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The Climate-G Portal: a Grid Enabled Scientifc Gateway for Climate Change

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Grid portals are web gateways aiming at concealing the underlying infrastructure through a pervasive, transparent, user-friendly, ubiquitous and seamless access to heterogeneous and geographical spread resources (i.e. storage, computational facilities, services, sensors, network, databases). Definitively they provide an enhanced problem-solving environment able to deal with modern, large scale scientific and engineering problems.
Scientific gateways are able to introduce a revolution in the way scientists and researchers organize and carry out their activities. Access to distributed resources, complex workflow capabilities, and community-oriented functionalities are just some of the features that can be provided by such a web-based environment.
In the context of the EGEE NA4 Earth Science Cluster, Climate-G is a distributed testbed focusing on climate change research topics. The Euro-Mediterranean Center for Climate Change (CMCC) is actively participating in the testbed providing the scientific gateway (Climate-G Portal) to access to the entire infrastructure.
The Climate-G Portal has to face important and critical challenges as well as has to satisfy and address key requirements. In the following, the most relevant ones are presented and discussed.
Transparency: the portal has to provide a transparent access to the underlying infrastructure preventing users from dealing with low level details and the complexity of a distributed grid environment.
Security: users must be authenticated and authorized on the portal to access and exploit portal functionalities. A wide set of roles is needed to clearly assign the proper one to each user. The access to the computational grid must be completely secured, since the target infrastructure to run jobs is a production grid environment. A security infrastructure (based on X509v3 digital certificates) is strongly needed.
Pervasivity and ubiquity: the access to the system must be pervasive and ubiquitous. This is easily true due to the nature of the needed web approach.
Usability and simplicity: the portal has to provide simple, high level and user friendly interfaces to ease the access and exploitation of the entire system.
Coexistence of general purpose and domain oriented services: along with general purpose services (file transfer, job submission, etc.), the portal has to provide domain based services and functionalities. Subsetting of data, visualization of 2D maps around a virtual globe, delivery of maps through OGC compliant interfaces (i.e. Web Map Service - WMS) are just some examples.
Since april 2009, about 70 users (85% coming from the climate change community) got access to the portal. A key challenge of this work is the idea to provide users with an integrated working environment, that is a place where scientists can find huge amount of data, complete metadata support, a wide set of data access services, data visualization and analysis tools, easy access to the underlying grid infrastructure and advanced monitoring interfaces.