



Hydrodynamics and Water Quality forecasting over a Cloud Computing environment: INDIGO-DataCloud

Fernando Aguilar Gómez (1), Jesús Marco de Lucas (1), Daniel García (1), and Agustín Monteoliva (2)

(1) IFCA-CSIC, Santander, Spain (aguilarf@ifca.unican.es), (2) Ecohydros S.L

Algae Bloom due to eutrophication is an extended problem for water reservoirs and lakes that impacts directly in water quality. It can create a dead zone that lacks enough oxygen to support life and it can also be human harmful, so it must be controlled in water masses for supplying, bathing or other uses. Hydrodynamic and Water Quality modelling can contribute to forecast the status of the water system in order to alert authorities before an algae bloom event occurs. It can be used to predict scenarios and find solutions to reduce the harmful impact of the blooms. High resolution models need to process a big amount of data using a robust enough computing infrastructure.

INDIGO-DataCloud (<https://www.indigo-datacloud.eu/>) is an European Commission funded project that aims at developing a data and computing platform targeting scientific communities, deployable on multiple hardware and provisioned over hybrid (private or public) e-infrastructures. The project addresses the development of solutions for different Case Studies using different Cloud-based alternatives. In the first INDIGO software release, a set of components are ready to manage the deployment of services to perform N number of Delft3D simulations (for calibrating or scenario definition) over a Cloud Computing environment, using the Docker technology: TOSCA requirement description, Docker repository, Orchestrator, AAI (Authorization, Authentication) and OneData (Distributed Storage System). Moreover, the Future Gateway portal based on Liferay, provides an user-friendly interface where the user can configure the simulations.

Due to the data approach of INDIGO, the developed solutions can contribute to manage the full data life cycle of a project, thanks to different tools to manage datasets or even metadata. Furthermore, the cloud environment contributes to provide a dynamic, scalable and easy-to-use framework for non-IT experts users. This framework is potentially capable to automatize the processing of forecasting applying periodic tasks. For instance, a user can forecast every month the hydrodynamics and water quality status of a reservoir starting from a base model and supplying new data gathered from the instrumentation or observations.

This interactive presentation aims to show the use of INDIGO solutions in a particular forecasting use case and to inspire others in the use of a Cloud framework for their applications.