Open Grid Services for Envisat and Earth Observation Applications

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Following the participation of the European Space Research Institute (ESRIN) at ESA to DATAGRID, the first large European Commission funded Grid project [European Data Grid Project Website: http://www.eu-datagrid.org.], the ESA Science and Application Department of Earth Observation Programmes Directorate at ESRIN has focused on the development of a dedicated Earth Science Grid infrastructure, under the name Earth Observation Grid Processing on-Demand [ESA Grid Processing on-Demand, or G-POD, Web portal: http://eogrid.esrin.esa.int.].

This G-POD based environment ensures that specific Earth Observation (EO) data handling and processing applications can be seamlessly plugged into the system. Coupled with high-performance and sizeable computing resources managed by Grid technologies, G-POD provides the necessary flexibility for building a virtual environment that gives applications quick access to data, computing resources, and results. Using a dedicated Web interface, each application has access to a catalogue like the ESA Multi-mission User Interface System and storage elements. It furthermore communicates with the underlying Grid middleware, which coordinates all the necessary steps to retrieve, process, and display the requested products selected from the large database of ESA and third-party missions.

Grid on-Demand provides an example of transparent, fast, and easy access to data and computing resources. This makes G-POD an ideal environment for processing large amounts of data, developing services which require fast production and delivery of results, comparing approaches and fully validating algorithms. In particular the G=POD concept and technology solves the equations:

   - Move processors close to the data in a flexible and controlled way, thus leave the data wherever they are archived, reduce dissemination costs and effort

   - Resources can be shared (data, tools, computing resources), thus reducing investments and running costs and reducing data flows to the minimum, with clear reliability & performance improvements

   - GRID as a common shared platform for collaborations with clear benefit of bringing scientists to work together specially in multidisciplinary approach to applications.

Many other Grid based systems are being proposed by various research groups using similar and alternative approaches, although sharing the same ambition for improved integration of the emerging ICT technologies

exploitable by the Earth Science community. The ESA GRID infrastructure is full compatible with EGEE provided middleware and we support EGEE Virtual Organisations interested in Earth Observation. At the same time it is being experimented in a campus-wide GRID environment to support SME industrial developments.

The presentation will provide

  - an overview of selected ESA Earth Observation missions and related software tools that ESA provides for facilitating data handling and analysis;

  - the G-POD environment, its infrastructure, the intermediary layer developed to interface the application, and the Grid computer and storage resources, the Web portals.

  - different examples of EO applications integrated in G-POD and its use in integrating the ESA Earth Science Knowledge Infrastructures.