April 16, 2014

Globus in the Campus Bridging Context

Barbara Hallock (bahalloc@iu.edu)

XSEDE

Extreme Science and Engineering
Discovery Environment

NSF

What is XSEDE?

- eXtreme Science and Engineering Discovery Environment

- Successor to TeraGrid

- NSF Grant

- Network of top-tier scientific computing resources nationwide

- The institution that supports the network

What is XSEDE? 2

- Through a simple allocation process, researchers can apply for and receive compute resources on top-tier cyberinfrastructure with which to run scientific experiments

- Work often involves extensive use of "Big Data" – so these researchers are moving a lot of data back and forth
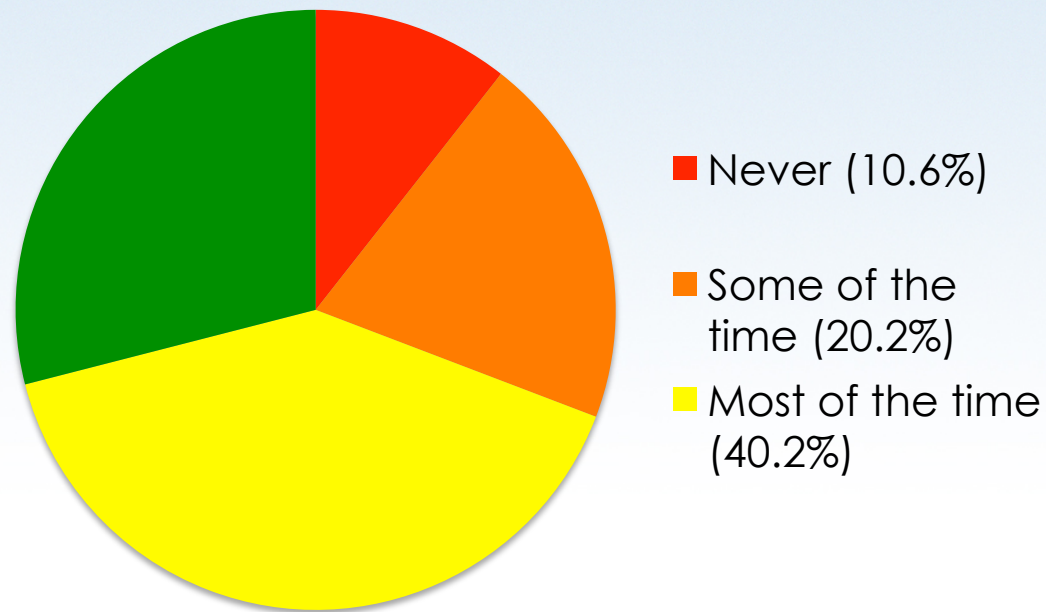
What is Campus Bridging?

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

Adequacy of research CI

- Never (10.6%)
- Some of the time (20.2%)
- Most of the time (40.2%)

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
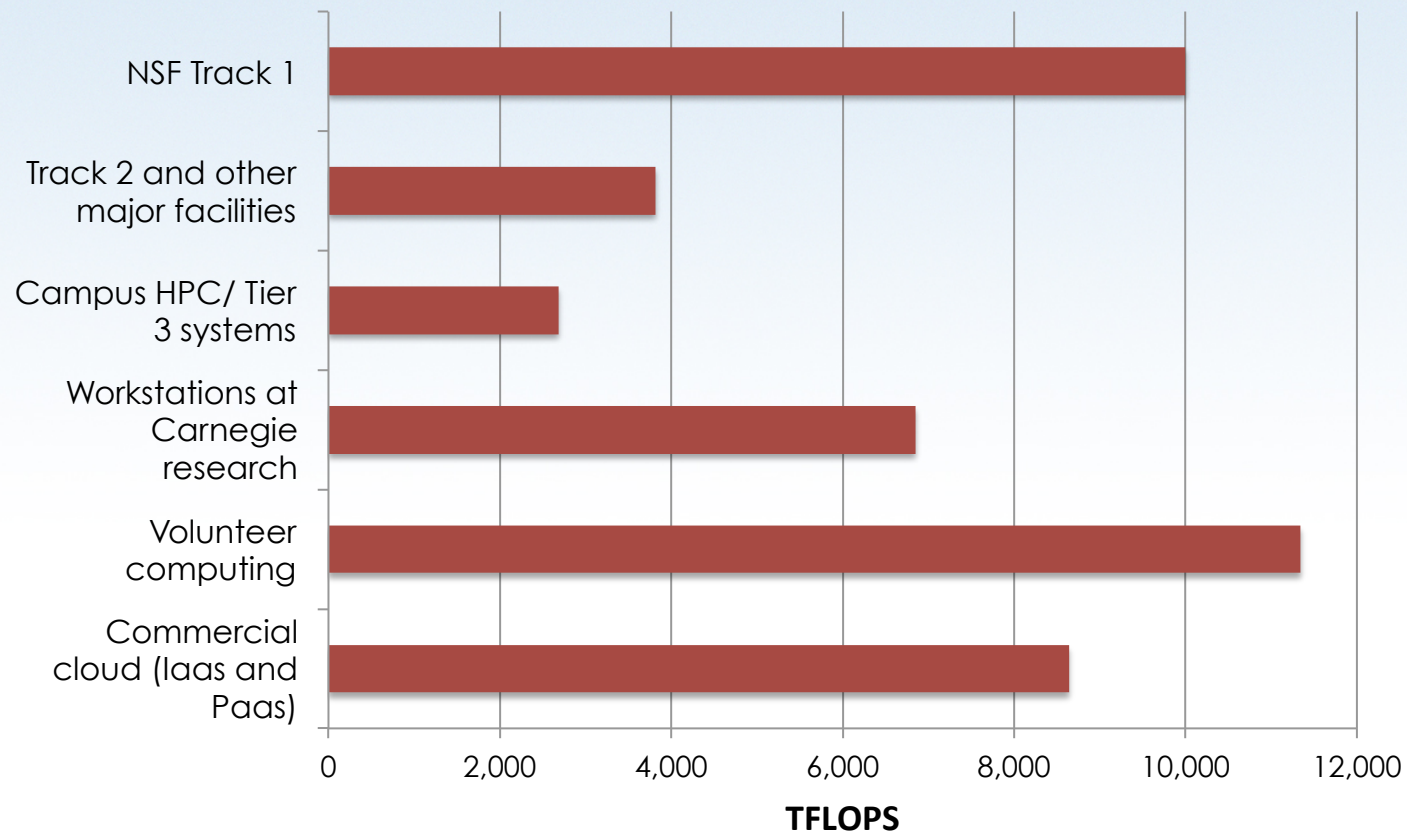
More on Campus Bridging

- 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

Some CI resources available to science and engineering researchers in US (March 2011)

Bar chart titled "Some CI resources available to science and engineering researchers in US (March 2011)". X-axis: TFLOPS (0 to 12,000). Categories and approximate values:
- NSF Track 1: ~10,000
- Track 2 and other major facilities: ~3,800
- Campus HPC/ Tier 3 systems: ~2,700
- Workstations at Carnegie research: ~6,800
- Volunteer computing: ~11,300
- Commercial cloud (Iaas and Paas): ~8,600

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

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:

Campus Bridging services today

- UNICORE – Grid system developed in Europe, supported and continually evolving, adopted by XSEDE for optional deployment on level 1 and 2 Service Providers. Nearly universal.

- Cluster Rocks Rolls and YUM Repo

- Globus Online – File transfer utility, approved for use on XSEDE resources. Globus Connect Multiuser also through engineering process.

- Genesis II – global file system and job submission service under evaluation & development

Globus in the Campus Bridging Context

– Screenshot courtesy of http://genome.jgi.doe.gov/pages/portal_apps.jsf

Globus with at least one XSEDE Endpoint

- 136 million files transferred to a XSEDE endpoint

- 121 million files transferred from a XSEDE endpoint

- 1,351 TBs transferred to a XSEDE endpoint

- 1,328 TBs transferred from a XSEDE endpoint

- 373 distinct Globus Transfer XSEDE users

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:
  - Basic XSEDE-compatible software stack
  - Full-time dedicated support and consulting
  - Globus Online
  - GenesisII

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
- +1 (812) 318-2872 (M-F, 9a-5p Eastern)

- 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