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The Climate-G testbed: towards a large scale data sharing environment for climate change

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Climate-G is a distributed testbed for climate change addressing challenging data and metadata management issues at a very large scale. It involves: CMCC, IPSL, SCAI, NCAR, Univ. of Reading, Univ. of Catania and Univ. of Salento. It provides P2P/grid metadata services, data access services, visualization tools, etc. The main scope of Climate-G is to allow scientists to carry out geographical and cross-institutional data discovery, access, visualization and sharing of climate data.

Impact

Climate-G work has the following results: wide data access/sharing environment for climate change (2TB of test data; 4 countries; 10 sites); P2P/grid metadata approach; production-level Climate-G Portal; high quality of data Viz tools; metadata search/discovery across several countries/institutions. The main impact is that scientists can transparently search data across the Climate-G distributed digital library for climate change. Existing projects in the same domain either centralize data and matadata at a single centre or distribute data among several centres, centralizing related metadata. On the contrary, Climate-G manages distributed data and distributed metadata (exploiting P2P/grid metadata services) with an high level of scalability, transparency, fault tolerance and autonomy. In the future, for instance in the context of IPCC AR5, 2010, distributed metadata management such as the one proposed in the Climate-G testbed could represent a suitable solution to handle geographically spread data/metadata sources.

URL for further information

http://grelc.unile.it:8080/ClimateG-DDC/

Conclusions and Future Work

Climate-G provides a cross-institutional data environment for climate change. It is the result of an open, successful and wide collaboration joining grids and P2P paradigm, OGC services, etc. Next steps will relate to data access optimization, integration/tuning of new/existing tools, XML metadata schema extension and automatic import/registration of existing climate data to increase the number of available datasets (from TB to PB) indexed-by/searchable-through the Climate-G digital library.

Keywords

Climate Change, Data and Metadata Management, P2P, Grid, OGC, IPCC, GRelC, OPeNDAP, Godiva2, LAS

Justification for delivering demo and technical requirements (ONLY for demonstrations)

Demonstration will be provided. The demo will show how the Climate-G environment enables a transparent access to the climate change oriented digital library and provides data search, access, visualization, etc. Through the Climate-G Portal we'll show how easily the P2P and gLite compliant GRelC DAIS enables metadata integration in grid. Poster or oral presentations wouldn't be so effective and impressive as a live demo could be. Network connection is needed to access to the Climate-G environment

Detailed analysis

The Climate-G testbed provides a large scale data environment for climate change. The activity started about one year ago joining three centres (CMCC, IPSL, Fraunhofer-SCAI) and right now it includes several new sites (NCAR, Univ. of Reading, Univ. of Catania, Univ. of Salento). To enable geographical data sharing, search and discovery activities (through a data grid portal interface) we adopted a distributed CMCC metadata solution leveraging P2P and grid technologies (GRelC DAIS). Data are available through OPeNDAP/THREDDS services, Live Access Server as well as the OGC compliant WMS and they can be downloaded, visualized, etc. GridFTP is used to transfer data among main sites and to ensure high data availability. Godiva2 displays 2D maps (and animations) and also exports maps for display on the Google Earth virtual globe. Right now Climate-G publishes (through the Climate-G Portal) about 2TB data related to the ENSEMBLES project as well as the IPCC AR4.

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