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Blue-Cloud: Developing a marine thematic EOSC cloud to explore and demonstrate the potential of cloud based open science in the domain of ocean sustainability

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The European Open Science Cloud (EOSC) is an initiative launched by the European Commission in 2016, as part of the **European Cloud Initiative**. EOSC aims to provide a virtual environment with open and seamless services for storage, management, analysis and re-use of research data, across borders and scientific disciplines, leveraging and federating the existing data infrastructures.

Following its launch several Calls have been published and several projects have been granted for developing (parts of) the EOSC, such as for example ENVRI-FAIR. For the marine domain a dedicated call was launched as part of 'The Future of Seas and Oceans Flagship Initiative', combining interests of developing a thematic marine EOSC cloud and serving the Blue Economy, Marine Environment and Marine Knowledge agendas.

The winning H2020 Blue-Cloud project is dedicated to marine data management and it is coordinated by Trust-IT with MARIS as technical coordinator. The aims are:

- To build and demonstrate a Pilot Blue Cloud by combining distributed marine data resources, computing platforms, and analytical services
- To develop services for supporting research to better understand & manage the many aspects of ocean sustainability

- To develop and validate a number of demonstrators of relevance for marine societal challenges
- To formulate a roadmap for expansion and sustainability of the Blue Cloud infrastructure and services.

The project will federate leading European marine data management infrastructures (SeaDataNet, EurOBIS, Euro-Argo, Argo GDAC, EMODnet, ELIXIR-ENA, EuroBioImaging, CMEMS, C3S, and ICOS-Marine), and horizontal e-infrastructures (EUDAT, DIAS, D4Science) to capitalise on what exists already and to develop and deploy the Blue Cloud. The federation will be at the levels of data resources, computing resources and analytical service resources. A Blue Cloud data discovery and access service will be developed to facilitate sharing with users of multi-disciplinary datasets. A Blue Cloud Virtual Research Environment (VRE) will be established to facilitate that computing and

analytical services can be shared and combined for specific applications.

This innovation potential will be explored and unlocked by developing five dedicated Demonstrators as Virtual Labs together with excellent marine researchers. There is already a large portfolio of existing services managed by the Blue Cloud founders which will be activated and integrated to serve the Blue-Cloud.

The modular architecture of the VRE will allow scalability and sustainability for near-future expansions, such as connecting additional infrastructures, implementing more and advanced blue analytical services, configuring more dedicated Virtual Labs, and targeting more (groups of) users.

The presentation will describe the vision of the Blue-Cloud framework, the Blue-Cloud data discovery and access service (to find and retrieve data sets from a diversified array of key marine data infrastructures dealing with physics, biology, biodiversity, chemistry, and bio genomics), the Blue-Cloud VRE (to facilitate collaborative research using a variety of data sets and analytical tools, complemented by generic services such as sub-setting, pre-processing, harmonizing, publishing and visualization). The technical architecture of Blue-Cloud will be presented via 5 real-life use-cases to demonstrate the impact that such innovation can have on science and society.