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# Campus Bridging: What is it and how do we do it?

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# XSEDE

Extreme Science and Engineering  
Discovery Environment



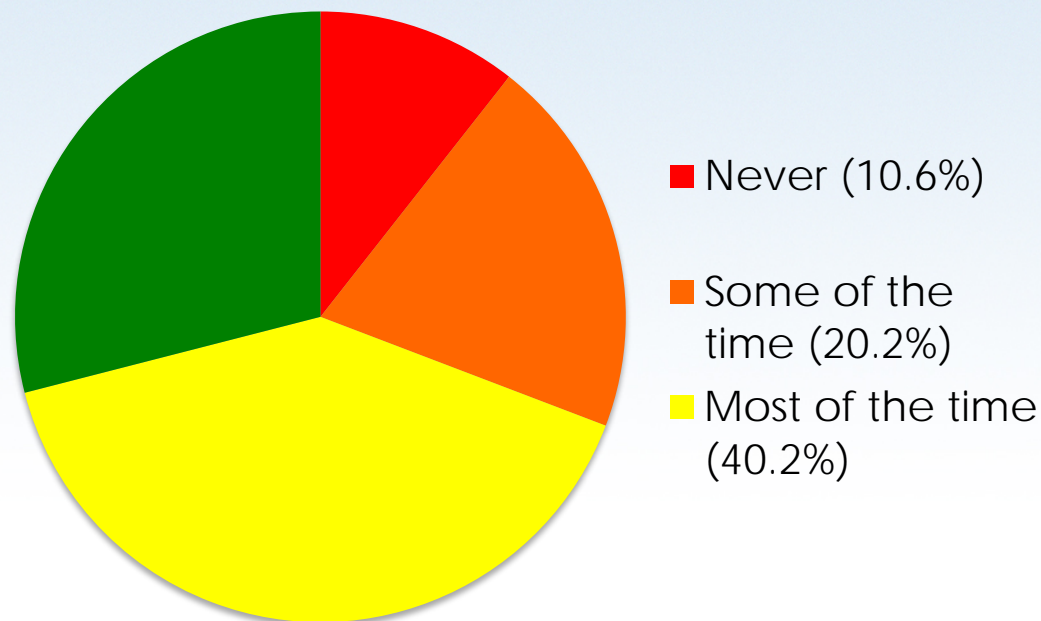
# What is Campus Bridging?

- “Bridging” the gap between local researcher cyberinfrastructure, campus CI, and national CI resources
  - Hardware
  - Software
  - Support
  - Outreach



# Adequacy of research CI

3



Responses to asking if researchers had sufficient access to cyberinfrastructure resources – survey sent to 5,000 researchers selected randomly from 34,623 researchers funded by NSF as Principal Investigators 2005-2009; results based on 1,028 responses

Stewart, C.A., D.S. Katz, D.L. Hart, D. Lantrip, D.S. McCaulay and R.L. Moore. Technical Report: Survey of cyberinfrastructure needs and interests of NSF-funded principal investigators. 2011. [hdl.handle.net/2022/9917](http://hdl.handle.net/2022/9917)



XSEDE

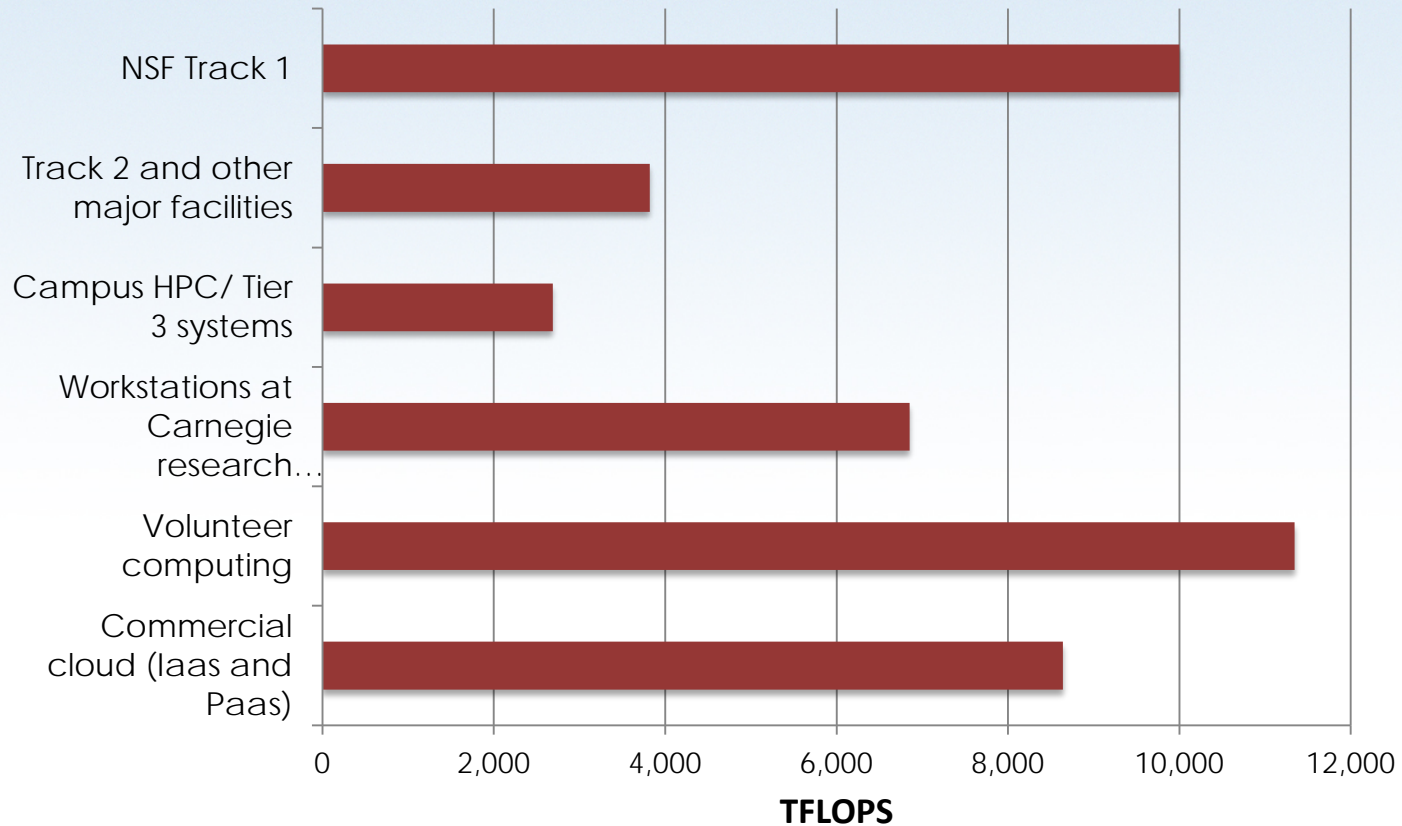
# More on Campus Bridging

- 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

## Some CI resources available to science and engineering researchers in US (March 2011)<sup>5</sup>



Based on: Welch, V.; Sheppard, R.; Lingwall, M.J.; Stewart, C. A. 2011. Current structure and past history of US cyberinfrastructure (data set and figures). [hdl.handle.net/2022/13136](http://hdl.handle.net/2022/13136)



# XSEDE Campus Bridging

- Even for those researchers with enough computing time, there has traditionally been little support once the allocation process is complete
  - XSEDE has prioritized training and documentation, as well as a number of initiatives designed to make the transition appear seamless to the user:



# Rocks Rolls + YUM Repository

- Tools to allow cluster administrators to create a XCBC: the “XSEDE-compatible basic cluster software stack”
- 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



# Rocks Rolls + YUM Repository 2

- 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



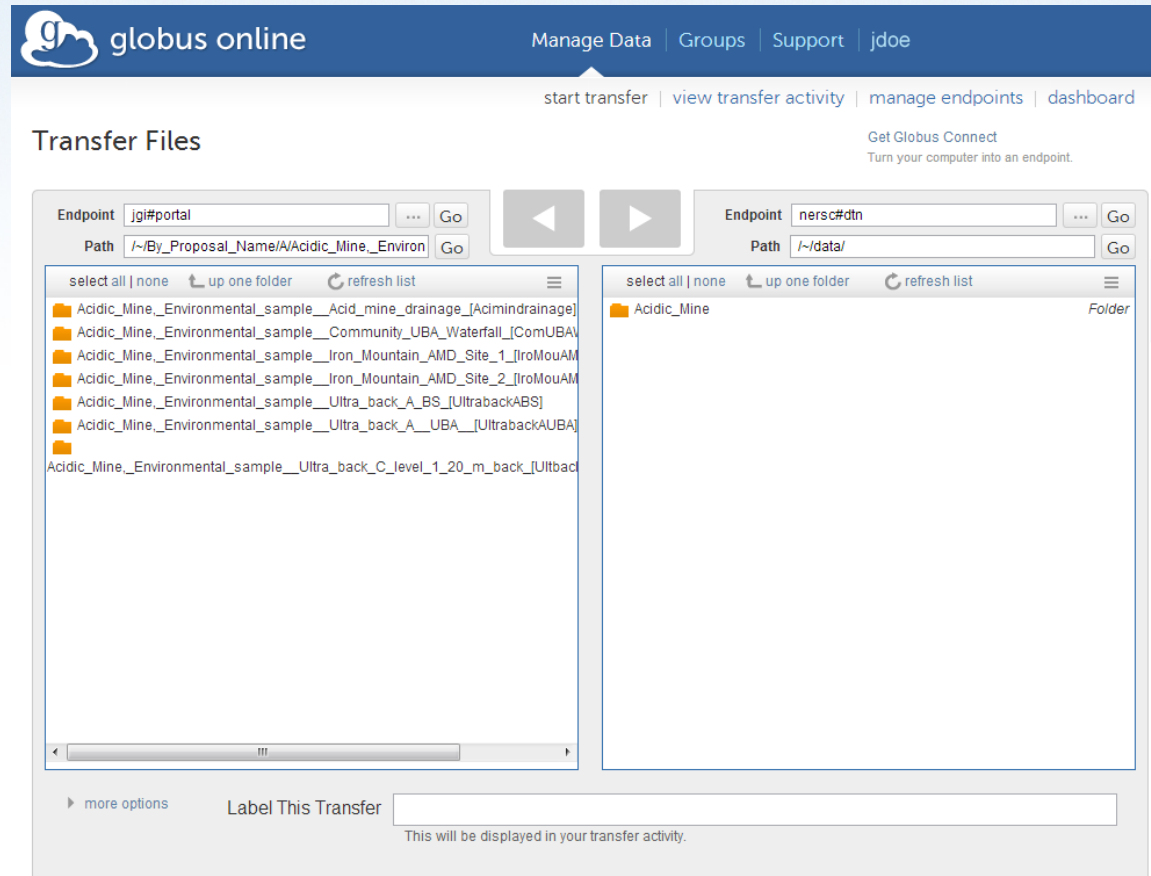


# Rocks Rolls + YUM Repository 3

- Existing cluster? XSEDE provides documentation to configure your cluster such that you can use these resources
- Install YUM Repo locally, manage XSEDE packages as if they were part of the OS, just like you would with the base or EPEL repositories

# 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](http://genome.jgi.doe.gov/pages/portal_apps.jsf)



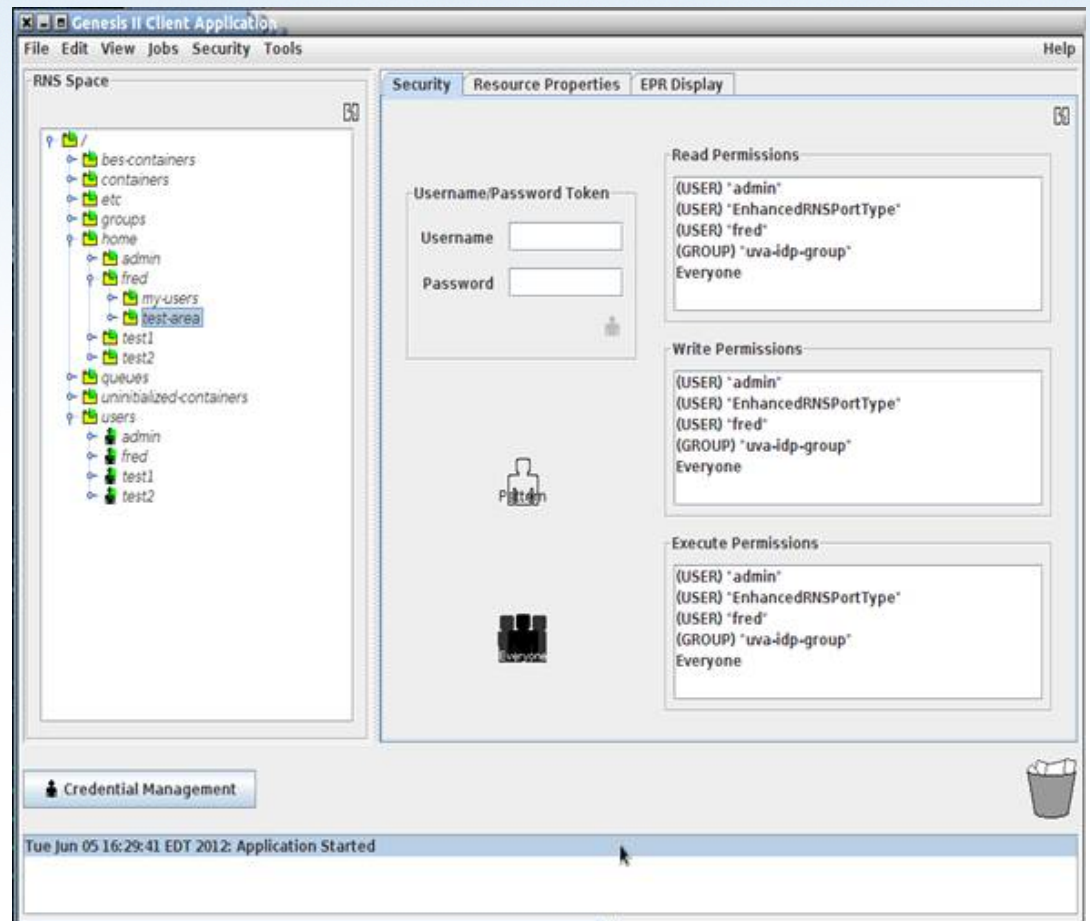


# Globus Online 2

- 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!

# GFFS

Screenshot  
courtesy  
[http://genesi  
s2.virginia.ed  
u](http://genesi<br/>s2.virginia.ed<br/>u)





## GFFS 2

- Allows users to export a directory into a globally federated file system that is visible from any system which is running a GenesisII client
- Provides a fuse-based filesystem, mountable in userspace with hooks to job management

# GFFS 3

- Two components
  - Unicore 6 Basic Execution Services (BES)
    - Allows for jobs to be submitted as files into a directory
    - Directory is a jobs queue and BES executes job files as jobs in a queue
  - Global Federated File System (GFFS)
    - Standardizes user interface across compute resources
    - GUI component allows drag and drop uploading, user and group management, and POSIX-style permissions management independent of the command line



# 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
  - Full-time dedicated support and consulting
  - GlobusOnline
  - GFFS



# For more information...

- <https://www.xsede.org/campus-bridging>
  - <http://cb-repo.iu.xsede.org/xsederepo/>
  - <https://www.xsede.org/globus-online>
  - <http://genesis2.virginia.edu>
  - [campusbridging@xsede.org](mailto:campusbridging@xsede.org)
  - +1 (812) 318-2872 (M-F, 9a-5p Eastern)
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- Any questions?





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

**XSEDE**

Extreme Science and Engineering  
Discovery Environment