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# WRF4G project: Adaptation of WRF Model to Distributed Computing Infrastructures

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Nowadays Grid Computing is powerful computational tool which is ready to be used for scientific community in different areas (such as biomedicine, astrophysics, climate, etc.). However, the use of this distributed computing infrastructures (DCI) is not yet common practice in climate research, and only a few teams and applications in this area take advantage of this infrastructure. Thus, the first objective of this project is to popularize the use of this technology in the atmospheric sciences area.

In order to achieve this objective, one of the most used applications has been taken (WRF; a limited- area model, successor of the MM5 model), that has a user community formed by more than 8000 researchers worldwide. This community develop its research activity on different areas and could benefit from the advantages of Grid resources (case study simulations, regional hind-cast/forecast, sensitivity studies, etc.). The WRF model is been used as input by many energy and natural hazards community, therefore those community will also benefit.

However, Grid infrastructures have some drawbacks for the execution of applications that make an intensive use of CPU and memory for a long period of time. This makes necessary to develop a specific framework (middleware). This middleware encapsulates the application and provides appropriate services for the monitoring and management of the jobs and the data. Thus, the second objective of the project consists on the development of a generic adaptation of WRF for Grid (WRF4G), to be distributed as open-source and to be integrated in the official WRF development cycle. The use of this WRF adaptation should be transparent and useful to face any of the previously described studies, and avoid any of the problems of the Grid infrastructure. Moreover it should simplify the access to the Grid infrastructures for the research teams, and also to free them from the technical and computational aspects of the use of the Grid.

Finally, in order to demonstrate the ability of Grid infrastructures in solving a scientific problem with interest and relevance on the meteorology area (implying a high computational cost) we will perform a high resolution hindcast on Southwestern Europe with ERA-Interim re-analysis as boundary and initial conditions. The production of an atmospheric hindcast at high resolution, will provide an appropriate assessment of the possibilities and uncertainties of the WRF model for the evaluation and forecasting of weather, energy and natural hazards.

[1] http://www.meteo.unican.es/software/wrf4g