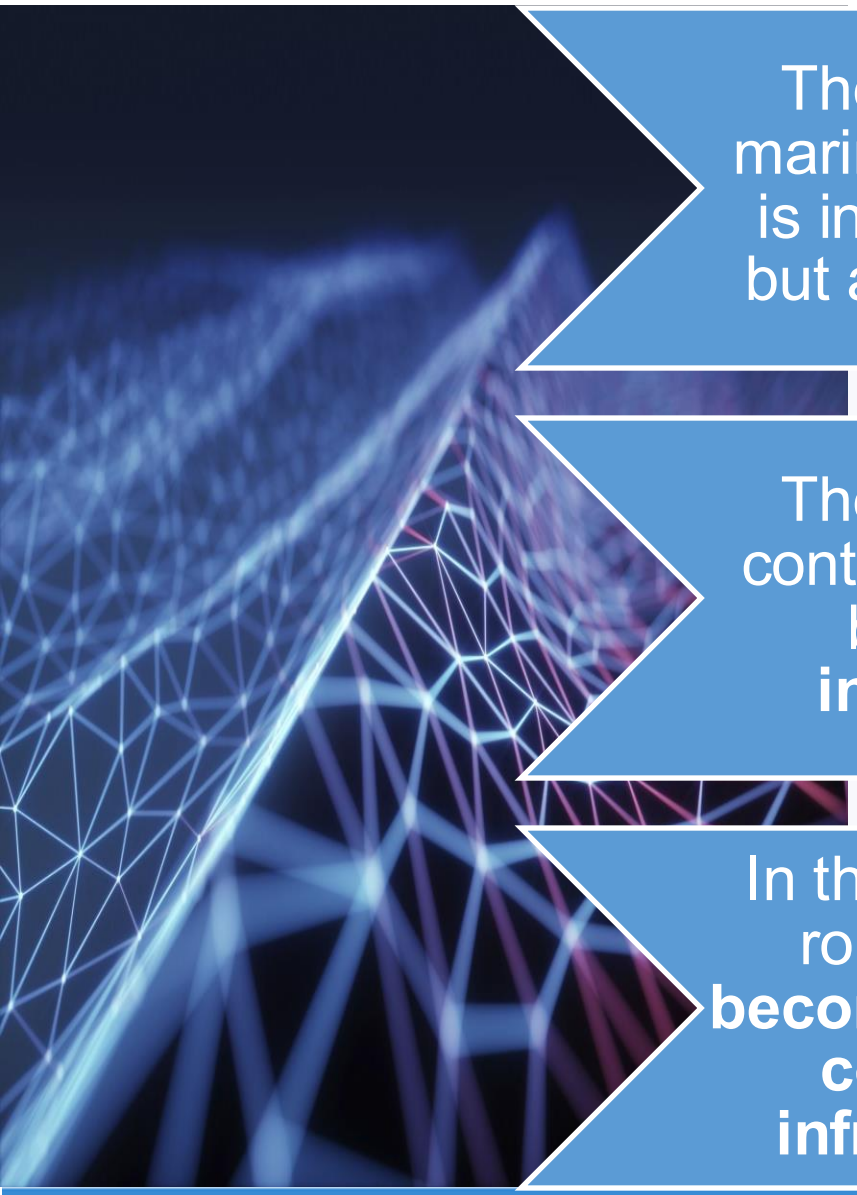
Our Perspective: A Common Vision for the EOSC Marine Space



The European marine landscape is incredibly rich but also complex

We have **world-class assets** like EMODnet for in-situ data, the Copernicus Marine Service for satellite data and forecasts, and the ambitious European Digital Twin Ocean (EDITO) initiative taking shape.

Therefore, our contribution must be one of **integration**

Blue-Cloud is championing a common vision where these major EU assets and our Marine Research Infrastructures are central to driving data provision and open science within the EOSC marine thematic space.

In this vision, our role is **not to become a parallel, competing infrastructure**

Our role is to be the connective material: **an integrator of data and services, and a scientific incubator that adds value on top of them.**

Let me give you a practical example of what this 'incubator' role looks like.

1. A researcher can log into the Blue-Cloud Virtual Research Environment.
2. Through our federated catalogue, they can discover and access harmonized data from both EMODnet and Copernicus Marine in a single workspace.
3. From there, they can launch a Virtual Lab with pre-configured analytical tools and develop, for instance, a new predictive model for nutrient cycles.
4. This entire environment - from data access, to collaborative analysis, to publication - is what we provide.
5. The resulting validated model or data product then becomes a candidate for integration into the operational EDITO framework.

We aim to provide an **agile, scientific sandbox that allows for rapid testing and co-development**, directly feeding and enriching the Digital Twin Ocean. This entire process is aligned with the EOSC federation requirements, ensuring the benefits are shared with all.

So, what can we share from our journey?

Build on sustainable, operational foundations

- Don't start from scratch.

Connect, don't compete

- A thematic node's greatest value comes from **integrating and adding value to existing strategic assets**. Our goal should be to make the whole ecosystem stronger. For new projects, this means thinking about your integration strategy from day one.

Clear governance and mandates

- To truly optimize the European landscape, we need **well-defined roles, data flows, and Service Level Agreements between thematic nodes and the core infrastructures**. This is essential to avoid duplication and maximize our collective impact.

Engage with your user communities early and often

- Ensure what you are building is not just technically sound, but that it **meets a real, pressing scientific need**.

Conclusions

Our journey has taken us from a feasibility pilot to a strategic node focused on integrating core EU assets

- Building on sustainable, operational foundations to ensure long-term impact.
- Connecting and adding value to the ecosystem, not to duplicate it.

A connected, collaborative, and sustainable marine data ecosystem for Open Science within EOSC.

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