



# Blue-Cloud

## Blue-Cloud Strategic Roadmap to 2030

### The Road Ahead

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### **Blue-Cloud Final Conference**

Brussels, 8 December 2022





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Shaping a vision, mission & value proposition for Blue-Cloud**
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# What is Blue-Cloud's added value?

## Shaping a vision, mission & value proposition for Blue-Cloud

### EU Green Deal & Mission "Restore our Ocean & Waters by 2030"



### G7 Future of Seas & Oceans Initiative



### SUSTAINABLE DEVELOPMENT GOALS



## The Science We Need For The Ocean We Want

Ocean science that is shared openly and available for re-use

# What is Blue-Cloud's added value?

Shaping a vision, mission & value proposition for Blue-Cloud



-  Improving the **transformation** of marine data to products
-  Advancing more efficient **modelling** of ocean variables
-  Inspiring, enabling & accelerating **community-driven innovation** to Ocean challenges
-  Supporting **biodiversity & environmental** monitoring
-  Strengthening **collaboration** at a global scale

# What is Blue-Cloud's added value?

## Shaping a vision, mission & value proposition for Blue-Cloud



### Stakeholder consultation process 2020 - 2022



**1st Phase of dialogue & consultations with key stakeholders**  
 Project Partners, ESEB, EU DGs, marine researchers, blue data infrastructures & e-infrastructures

**2nd Phase: Public consultation**  
 Wider Blue-Cloud Stakeholder Communities

### Blue-Cloud External Stakeholder & Expert Board



# What is Blue-Cloud's added value?

## Shaping a vision, mission & value proposition for Blue-Cloud

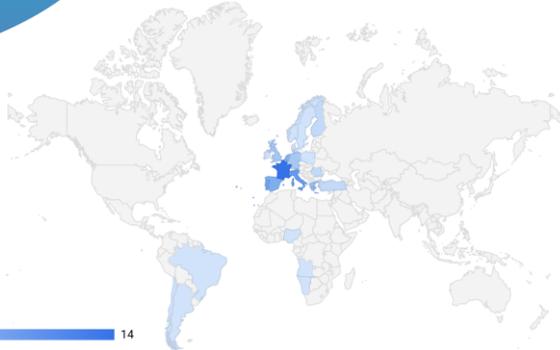


### Roadmap to 2030 Online Consultation

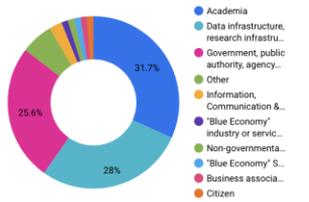
138 + 82  
Responses

+120  
Participants  
34 Responses

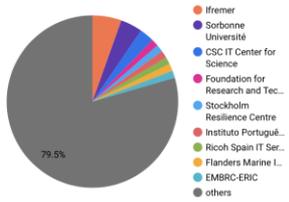
Respondents by country/region



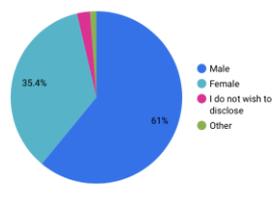
Respondent types



Organisation



Gender



### One-2-one Interviews


# What is Blue-Cloud's added value?

## Shaping a vision, mission & value proposition for Blue-Cloud



**Primary users:** Directly interact with Blue-Cloud' services.

### USER VALUE

**They are attracted by...convenience!**

- ✓ No need to download data to own computer
- ✓ No need to buy expensive software & licenses
- ✓ No need to buy a new computer

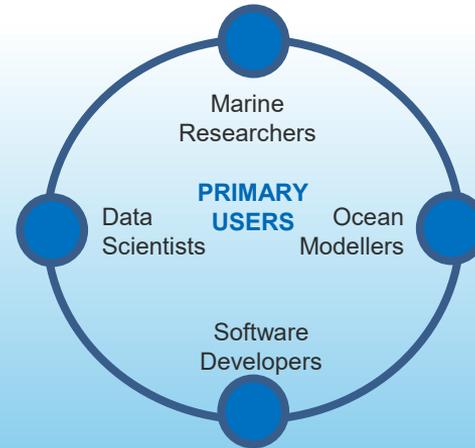
**Benefits:** Higher scientific productivity

What are the most important core functionalities and services offered by Blue-Cloud to you?

- Easy access to marine data across data services & RIs
- Analytical software tools (R-Studio, Jupyter Hub, etc)
- Computing power

What else would you like Blue-Cloud to deliver?

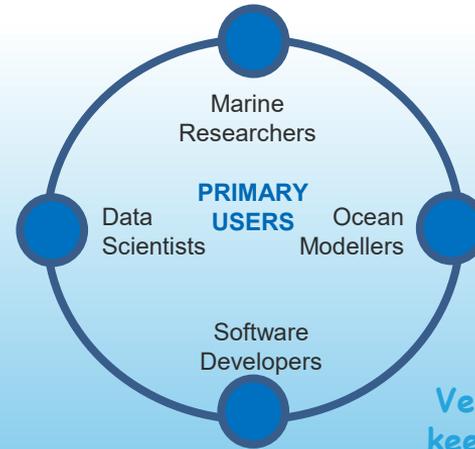
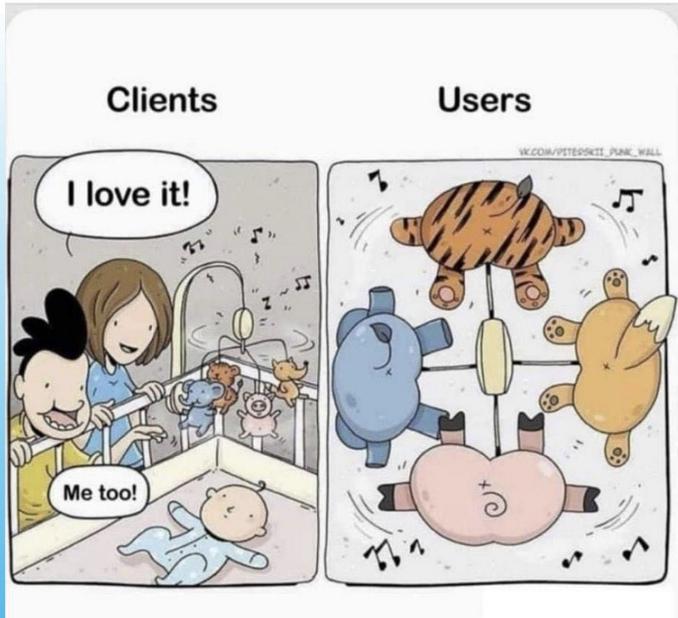
- More data, a "real" cloud experience & more computing power
- Support & training to apply Artificial Intelligence
- Access to Ocean models
- Supporting visualisation tools to enable exploitation of results



# What is Blue-Cloud's added value?

## Shaping a vision, mission & value proposition for Blue-Cloud

**Primary users:** Directly interact with Blue-Cloud' services.  
**USER VALUE**



Very important to keep primary users happy by listening and delivering to their needs!

# What is Blue-Cloud's added value?

## Shaping a vision, mission & value proposition for Blue-Cloud

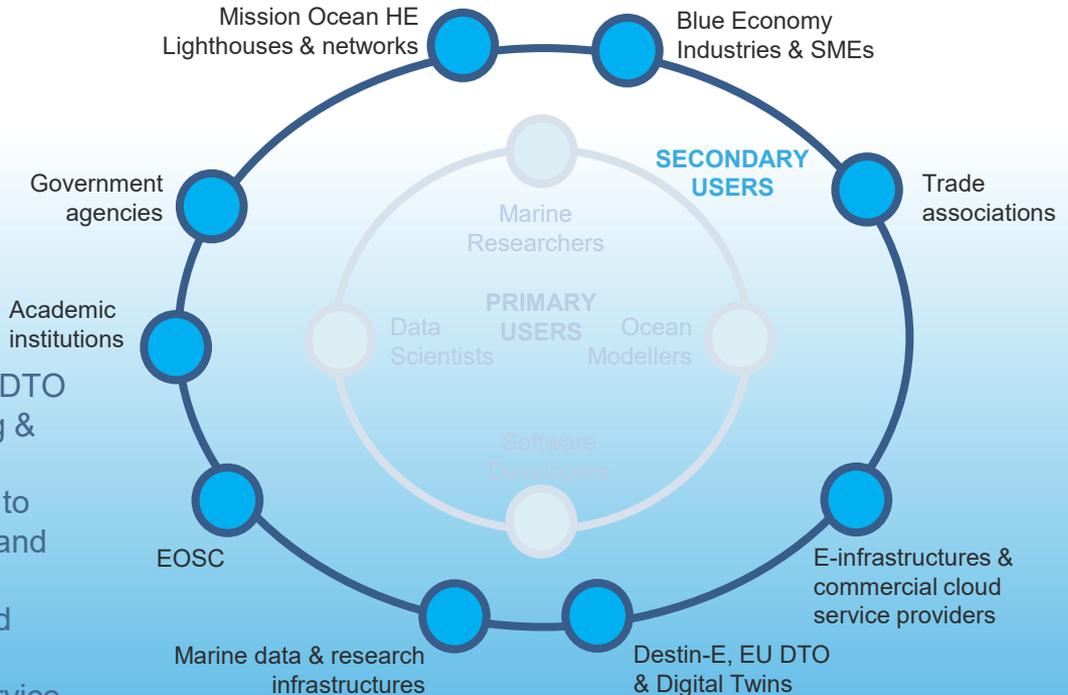


**Secondary users:** Benefit from Blue-Cloud and/or can influence Blue-Cloud, but do not interact directly with the tools, digital assets & services provided by Blue-Cloud.

### IDENTIFY NEEDS & OPPORTUNITIES FOR COLLABORATION

What added value can Blue-Cloud bring in support of your efforts?

- Bridging the gap with EOSC
- Contribute to the underlying fabric of EU DTO
- Contribute to bridge the Ocean observing & modelling communities
- Collaborate with modelling organizations to attract users seeking to experiment with and build from “pre-loaded” scenarios
- Become natural partner for Ocean related Digital Twins
- Become preferred or mandated cloud service for EU funded projects



# What is Blue-Cloud's added value?

## Shaping a vision, mission & value proposition for Blue-Cloud

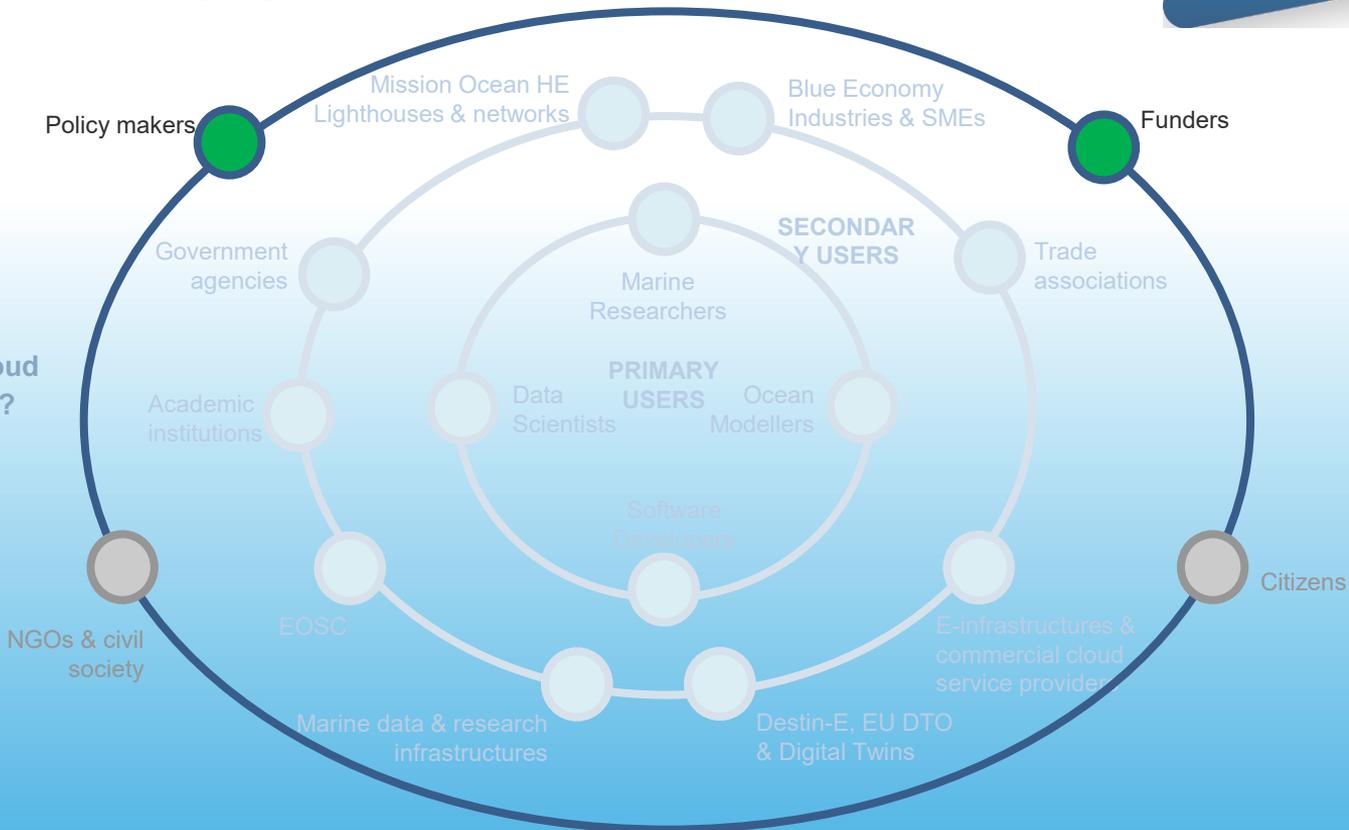


**Tertiary users (stakeholders):**  
Do not interact nor directly use Blue-Cloud' services but either affect or are affected by the services.

### POLICY & SOCIETAL EXPECTATIONS

What added value can Blue-Cloud bring in support of your efforts?

- Blue-Cloud should deliver value to policies addressing societal challenges: **EU Green Deal** and **UN Agenda 2030**.
- **Green Deal Data Space** will need supporting technical infrastructures, including **AI testing** and **experimentation facilities**.



# What is Blue-Cloud's added value?

Shaping a vision, mission & value proposition for Blue-Cloud



Blue-Cloud

Policy Institute for Ocean Health Research & Blue Economy

## What is Blue-Cloud?

A **community of practice**.  
An **incubator**.

Of **data analytical services** and **modeling methods** in support of research of oceans, European seas, coastal and inland waters.



## For whom is Blue-Cloud?

For **marine researchers, data scientists & modelers, computer scientists & software developers**.

## What problem does it solve?

Accelerating **marine & freshwater data interoperability, modeling** and **Big Data analytics** to catalyse innovation in support of research & knowledge of oceans, seas, coastal and inland waters.



*Blue-Cloud's  
Mission 2030*

## How does it contribute to solve it?

By providing a FAIR digital ecosystem offering **cloud capabilities, federated data, collaborative tools, Artificial Intelligence (AI) expertise, training & services** and **visualization tools** for exploration of data and results.

**Blue-Cloud's  
Value Proposition**

# What is Blue-Cloud's added value?

## Shaping a vision, mission & value proposition for Blue-Cloud



**Secondary users**  
EOSC, GDDS, EU DTO, Digital Twins

### Tested data analytical methods & workflows to build:

- Analytical data services (Biodiversity, MSFD, MSP, SDG14)
- EU Digital Twin Ocean & private sector (Ocean related) DTs

**Knowledge of Ocean, seas, coastal & inland waters**

A bridge to feed data from existing services and RIs and new **digital commons** into **EOSC**



Solutions to enhance the **marine data space** that will feed and support the **Green Deal Data Space**



A platform & services that **scientists & researchers** can harness to **test & develop new analytical methods**, including through **AI testing** and **experimentation**

Opportunities for **collective learning**, together with **support** and **training** on the application of **AI, ML and Big Data** analytics

**Primary users**

Marine researchers · Data scientists & modelers · Computer scientists & software developers

# Blue-Cloud Strategic Roadmap to 2030



2023

*"Demonstrating the potential of web-based open science in the marine domain."*

2026

*"Accelerating marine & freshwater data interoperability, modelling and Big Data analytics through AI, Machine Learning and cloud-based Open Science to catalyse innovation in support of the EU Green Deal & UN Agenda 2030".*

2030

Key Assets

01

## + FAIR & OPEN DATA

**Strategic Action Path 1: Sustain flow of FAIR & open Ocean data into Blue-Cloud**

1.1. Expand DD&AS with **priority EU marine data & research infrastructures**

1.2 Optimise machine-to-machine interactions with RIs  
1.3 Enhance for sub-setting & extracting data sets and feeding data lakes for EOVs.  
1.4. Expand with **citizen science** repositories

1.5 Expand with **freshwater** repositories

02

## + APPLICATIONS

**Strategic Action Path 2: Trigger innovative AI applications & methods around priority thematics to inspire & guide the community**

2.1 Test and develop new digital assets, including **workbenches** for EOVs

2.2 Test and develop **new** analytical services addressing **priority policy areas of EU Green Deal**

2.3 Continue evolving existing VLabs to **upscale existing analytical products & services** to service policy objectives  
2.4 Engage with **private sector** to develop fit-for-purpose analytical services to support **digital twins** servicing **Blue Economy** applications

03

## + CLOUD & IT

**Strategic Action Path 3: (Further) federate (with) blue infrastructures, e-infrastructures & strategic initiatives**

3.1 Further **e-integration**: Orchestrating analytical workflows, Single-Sign-On, monitoring & accounting, + computing pc  
3.2 Further integrate with **WEKEO**  
3.3 Setup **DTO Task Force** to align w/ EU DTO & DestinE  
3.4 Connect with **communities** developing components of **EU DTO**  
3.5 Ensure **long-term EOSC alignment** and integration

04

## + COMMUNITY

**Strategic Action Path 4: (Further) grow a thriving Ocean open science community, leveraging skills, incentives & rewards to boost innovation**

4.1 Continuously **monitor & deliver needs of primary users**

4.2 Set up a **support** service and a **training academy** to build FAIR data, AI & Big Data skills amongst researchers and to attract and service new users

4.3 Set up **competitions** to invite users to innovate solutions to challenges put forward by secondary users

4.4 Connect with **(Horizon Europe) research project communities** to attract **new users** to Blue-Cloud

4.5 Set up MoU's with key EU initiatives (i.e., EU DTO, GDDS) to reward methods developed in Blue-Cloud with attribution of "excellence"; and/or enticing **Terms of Use**.

4.6 Explore opportunities with commercial platforms to promote **dissemination of FAIR methods** "incubated" in Blue-Cloud

05

## + ALLIANCES

**Strategic Action Path 5: Connect & align with wider developments and other communities to bring in state-of-the-art and contribute experience**

5.1 Engage with **Green Deal Data Space Community of Practice**

5.2 Engage with **Mission Lighthouses** and **EU4Ocean networks** to identify priorities & challenges when "interrogating" the Ocean

5.3 Continue collaboration with **All-Atlantic Ocean Research Alliance**

5.4 Evolve methods into international **Ocean Best Practices** supporting international efforts (GOOS, GEOSS) and **UN "Ocean Decade" Programs**



A (Blue) Data Space federated into EOSC



An incubator of (blue) data analytical methods & services



A trusted Community of Practice



A sustainable business model

# Blue-Cloud Strategic Roadmap to 2030

## Policy Recommendations



Blue-Cloud  
Policy Recommendations Roadmap 2030

### Towards sustaining the flow of FAIR and open marine data in Blue-Cloud and other Open Science environments

1. Operationalise **funding** for **trusted EU marine data infrastructures** to maintain seamless operation & evolution of services to meet future needs e.g., cloud-based data sharing & Open Science
2. Take measures to strongly **mandate improved flow of scientific data into EU marine data & research infrastructures** and help overcome barriers to data retention for publicly funded research.

### Towards triggering development of innovative methods around priority thematic to inspire & guide the community

3. **Capitalise on Blue-Cloud** to service the needs of projects building analytical tools & services to support research (e.g., HE projects) and/or to inform policy (e.g. biodiversity, MSFD, WFD, etc).
4. Encourage EU initiatives to **share outcomes of stakeholder consultations** to identify **user needs & requirements** for new analytical services that could be developed within Blue-Cloud.
5. Promote **free access to data services** with data formats and access protocols supporting interoperability worldwide (e.g., OGC, TDWG...), relaxing 3rd party barriers to Open data in the marine domain to enable user-driven innovation and Open Science at a wider scale, while fostering data licensing to support data usage tracking.

### Towards (further) federating with key marine data, research and e-infrastructures and strategic initiatives to enhance value to users

6. Sustain progress towards federated EU e-infrastructures to **increase cloud storage, computing power & GPUs**, enabling researchers to tap on **EU digital commons** to deliver Open Science.
7. Encourage key players (EOSC, future EU DTO) to fix rules of compliance that enable users to **easily port their digital assets across e-infrastructures** without being “tied” to them.
8. Promote **cooperation** between **public** marine data and research infrastructures, e-infrastructures and European, **private** cloud service providers to bring data and models to their platforms, making them also available in their computing facilities to support wider use, exploitation, dissemination and uptake.

### Towards (further) growing a thriving community of Ocean Open Science practitioners to boost innovation at a wider scale, leveraging on skills, incentives & rewards

9. Include in curricula and support **training** efforts to build capacity amongst researchers in the use of **AI, ML**, and on the application of **FAIR** practices **capitalising on Blue-Cloud** to deliver training.
10. Foster mechanisms that **reward research teams** that incubate methods/services that are taken-up by EU initiatives or services, including **economic rewards** linked to their exploitation.
11. Establish **Terms of Reference** for exploitation of digital commons across the EU Green Deal Data Space.

### Towards connecting and aligning with wider developments and other communities

12. Support uptake and capitalization of the results of the community-driven, Open Science efforts delivered by Blue-Cloud into the **EU Digital Twin Ocean** and other EU and **global environmental initiatives**, such as the UN Convention on Biological Diversity and the UN Framework Convention on Climate Change.

Thank you for your attention!



**Blue-Cloud**

Unlocking  
*Open Science*  
in support of the  
*EU Green Deal*

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FINAL CONFERENCE