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XSEDE's Campus Bridging Project

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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 http://genome.jgi.doe.gov/pages/portal_apps.jsf

The screenshot displays the Globus Online web interface. At the top, the logo and navigation links are visible: "globus online", "Manage Data", "Groups", "Support", and "jdoe". Below the navigation bar, there are links for "start transfer", "view transfer activity", "manage endpoints", and "dashboard". A "Get Globus Connect" button is also present with the text "Turn your computer into an endpoint."

The main area is titled "Transfer Files" and shows two endpoint panels. The left panel has an "Endpoint" field with "jgi#portal" and a "Path" field with "/~/By_Proposal_Name/~/Acidic_Mine_Environ". The right panel has an "Endpoint" field with "nersc#dtn" and a "Path" field with "/~/data/". Both panels have "Go" buttons and navigation arrows.

Below the endpoint panels are two file lists. The left list shows a directory structure with folders like "Acidic_Mine_Environmental_sample__Acid_mine_drainage_[Acimindrainage]", "Acidic_Mine_Environmental_sample__Community_UBA_Waterfall_[ComUBA]", "Acidic_Mine_Environmental_sample__Iron_Mountain_AMD_Site_1_[IroMouAM]", "Acidic_Mine_Environmental_sample__Iron_Mountain_AMD_Site_2_[IroMouAM]", "Acidic_Mine_Environmental_sample__Ultra_back_A_BS_[UltrabackABS]", "Acidic_Mine_Environmental_sample__Ultra_back_A_UBA_[UltrabackAUBA]", and "Acidic_Mine_Environmental_sample__Ultra_back_C_level_1_20_m_back_[UltrabackClevel120mback]". The right list shows a single folder named "Acidic_Mine".

At the bottom, there is a "Label This Transfer" section with a text input field and a "more options" link. Below the input field, it says "This will be displayed in your transfer activity."

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 Toolkit (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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