

NSF Site Visit to the Computational Infrastructure for Geodynamics

Overview of CIG
Mike Gurnis



Outline

- Committees, membership and roles
- Development staff and expertise
- Partnerships
- <http://geodynamics.org>
- Development tasks
- Hurdles CIG face – an internal view
- What we expect to cover today

Committees, membership and roles (1)

- Science Steering Committee
 - Sets the scientific priorities and goals for CIG
 - Evaluates proposals
 - Formulates yearly Strategic Plan
 - Makes Recommendations to EC
 - Meet for the first time Nov., 2005 & will meet again May, 2006 at CIG. Has TeleCons & own List-serv.

Committees, membership and roles (2)

- Science Steering Committee
 - Marc Parmentier, Chair (June 2006), Brown University
 - Brad Aagaard (June 2008), USGS
 - Wolfgang Bangerth (June 2008), Texas A&M
 - Roger Buck (June 2006) Columbia University
 - Omar Ghattas (June 2007), UT, Austin
 - Peter Olson (June 2007), Johns Hopkins
 - Jeroen Tromp (June 2007), Caltech
 - Shijie Zhong (June 2008), University of Colorado

Committees, membership and roles (3)

- Executive Committee
 - Ultimate decision making body for CIG
 - Evaluates and approves recommendations from the SSC, including proposals & yearly Strategic Plan
 - Last meet Nov., 2005 & will meet again Nov, 2006 at Columbia. Has TeleCons and own List-serv.

Committees, membership and roles (4)

- Executive Committee
 - Mark Richards, Chair (Oct., 2007) UC, Berkeley
 - Marc Spiegelman, Vice Chair (Oct., 2006) Columbia
 - Bill Appelbe, (Oct., 2007) VPAC
 - Brad Hager, (Oct., 2008), MIT
 - Michael Gurnis, *Ex officio*
 - Michael Aivazis, *Ex officio*
 - Marc Parmentier, *Ex officio*

Development staff and expertise(1)

- Walter Landry, computational scientist, previously at Ohio Supercomputer Center. PhD. Oversees SVN repository & GALE development.
- Leif Strand, a BS, UC Irvine in computer science, previously with Symantec and ParaSoft. Oversees seismology codes and uniform build procedure.
- Luis Armendariz, recent BS, Caltech in computational mathematics. Oversees uniform benchmarks linked with build procedure & regression testing. Also assisting with mantle convection.

Staff (2)

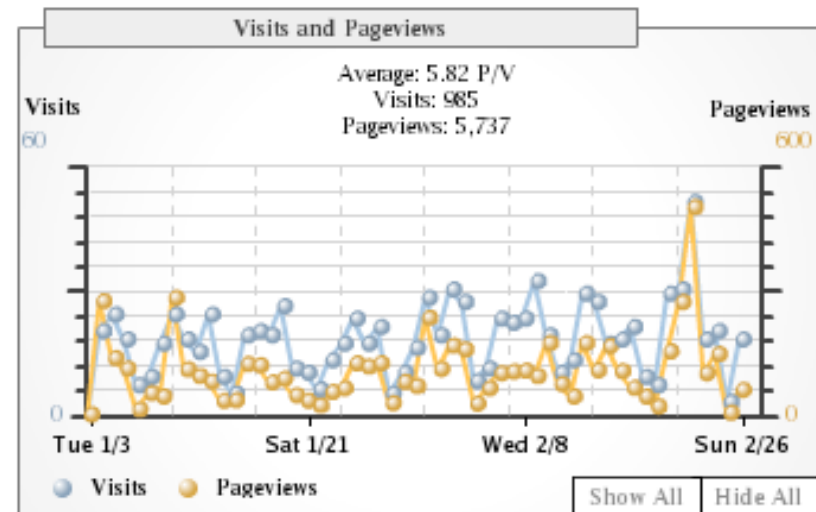
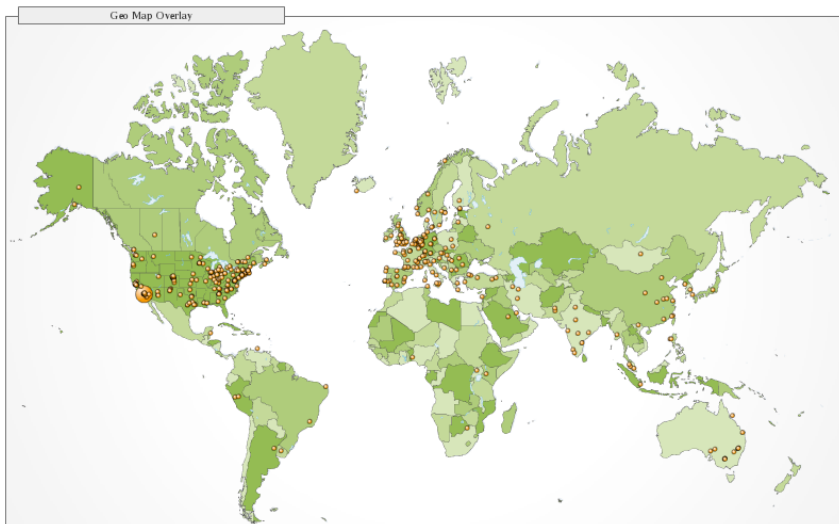
- Ariel Shores, BS, is our administrative assistant
- Cassie Ferguson, graduate certificate in science communication, technical writer & web master
- Eh Tan, shortly Ph.D. from Caltech. FEM & Pyre expert. Will oversee mantle convection effective July 1.
- Searching for additional software engineer & system administrator

Major Partnerships

- Center for Advanced Computer Research (CACR). Michael Aivazis continues his development of Pyre as a science neutral framework.
- MSC Division at Argonne National Laboratory, the developers of PETSc, a Portable, Extensible Toolkit for Scientific computation. CIG provides a sub-award to ANL. Dr. Matt Knepley is our principal collaborator & primarily is working on PyLith.
- Victorian Partnership for Advanced Computing (VPAC) through the StGermain modeling framework & advice on software engineering. CIG & VPAC are co-developing GALE. CIG provides a contract to VPAC allowing Luke Hodgkinson to work on GALE full time. Caltech and VPAC work under the terms of a MOU.

Web Site

- <http://geodynamics.org>
- Plone site -- editable web page
- Monitoring with Google Analytics



Development tasks (current)

- Establish benchmarks in each science area, develop SW to compare output of various codes to BMs, & link BMs to regression testing
- Develop and deploy GALE -- Geodynamics Arbitrary Lagrangian Eulerian code for Tectonics community
- Develop and deploy PyLith -- modular FE code for co-seismic and inter-seismic science problems

Development tasks (2)

- Bring several different seismic codes into the repository and create uniform means to interact with all SW with modeling framework. Prelude to “Science Portal”.
- Develop and deploy a compressible mantle convection (thermo-chemical) code.
- Migrate geodynamo codes into repository, establish BMs, & develop SW to link code output to broader observational community.

Hurdles CI G face – an internal view

- Recruiting and maintaining a team of quality software developers
- We will overstretch staff if we add too many communities and/or commitments with level funding
- The development of entirely new codes that our communities are requesting could require a larger team of developers. Must maintain and expand links to broader computational science community, especially for problems requiring complex meshes and adaptive mesh refinement (AMR).

What we expect to cover today

- Discuss science and community links to the broader world of computational Science.
- Two demos (SVN/build/web & PyLith).
- Individuals discussions centered around the tectonics-long, tectonics-short, seismology & mantle convection communities.
- New areas for CIG (geodynamo & magma migration)
- Working with CIG communities
- NSF program officers can meet with the CIG committee members.
- Can try and plan for a dinner tonight.