

Grid, Cloud and Mobile exploitation in Earth Sciences

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The access to distributed computing and storage infrastructures based on Grid and Cloud paradigms has recently been improved thanks to the spread of Science Gateways and the support for mobility.

In this contribution we present the results obtained in this context of two different European projects funded by the European Commission, both under its Seventh Framework Program and both belonging to the Earth Sciences' domain: eI4Africa (www.ei4africa.eu) and EarthServer (www.earthserver.eu).

The ei4Africa project aims of boosting the Research, Technological Development and Innovation (RTDI) potential of African e-Infrastructures and to support policy dialogues and Euro-African cooperation in the framework of the joint Africa-EU Strategic Partnership on 'trade, regional integration and infrastructures' (JAES Partnership 3). In the presentation we will show a use case where simulations of the Weather Research and Forecasting (WRF) Model are simultaneously and seamlessly executed on Grid and Clouds, including the EGI Federated Cloud.

The EarthServer project aims at establishing open access and ad-hoc analytics on extreme-size Earth Science data, based on and extending leading-edge Array Database technology. In the presentation we will show some of the applications integrated in the EarthServer Science Gateway Mobile and the services developed to allow federated authentication and WCS/WCPS standards exploitation.

Wider impact and conclusions

This contribution successfully addresses the issue of transparently accessing heterogeneous e-Infrastructures, also "on the go", by large numbers of potential users, including citizen scientists and the general public. Two Earth Science use cases, belonging to two different EU co-funded projects, are presented and discussed. A brief discussion about how to extend the services developed to other communities will also be made in the conclusions.

URL(s) for further info

www.earthserver.eu and www.ei4africa.eu

Description of work

This work will present how the Weather Research and Forecasting Model (www.wrf-model.org) has been integrated into the Africa Grid Science Gateway (<http://sgw.africa-grid.org>) to seamlessly and successfully execute both on Grid and Cloud-based distributed infrastructures, including the EGI Federated Cloud.

The WRF modelling system is a widely used meso-scale numerical weather prediction system designed to serve both atmospheric research and operational forecasting needs. WRF has a large worldwide community counting more than 20,000 users in 130 countries and it has been specifically designed to be the state-of-the-art atmospheric simulation system being portable and running efficiently on available parallel computing platforms. Although WRF can be executed in many different environments, ranging from the single core inside a stand-alone machine up to the most sophisticated HPC platforms, there are no solutions yet to match the e-Science paradigm where software, data and users are "linked" together by the network as components of distributed computing infrastructures. The topmost component of the typical e-Infrastructure multi-layered model consists of Science Gateways and in this particular case by the CSGF, thus allowing to execute WRF simulations on various kinds of distributed computing infrastructures at the same time, including the EGI Federated Cloud. Some use cases of WRF related to Africa will be included in the presentation.

In the second part of the contribution we will report on the EarthServer Science Gateway Mobile app (<https://itunes.apple.com/us/app/earthserver-science-gateway-mobile/id740603213?ls=1&mt=8>), available both on Google Play and App Store, which allows users to seamlessly access and use some of the EarthServer applications exploiting SAML-based federated authentication, fine-grained authorisation mechanisms and WCS/WCPS-compliant queries.

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