Blue-Cloud Roadmap to 2030

Co-creating a Vision & Recommendations to 2030

March 23rd, 2021
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Blue-Cloud Roadmap to 2030
Introduction

🌀 **Why a long-term vision for the B-C's efforts?**

🌀 **What added value will B-C deliver?**

🌀 **The road ahead: How should these efforts evolve into the future?**

🌀 **How can you join us in planning this journey?**

Why a long-term vision?
Responding to global change with global action

Global change ← → **Global response**

CLIMATE CHANGE	SCIENCE-BASED SOLUTIONS
BIODIVERSITY LOSS	DIGITAL COOPERATION
POLLUTION & WASTE	BLUE JOBS & WELLBEING

Why a long-term vision?
Responding to global change: The role of web-based open science

Blue-Cloud

EU Green Deal & Mission Starfish

G7 Future of Seas & Oceans Initiative

SUSTAINABLE DEVELOPMENT G⊙ALS

The Science We Need For The Ocean We Want

Ocean science that is shared openly and available for re-use
[Web-Based Open Science]

Why a long-term vision?
Delivering on the EU Green Deal, G7 FSOI & UN Agenda 2030

Blue-Cloud

Ocean-related policy objectives

| Pollution | Biodiversity | Food | Climate change | Ocean hazards | Blue economy | Ocean observation | Ocean modelling & forecasting | Data knowledge & access | Ocean citizenship |

EU Green Deal & Mission Starfish

UN Agenda 2030 & Ocean Decade for Sustainable Development

G7 Future of Seas & Oceans Initiative

Improve our **knowledge** and **understanding** of marine ecosystems, including their status, underlying processes and interconnections.

Monitor trends and **evolution**, **predicting** future developments around different, **simulated scenarios**. Evaluate and **guide policies**, **strategies** and **plans**, providing **scientific evidence** to support and/or improve and/or update them.

How web-based open science can contribute to support EU and international policy objectives

Trigger **innovative**, **marketable science-based applications** and **solutions** to challenges.

Shorten **time span** between **research** and **innovation** in frontier fields.

Develop new **observation technologies** and capabilities through **science-based innovation**.

Develop **models** for application in "**digital twins**".

Train future scientists & researchers in **data modelling**.

Train **future users** of DTOs.

Develop **scenarios** & **policy options**.

Build case for **data sharing**.

Build case for **federation** of catalogues of EU blue data infrastructures and alignment of **FAIR** standards towards global capability.

Train future scientists & researchers in **FAIR data management**.

Enable **user-friendly interfaces** to bring Ocean science closer to citizens
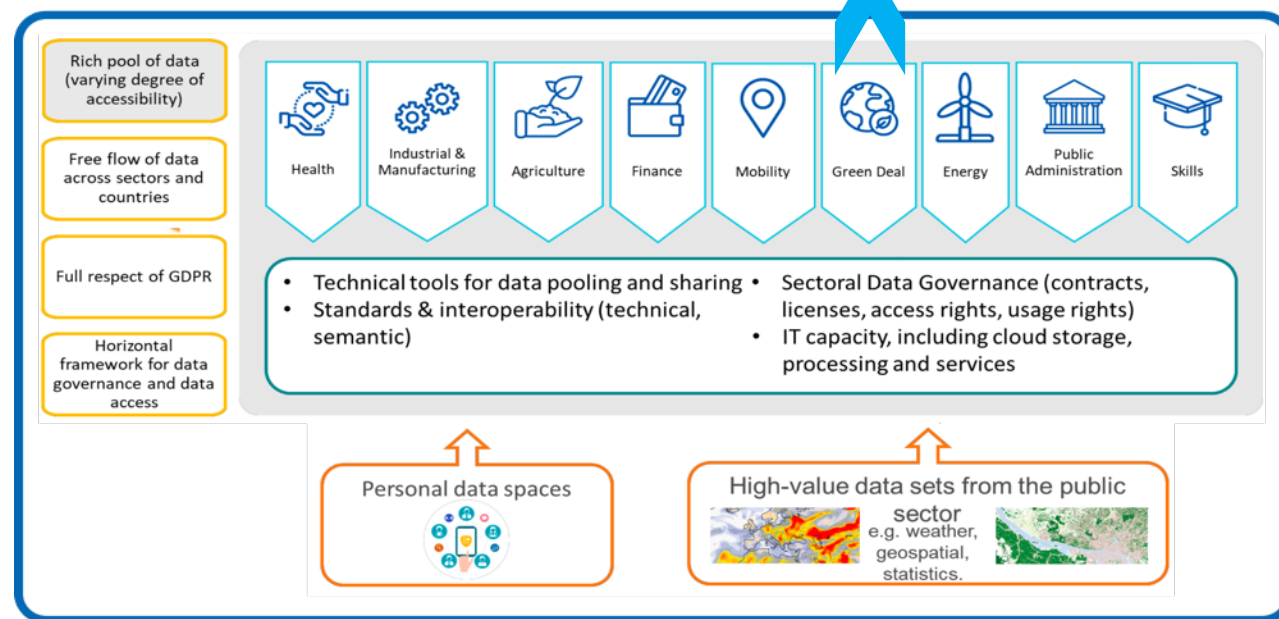
Why a long-term vision?
Not working in isolation, but as part of a European strategy

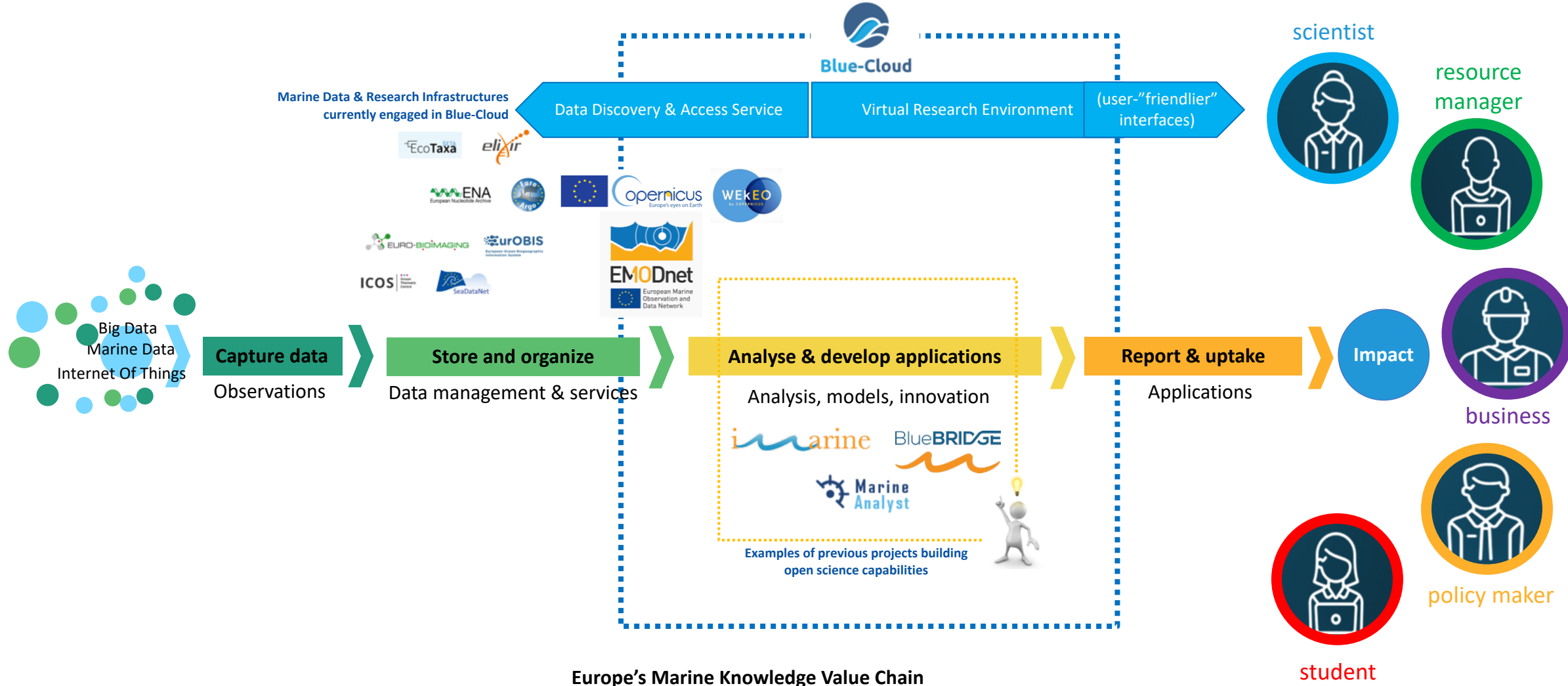# Gearing up for web-based, open Ocean science
B-C's added value to a thriving landscape

Europe's Marine Knowledge Value Chain

Gearing up for web-based, open Ocean science
B-C's added value

Blue-Cloud

Ocean-related policy objectives

Pollution	Biodiversity	Food	Climate change	Ocean hazards		Blue economy		Ocean observation	Data knowledge & access	Ocean modelling & forecasting

Ocean citizenship

EU Green Deal & Mission Starfish

UN Agenda 2030 & Ocean Decade for Sustainable Development

2 ZERO HUNGER

13 CLIMATE ACTION

14 LIFE BELOW WATER

Zoo & Phytoplankton EOV products

Plankton Genomics

Marine Environmental Indicators

Fish a matter of scales

Aquaculture Monitor

How Blue-Cloud is contributing to support EU and international policy objectives

Future of Seas & Oceans Initiative

EMODnet, **CMEMs** and other blue data infrastructures in dialogue for further **interoperability** of data services.

Alignment of **FAIR** principles towards global capability.

Promotion of **data sharing**.

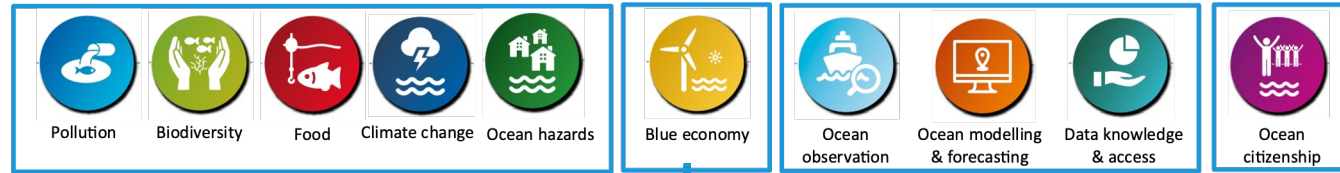Train future scientists & researchers in **FAIR data management.**

Analytical models developed in demonstrators can nurture future EU pilot "**digital twin**".

Train **future users** of EU pilot DTO.

Gearing up for web-based, open Ocean science
B-C's added value

To support EU Green Deal & UN Agenda 2030 **open science** in the marine domain requires

| Pollution | Biodiversity | Food | Climate change | Ocean hazards | | Blue economy | | Ocean observation | Ocean modelling & forecasting | Data knowledge & access | | Ocean citizenship |

| **OPEN & FAIR marine data** | **Federated infrastructures** | **Analytical resources** | **Community** (Users, practitioners, advocates) | **Open science policies** |

2022

KER: Data Discovery &Access Service (DD&AS), underpinned by (potential) metadata standard for marine data sets.

KER: B-C Catalogue (notebooks, models, publications, etc…), underpinned by EOSC compliant metadata for research outputs.

KER: DD&AS (showcase approach towards federation of infrastructures, signposting outstanding challenges).

KER: B-C Virtual Research Environment

KER: B-C Catalogue of **virtual labs**

Asset: B-C **Community**

Alignment with **EOSC** policies

Important steps in the right direction...
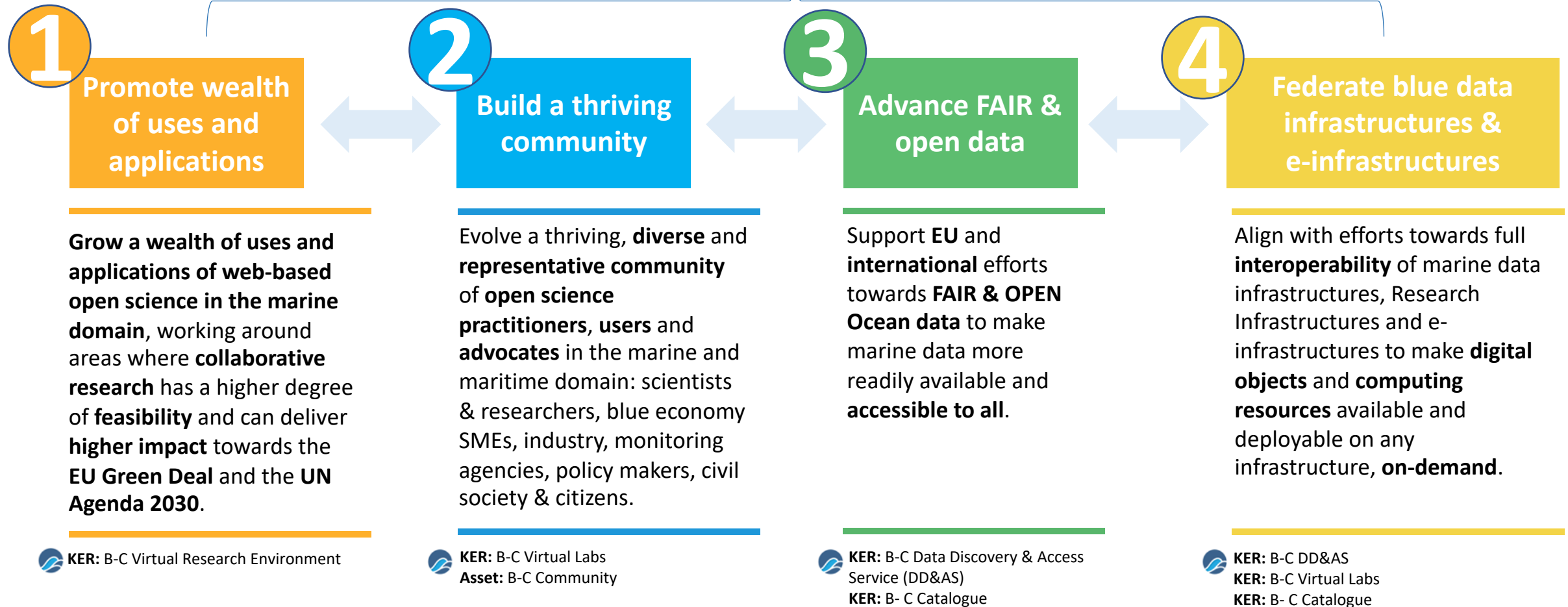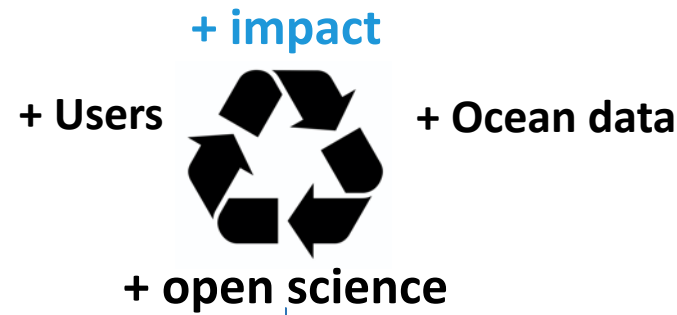
The road ahead
What next?

By 2030, realizing the full potential of web-based open science in the marine domain in support of the EU Green Deal & UN Agenda 2030

...but where do we go from here?

The road ahead
What next?

+ impact

+ Users   + Ocean data

+ open science

1 Promote wealth of uses and applications

Grow a wealth of uses and applications of web-based open science in the marine domain, working around areas where **collaborative research** has a higher degree of **feasibility** and can deliver **higher impact** towards the **EU Green Deal** and the **UN Agenda 2030**.

KER: B-C Virtual Research Environment

2 Build a thriving community

Evolve a thriving, **diverse** and **representative community** of **open science practitioners**, **users** and **advocates** in the marine and maritime domain: scientists & researchers, blue economy SMEs, industry, monitoring agencies, policy makers, civil society & citizens.

KER: B-C Virtual Labs
Asset: B-C Community

3 Advance FAIR & open data

Support **EU** and **international** efforts towards **FAIR & OPEN Ocean data** to make marine data more readily available and **accessible to all**.

KER: B-C Data Discovery & Access Service (DD&AS)
KER: B- C Catalogue

4 Federate blue data infrastructures & e-infrastructures

Align with efforts towards full **interoperability** of marine data infrastructures, Research Infrastructures and e-infrastructures to make **digital objects** and **computing resources** available and deployable on any infrastructure, **on-demand**.

KER: B-C DD&AS
KER: B-C Virtual Labs
KER: B- C Catalogue

KER: Key **E**xploitable **R**esult resulting from the **B**lue-**C**loud project

The road ahead
Co-creating a shared Vision & Action Plan

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

2022

2030

"Realizing the full potential of web-based open science in the marine domain to guide the next decade of challenges, servicing a wealth of multidisciplinary users."

+ FAIR & OPEN DATA

03

+ COMMUNITY

02

04

+ USES & APPLICATIONS

01

+ FEDERATED BLUE DATA & e-INFRASTRUCTURES

Blue-Cloud

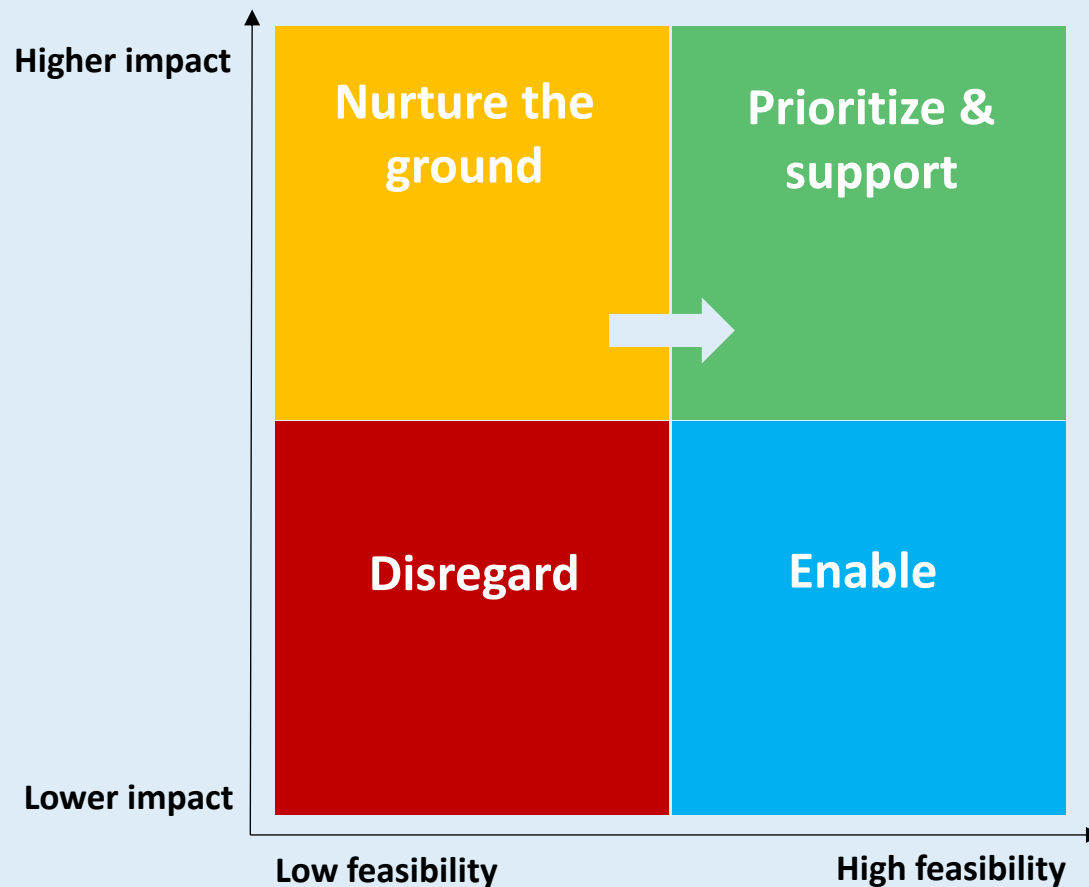# The road ahead
Co-creating a shared Vision & Action Plan

+ USES & APPLICATIONS

01

What web-based, collaborative research initiatives should we **prioritize** for higher impact?

Green deal monitoring

Biodiversity monitoring

MPA designation and monitoring

Monitoring and mapping HABs

A social science & sustainability demonstrator that integrates public opinions about the ocean, and helps to guide to way towards transformational behavioral change

Resilient coastal communities: enabling artificially intelligent systems mapping indicators for coastal flooding and coastal erosion

Linking with human health and wellbeing data

Transdisciplinary ocean simulator: A demonstrator that integrates science, social and economic data and information to inform future decisions.

River-coastal-open-ocean connectivity applications; 3D particle tracking applications; Deep sea applications; Polar applications

Ecosystem approach to fisheries projects

Marine Spatial Planning

A platform for serious games

Underwater imagery: a tool for imagery management across countries, develop a standard way to imagery archiving to support benthic monitoring (habitat and communities' distribution in time and space)
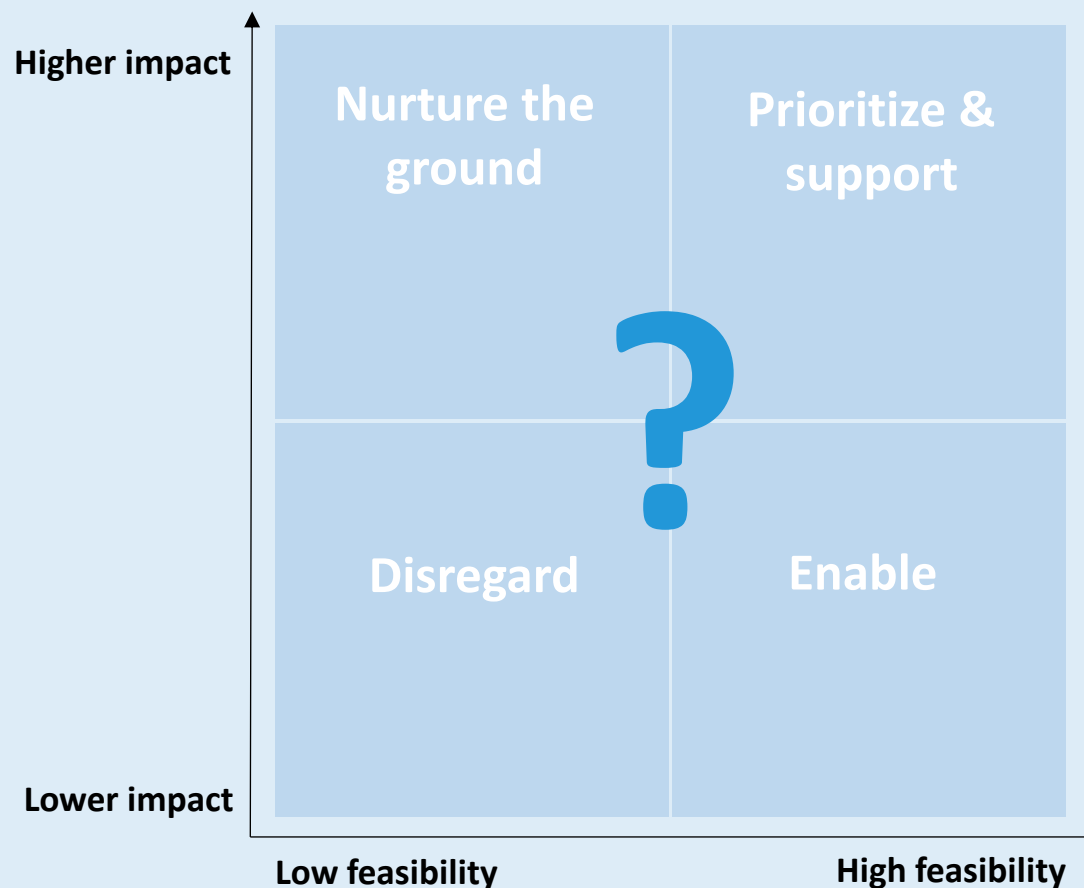
The road ahead
Co-creating a shared Vision & Action Plan

+ USES & APPLICATIONS

01

What web-based, collaborative research initiatives should we **prioritize** for higher impact?

Higher impact

Nurture the ground	**Prioritize & support**
Disregard	**Enable**

Lower impact

Low feasibility **High feasibility**

The road ahead
Co-creating a shared Vision & Action Plan

2030

Blue-Cloud

+ USES & APPLICATIONS

01

What web-based, collaborative research initiatives should we **prioritize** for higher impact?

Higher impact

Nurture the ground

Prioritize & support

?

Disregard

Enable

Lower impact

Low feasibility

High feasibility

What collaborative research in the marine domain can deliver higher societal impact?

Which has a higher probability of success?

The road ahead
Co-creating a shared Vision & Action Plan

By 2030 Blue-Cloud should…

96% agree that B-C should **support open science**

95% be actively used by the **marine research & science community**

93% inform better **science-based policies**

88% be actively used by **other stakeholders**

83% believe it should **drive innovation** across the **blue economy**

02

What **actions** and **incentives** will help us bring new open science practitioners, users and advocates onboard? **Who** should we target? **When**?

What will **draw marine scientists** into using B-C services?

What will **attract blue economy SMEs**? **Industry**?

What will draw **policy makers**? And **citizens**?

What will draw **researchers** from **other disciplines**?

+ COMMUNITY

The road ahead
Co-creating a shared Vision & Action Plan

03

How should **B-C's efforts evolve** to contribute towards aligning **FAIR data principles** and **standards** in the EU **marine community**? And **internationally**?

+ FAIR & OPEN DATA

- How can B-C assets evolve to **support data ingestion efforts** of existing European **marine data** and **research infrastructures** and contribute to drive **new users** to them through **EOSC**?

- How can B-C assets contribute to further advance **G7 Future of Oceans Initiative**? And other **international initiatives**? (e.g; **IOC-IODE**'s **ODIS**, **GOOS**, etc).

- What **international alliances** should we target?

The road ahead
Co-creating a shared Vision & Action Plan

- How do we evolve **B-C's Data Discovery & Access Service** to **include the wealth of data catalogues** from across all European marine data & research infrastructures?

- What should we do to enable **B-C's Catalogue** of **analytical methods**, **algorithms** and **applications** to **be deployed in other e-infrastructures** but also in **blue data infrastructures**, **closer to data**?

- How should **B-C virtual labs** evolve to be **interoperable** across HPC computing platforms in Europe?

- How do we evolve **B-C's assets** for full integration into **EU pilot DTO**, feeding its development with **B-C's virtual labs**, **analytical methods**, **algorithms**, **applications** and **user community**? And into EU's **GreenData4All** data space? Other data spaces?

04

+ FEDERATED BLUE DATA & e-INFRASTRUCTURES

How do we **contribute** towards better interoperability standards and protocols?

What do we bring into the EU pilot **Digital Twin of the Ocean**?

The road ahead
Co-creating a shared Vision & Action Plan

2030

B-C Roadmap to 2030:

A shared Vision
Action Plan 2025
Recommendations to 2030

To contribute to successfully advancing web-based open science in the marine domain into the decade, in support of the EU Green Deal & UN Agenda 2030, capitalizing and building on Blue-Cloud's assets
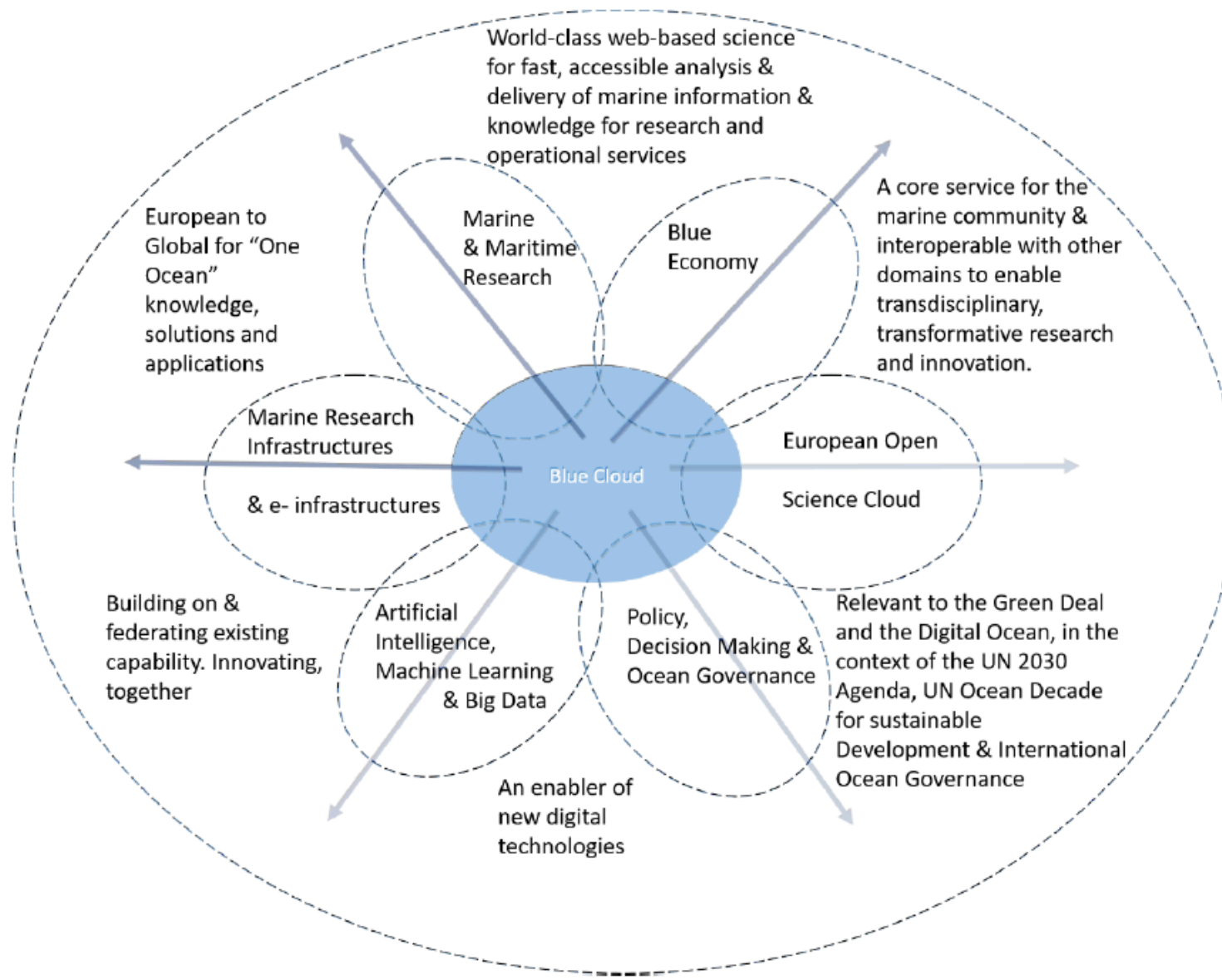
Blue-Cloud Key Stakeholder Communities

B-C Roadmap to 2030
Policy Document
July 2022

THEE FOLKE WERE RICH BVT FVLL OF WOE

"VNTO THE SEA YE ALL MVSTE GO!"

SO BOARDED BARQVES AND GRABBED SOME OARS

AND LEFFT BEHND TEH DAILY CHORES

"COMETH ERE MOR OFT WE OVGHTA"

"ITS JVST SO GRAET VPON THE WATER"

SO WHATS THE MORAL OF OVR TALE?

OF COVRS ITS GOOD TO BE FVLL WEALTHY

BVT NEED WE OCEANS TO KEEP VS HEALTHY

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Policy Document**
July 2022

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Thank you! Stay tuned!
https://blue-cloud.org/
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