Science Gateway Services for NERSC Users

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NERSC User Group Meeting

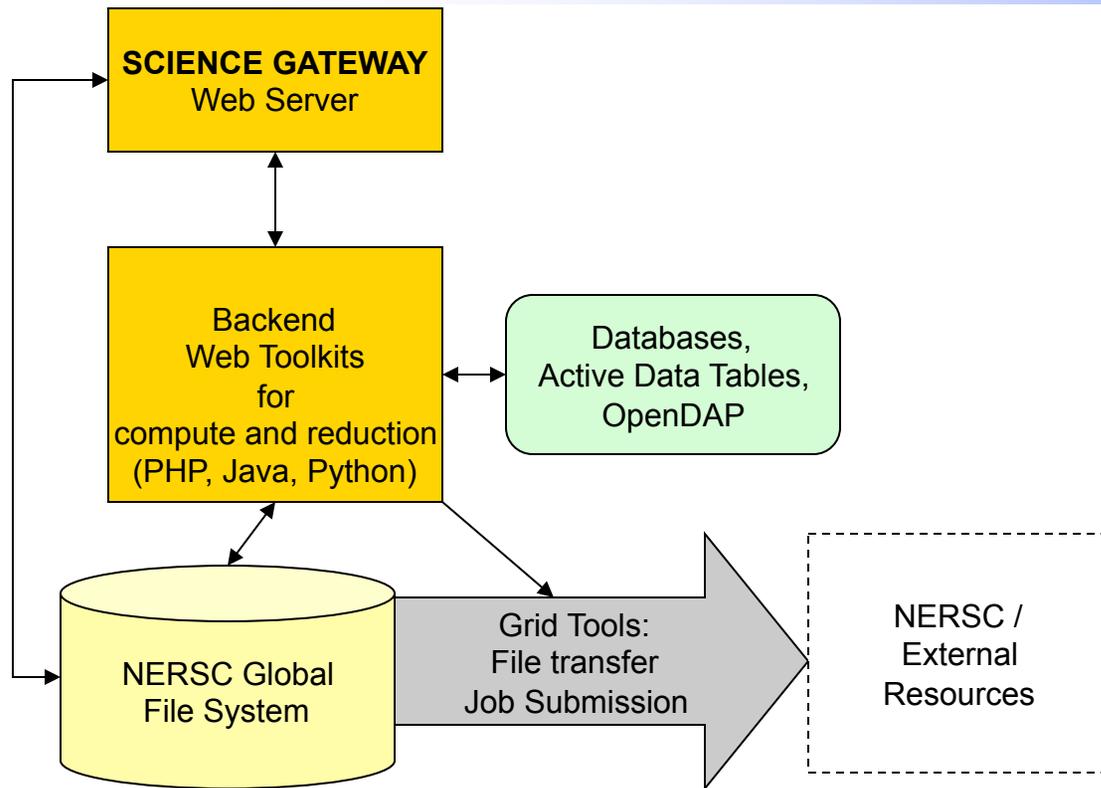October 7, 2009

Science Gateways at NERSC

- **Web access methods to NERSC resources**
  - Much is possible beyond yesterday's "ssh+pbs" computing
  - Today web interfaces expected for everything
  - Science Gateways at NERSC are web interfaces to NERSC resources
  - Custom gateways for individual science projects
  - NERSC can
    - host the gateway
    - assist in building the webapp
    - provide building blocks to science groups for their own apps.

Goals

- **Expose valuable scientific data products on Global File System and HPSS to larger communities. Turning data into scientific resources**

- **Work with large data remotely. Just in time sub-selection from unwieldy data sets. No one downloads the Google map, we just get the parts we need**

- **Manipulating streams of jobs, data and HPC workflows through canned interfaces**

- **Outreach - Gateways bring HPC apps to those familiar with the web but not the command line**

- **Scope may differ for each gateway - Can benefit a broader community or an internal science team**

Science Gateway Architecture

Provide sophisticated building blocks for science on the web

- –Direct access to massive data (NGF) through web-server
- –Reduction and compute backend tools available (PHP, Python, Java)
- –Databases, active tables, OpenDAP, File Browsing tools
- –Grid tools for file transfer and job submission

Levels of Gateway Services

- **Simplest model - expose read-only data in /project/projectdirs/ yourproject/www via web gateway. Add your data to this directory - it is now automatically available through http://portal.nersc.gov/project/yourproject/**

- **Richer interfaces - wrap the data using PHP and HTML. Add viz and google-maps interfaces.**

- **Read/Write access - read/write web interfaces for authenticated users (using NERSC LDAP password) https://portal-auth.nersc.gov/project/yourproject/**

- **More sophisticated web applications to access data and jobs including**
  - **Database Access**
  - **Access to HPSS data**
  - **Grid connectors to NERSC batch queues and filesystems.**
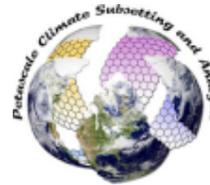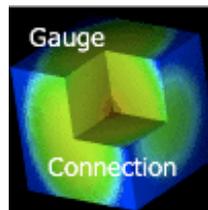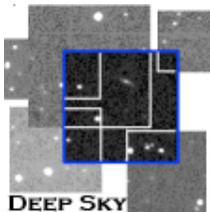 - **External gateways using building blocks**

Building Blocks

- **http access to NGF**
- **Apache connectors for Python, PHP, Java**
- **HPSS access**
- **Database access**
- **Google Visualization and Mapping APIs**
- **Authentication - LDAP and MyProxy**
- **File Browsing**
- **Job Submission**
- **Queues**
- **SVN code hosting and browsing**
- **Others …**

Current Projects

- **Deep Sky / PTF - Web interface to browse astronomical image data. http://deepskyproject.org**

- **Gauge Connection - Browse/Download QCD Lattice data sets stored in HPSS http://qcd.nersc.gov**

- **GCRM (demo) – Interactive subselection of IPCC climate data https://portal-auth.nersc.gov/gcrm**

- **Planck Portal - Access to Planck data in NGF/HPSS and specific applications through external Planck portal server using grid building blocks http://shannon.lbl.gov**

- **PDSF projects sharing datasets: http://portal.nersc.gov/project/pdsf**

- **Public SVN code repo for VisIt: http://portal.nersc.gov/svn/visit**

Service Models

- **NERSC provides building blocks and backend infrastructure (web hosting, tools etc.); Science groups build their own gateways. eg. Planck, GCRM**

- **Immersive development - science groups work in collaboration with NERSC engineers to build gateways. Requires more resources on both sides, but is effective for rapid, iterative development. eg. Deep Sky/PTF, QCD**

- **Long-term support: Science team manages gateway application; NERSC supports infrastructure**

Science Gateways and You

- **We want to work with you to benefit your scientific community!**

- **We will collaborate with you customize the gateway solution that best fits your needs**

- **Contact Us:**
  - **David Skinner deskinner@lbl.gov**
  - **Shreyas Cholia scholia@lbl.gov**

- **URLs:**

  http://www.nersc.gov/nusers/services/Grid/SG/sg.php

  http://portal.nersc.gov

  https://portal-auth.nersc.gov/

- **Do you have a project or application that might be suitable for Science Gateway?**

- **At what level of service would you benefit the most from Science Gateways?**

- **Do you have any suggestions for building blocks that would be useful to you?**