Geophysical Research Abstracts
Vol. 14, EGU2012-4585-1, 2012
EGU General Assembly 2012

Implementation of probabilistic approach in solving inverse problems as a grid-backed web service.

K. I. Kholodkov (1), I. M. Aleshin (1), V. N. Koryagin (1), A. N. Shogin (2), and O. V. Sukhoroslov (3)

(1) Institute of Physics of the Earth RAS, Moscow, Russia, (2) All-Russia Institute for Scientific and Technical Information RAS, Moscow, Russia, (3) Institute of System Analysis RAS Moscow, Russia

In this work probabilistic approach to inverse problem was adopted. It leads to definition and sampling of *a posteriori* probability density function (APDF), which combines *a priori* system information with information, derived from observation data. Use of APDF implies significant computational resourses consumption, even for moderate model parameter count. However the computation of APDF value at different points is carried out completely independently, therefore this problem is considered ideal for loosely coupled distributed computing system.

Globus Toolkit middleware was used, including the GridFTP for data transfer and GRAM for execution control, as well as TORQUE resource manager for each computing node. To reduce the hardware cost all grid services, except for GridFTP, run as virtual guests on execution nodes. Due to very insignificant resources utilization the guests make no footprint on node's computation power.

To hide complex middleware interface from scientific users, user friendly web interface was created, which provides restricted but sufficient tool set. Determination of seismic anisotropy by wave form inversion was implemented as model problem. The interface allows user to edit model parameters, estimate execution time for specified parameter set, run calculation and perform result visualization. Details of start-up, management and results acquisition are hidden from user.

This work was supported by Russian Foundation of Basic Research, grants 10-07-00491-a, 11-05-00988-a and 11-07-12045-ofi-m-2011