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Homogenization of access to DCIs

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In most science fields, the complexity of computing models are growing and the access to Distributed Computing Infrastructures (DCI) has become essential. Additionally, there are available a large variety of DCIs such as workstations, clusters, grid services or clouds with different Distributed Resource Managements (DRM) as well. This issue can represent a significant barrier for scientists. Therefore, tools to homogenize the access to these DCIs are one of the most important challenges facing.
To deal with this issue, several approaches have been proposed from a resource admin's point of view. In this work is introduced a new solution to give homogenous access to DCIs but without resource admin intervention. This solution, named DRM4G, aims to expand the possibilities of scientists using it for their computing models. One example of that is WRF4G framework that is used for simulating large-scale climate experiments. This framework takes advantages of DRM4G to provide a homogeneous access between WRF4G users and DCIs. In order to achieve this, DRM4G enables the submission and management of jobs to DRMs such as FORK, PBS/Torque, SGE, LSF, LoadLeveler and SLURM and grid EGI services such as Globus and CREAM.

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Wider impact and conclusions

DRM4G aims at providing a general solution for very different scientific communities, giving a way to use their computing models on heterogeneous DCIs. Furthermore, DRM4G allows scientists to have access to resources needed for large-scale applications. Offering a tool in order to create, delete, submit and get information about jobs. Thus, DRM4G is able to take other scientific communities one step beyond homogenizing the access to DCIs.

URL(s) for further info

http://www.meteo.unican.es/software/wrf4g
http://www.meteo.unican.es/trac/meteo/wiki/DRM4G

Description of work

Earth Science applications such as numerical weather and climate models are nowadays among the most computationally demanding applications due to both the huge amount of data involved and the enormous requirements of computing facilities. One of these climate models is the well-known Weather Research and Forecasting (WRF) model, which offers cutting-edge advances in physics, dynamics and data assimilation. Unfortunately, configuring and running WRF model is a very complicated process. Because of that, the Santander Meteorology Group has developed a framework, named WRF4G, to automatically manage WRF climate experiments. This framework, based on layers, separates the experiment design from the execution environment, as well as offering the ability to run these experiments concurrently on DCIs.
The way WRF4G provides a uniform interface to connect users and resources is by using DRM4G. DRM4G facilitates the access and management of DCIs and also enables the interoperability of several resources during the execution of the experiments. As a result, DRM4G enhances the usability and accessibility of the available resources to WRF4G users.
Although DRM4G is part of WRF4G framework, you can use as an independent tool for any kind of computing model. DRM4G does not need to be deployed by a resource admin on a specific machine such as a grid user interface or a cluster front-end (UI). In fact, it can be deployed on a desktop or laptop, and then configuring the access to UIs, typically a ssh access.

Primary author: Mr BLANCO, Carlos (University of Cantabria)

Co-authors: Dr COFIÑO, Antonio S. (University of Cantabria); Mrs FERNANDEZ QUIRUELAS, Valvanuz (University of Cantabria, Spain)

Presenter: Mr BLANCO, Carlos (University of Cantabria)

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