Geophysical Research Abstracts
Vol. 15, EGU2013-5697, 2013
EGU General Assembly 2013

The EarthServer project: Exploiting Identity Federations, Science Gateways and Social and Mobile Clients for Big Earth Data Analysis

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The EarthServer project (www.earthserver.eu), funded by the European Commission under its Seventh Framework Program, aims at establishing open access and ad-hoc analytics on extreme-size Earth Science data, based on and extending leading-edge Array Database technology.
The core idea is to use database query languages as client/server interface to achieve barrier-free "mix & match" access to multi-source, any-size, multi-dimensional space-time data – in short: "Big Earth Data Analytics" - based on the open standards of the Open Geospatial Consortium Web Coverage Processing Service (OGC WCPS) and the W3C XQuery. EarthServer combines both, thereby achieving a tight data/metadata integration. Further, the rasdaman Array Database System (www.rasdaman.com) is extended with further space-time coverage data types. On server side, highly effective optimizations - such as parallel and distributed query processing - ensure scalability to Exabyte volumes.
Six Lighthouse Applications are being established in EarthServer, each of which poses distinct challenges on Earth Data Analytics: Cryospheric Science, Airborne Science, Atmospheric Science, Geology, Oceanography, and Planetary Science. Altogether, they cover all Earth Science domains; the Planetary Science use case has been added to challenge concepts and standards in non-standard environments. In addition, EarthLook (maintained by Jacobs University) showcases use of OGC standards in 1D through 5D use cases.
In this contribution we will report on the first applications integrated in the EarthServer Science Gateway and on the clients for mobile appliances developed to access them. We will also show how federated and social identity services can allow Big Earth Data Providers to expose their data in a distributed environment keeping a strict and fine-grained control on user authentication and authorisation. The degree of fulfilment of the EarthServer implementation with the recommendations made in the recent TERENA Study on AAA Platforms For Scientific Resources in Europe (https://confluence.terena.org/display/aaastudy/AAA+Study+Home+Page) will also be assessed.