

Dissemination and Exploitation of Grids in Earth Science

Friday 11 May 2007 11:00 (20 minutes)

Describe the scientific/technical community and the scientific/technical activity using (planning to use) the EGEE infrastructure. A high-level description is needed (neither a detailed specialist report nor a list of references).

Earth Science (ES) is an all-embracing term for sciences related to the planet Earth, covering a large and diverse user community. The major disciplines use physics, geology, mathematics, chemistry, and biology to build a quantitative understanding of the principal areas or spheres of the Earth system. Examples of thematic areas are: atmospheric sciences, hydrology, and geophysics. The DEGREE project is a consortium of ES and computer science partners aiming at promoting the uptake of Grid in ES

Report on the experience (or the proposed activity). It would be very important to mention key services which are essential for the success of your activity on the EGEE infrastructure.

Three families have been identified, following a scheme with three different levels of complexity. In this case complexity is referring to the complexity of requirements placed on Grid technology by the application, not of the application itself. The first family is called the simple applications, the second the complex applications and the third family is the complex workflow applications. In short specific ES Grid requirements are: Reliability (QoS); real-time and instantaneous access; The need to access licensed software; Data policies on input and output data i.e. complicated security requirements; data is scattered around various institutes in various formats, in various databases and has metadata attached to it in various forms, i.e. data management (accessibility, harmonization) is essential in ES. Workflow orchestration is vital to cover requirements from the third family of applications. Key services for ES are workflow management and data and metadata management.

With a forward look to future evolution, discuss the issues you have encountered (or that you expect) in using the EGEE infrastructure. Wherever possible, point out the experience limitations (both in terms of existing services or missing functionality)

The current maturity of GRID systems implies that (potential) users are troubled with in-depth knowledge to perform basic actions as a hindrance for wide utilization in the ES community. In order to make e-science take the next step in ES, there is a need for standardization on Grid service level so existing and for coupling easily new web services to the Grid. Portals improving the accessibility to data, computing and results will greatly improve ES research and Grid infrastructure usage.

Describe the added value of the Grid for the scientific/technical activity you (plan to) do on the Grid. This should include the scale of the activity and of the potential user community and the relevance for other scientific or business applications

Like other sciences ES needs to deal with enormous amounts of data and large computational needs. But what makes ES different? ES deals with geospatial data in combination with time components (4D) in various scales and resolutions, consists of many different domains, scattered among all countries in numerous institutes, using complex applications. For ES e-science can be an essential improvement in research, operation and business, especially when Grid services can be coupled to existing ES services. But is e-science mature and does it cover all ES requirements? DEGREE aims at answering these questions by capturing ES requirements and analyzing Grid solutions. To capture evolving ES requirements for Grid services, over 20 application scenarios were collected and grouped into families of applications. This will ease communication, maintenance and tracing of requirements More ES applications scenarios will be added; updating and analyzing requirement progress will be a continuous effort

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