

EGU2020-13518

<https://doi.org/10.5194/egusphere-egu2020-13518>

EGU General Assembly 2020

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Supporting Multi-cloud Model Execution with VLab

Mattia Santoro¹, Paolo Mazzetti¹, Nicholas Spadaro², and Stefano Nativi²

¹Institute of Atmospheric Pollution Research (CNR-IIA), Firenze, Italy (mattia.santoro@cnr.it)

²European Commission - Joint Research Centre, Ispra, Italy

The VLab (Virtual Laboratory), developed in the context of the European projects ECO-POTENTIAL and ERA-PLANET, is a cloud-based platform to support the activity of environmental scientists in sharing their models. The main challenges addressed by VLab are: (i) minimization of interoperability requirements in the process of model porting (i.e. to simplify as much as possible the process of publishing and sharing a model for model developers) and (ii) support multiple programming languages and environments (it must be possible porting models developed in different programming languages and which use an arbitrary set of libraries).

In this presentation we describe how VLab supports a multi-cloud deployment approach and the benefits.

In this presentation we describe VLab architecture and, in particular, how this enables supporting a multi-cloud deployment approach.

Deploying VLab on different cloud environments allows model execution where it is most convenient, e.g. depending on the availability of required data (move code to data).

This was implemented in the web application for Protected Areas, developed by the Joint Research Centre of the European Commission (EC JRC) in the context of the EuroGEOSS Sprint to Ministerial activity and demonstrated at the last GEO-XVI Plenary meeting in Canberra. The web application demonstrates the use of Copernicus Sentinel data to calculate Land Cover and Land Cover change in a set of Protected Areas belonging to different ecosystems. Based on user's selection of satellite products to use, the different available cloud platforms where to run the model are presented along with their data availability for the selected products. After the platform selection, the web application utilizes the VLab APIs to launch the EODESM (Earth Observation Data for Ecosystem Monitoring) model (Lucas and Mitchell, 2017), monitoring the execution status and retrieve the output.

Currently, VLab was experimented with the following cloud platforms: Amazon Web Services, three of the 4+1 the Copernicus DIAS platforms (namely: ONDA, Creodias and Sobloo) and the European Open Science Cloud (EOSC).

Another possible scenario empowered by this multi-platform deployment feature is the possibility to let the user choose the computational platform and utilize her/his credentials to request the

needed computational resources. Finally, it is also possible to exploit this feature for benchmarking different cloud platforms with respect to their performances.

References

Lucas, R. and A. Mitchell (2017). "Integrated Land Cover and Change Classifications" *The Roles of Remote Sensing in Nature Conservation*, pp. 295–308.