

The importance of grid network for environmental studies

Grid networks

Grid networks are typically large set of computers connected in a grid topology, as in the case of a regular topology in which each node is connected with two neighbours in one-dimensional or multi-dimensional way. Grid networks make distributed computational resources transparent to the potential users, who can access to the computers as a whole for solving large-scale compute/data intensive applications.

Environmental applications

Grid computing is ideal for the study of large-scale environmental problems, and many researchers adopted this kind of tool to simulate and model very different conditions. Just to name some of the most recent cases, the following research fields can be underlined:

- large scale air pollution model (Ostromsky and Zlatev 2007);
- hybrid power generation system modelling (Wang and Singh 2006);
- landscape analysis and simulation (Pausas and Ramos 2006);
- parallel ecosystem simulation and modelling (Wenderholm 2005);
- agricultural modelling with interpolated climate data (Mineter, Jarvis, Dowers 2003);
- flood forecasting and water management (Zhu, Liu, Gong et al 2006);
- animal subpopulations and their landscape (such as the monk seal subpopulation of the Hawaiian Archipelago, Schmelzer 2000);
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The way forward

Looking at the future issues, Climate Change is surely the most dramatic environmental questions for humankind. Climate observation, scenarios development and related analysis require high computation power, and the most of research centres in Developing Countries (but also in Developed world) have not the financings to access to supercomputers able to produce geo-referenced scenarios as well as related studies (impact modelling, risk assessment, etc.).

Grid networks represent a fundamental resource for future applications in the Climate Change field, because allow the realisation of *ad-hoc* studies for analysing future climate projections and designing adaptation and/or mitigation initiatives.

IBM itself started at the end of 2007 to work with academics from the University of Cape Town to apply grid computing for climate change modelling in Southern Africa*, and this is an that this is the right moment for investing in grid technology for climate (and more generally environmental-related) studies.

* : http://www.worldcommunitygrid.org/projects_showcase/ach/viewAchMain.do

