## XSEDE's Campus Bridging Project

Jim Ferguson
National Institute for Computational Sciences
jwf@utk.edu

# XSEDE

Extreme Science and Engineering Discovery Environment



#### What is XSEDE?

- eXtreme Science and Engineering Discovery Environment
- \$121M project funded by NSF to fund all the "non-infrastructure" things needed to support users and their science on NSF-funded hardware awards. Computational science support, Training, Helpdesk, Education, Allocations, Accounting, etc.





## **Campus Bridging**

- Mission: Facilitate the use of national cyberinfrastructure in aggregate
- What's this mean?
  - Tools to facilitate management of data and jobs between campuses and national CI
  - Sharing best practices from XSEDE
  - Documentation, consulting, site visits





## **More on Campus Bridging**

- The goal of campus bridging is virtual proximity
- The biggest problems:
  - Not enough CI resources available to most researchers
  - When you go from your campus to the national cyberinfrastructure it can feel like you are falling off a cliff! That's why you need bridging....
- Campus bridging is a major priority within XSEDE





## **XSEDE Campus Bridging Initiatives**

- Software for Clusters
  - Repository of XSEDE software packages
  - Rocks Roll including XSEDE software packages for new cluster installations
- Tools for data and job management
  - Globus Transfer
  - Unicore 6 workflow manager





## **Campus Bridging services today**

- XSEDE Compatible Basic Cluster
  https://portal.xsede.org/web/xup/knowledge-base/-/kb/document/bdpe
- XSEDE National Integration Toolkit (XNIT)
   https://portal.xsede.org/knowledge-base/-/kb/document/bdwx
- Globus Online File transfer utility, approved for use on XSEDE resources. Globus Connect Server also through engineering process.
- UNICORE https://portal.xsede.org/software/unicore





#### **Rocks XCBC**

- Tools to allow cluster administrators to create a XCBC: the "XSEDE-compatible basic cluster"
- Make your cluster more XSEDE-like
  - Eases later transition to larger CI
  - Saves investment on development and updates
  - Allows researchers to benefit from XSEDE-wide training
  - Teaches students interested in HPC to operate within a context similar to XSEDE





#### **XCBC** notes

- Maintained and updated by XSEDE Campus Bridging
- New cluster? Rocks ISOs can automate much of the work of setting up a basic XSEDE-like cluster





## **XNIT: XSEDE National Integration Toolkit**

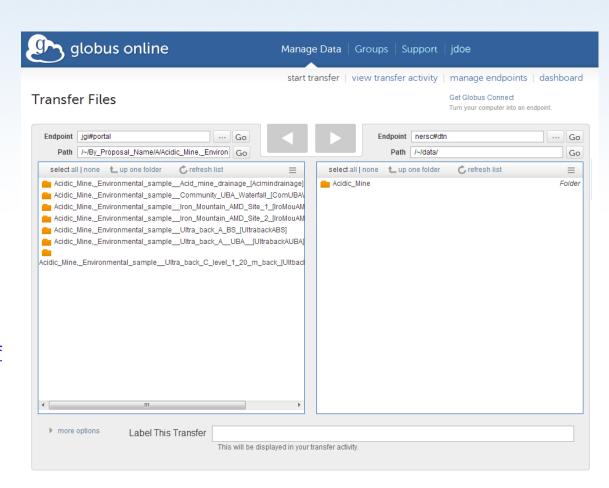
- For those with an existing cluster you like
- Install YUM Repo locally, manage XSEDE packages as if they were part of the OS
- a collection of recommended Red Hat Package Manager (RPM) packages
- packages included in the repository are specific versions and builds of scientific, mathematical, and visualization applications





#### **GlobusOnline**

- Simple, Dropbox-like interface for moving files back and forth
- Can be configured to connect between multiple computers and larger resources to transfer data
  - Screenshot
     courtesy of
     <a href="http://genome.jgi.doe.gov/pages/portal\_apps.jsf">http://genome.jgi.doe.gov/pages/portal\_apps.jsf</a>







## Globus Online (cont.)

- Set a transfer and start it, walk away, and get a notification when the transfer is complete
- During Q3 2013, GlobusOnline allowed researchers to move over 630TB of data onto the XSEDE network
  - That's just ONE direction!





#### **UNICORE**

- Production CI suite
- Installation instructions at https://portal.xsede.org/software/unicore
- Server and Client software available, web interface under development
- Under continued development at Forschungszentrum Jülich in Germany, one developer on XSEDE team.





### **Summary**

- Campus bridging aims to create virtual proximity between researchers and resources
- Streamlining and easing the analysis part of research
- Ways we are working to bridge research computing:
  - XSEDE-compatible basic cluster stack (XCBC)
  - XSEDE National Integration Tookit (XNIT)
  - Full-time dedicated support and consulting
  - GlobusOnline
  - UNICORE





#### For more information...

- https://www.xsede.org/campus-bridging
- http://cb-repo.iu.xsede.org/xsederepo/
- https://www.xsede.org/globus-online
- campusbridging@xsede.org
- +1 (812) 318-2872 (M-F, 9a-5p Eastern)





Our reach will forever exceed our grasp, but, in stretching our horizon, we forever improve our world.

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