XSEDE Computational Resource Support at CHPC

Anita Orendt – University of Utah Campus Champion
anita.orendt@utah.edu
Overview

• Current XSEDE Resources
• Other Compute Resources
• Signing up for an XSEDE User Portal (XUP) account
• Short Review of User Responsibility and Security
• Requesting an Allocation on XSEDE Resources
• Short review of the XSEDE Computing Environment
• Signing up for XSEDE Training
• Where to Get Help on XSEDE
• Campus Champion Program
XSEDE Resources
XSEDE HPC Computing Resources

https://www.xsede.org/resources/overview

**TACC Stampede2** Update of Stampede in production Fall 2017. With 4,200 KNL (Intel Xeon Phi 7250) compute nodes along with 1,736 Skylake (48 core, 192GB) compute nodes it is designed for large scale computing needs. 18 petaflops

**SDSC Comet** About 1950 Intel Haswell nodes (24 cores, 128GB RAM), SSD local scratch. It is intended for moderately scalable parallel applications with an emphasis on improving productivity for a broad spectrum of users. Additional nodes with NVIDIA K80/P100 GPUs; others have 1.5TB RAM

**XStream** (Stanford), K80 GPU cluster with 65 nodes each with 20 cores (Ivybridge) and 8 K80s; 20% cycles to XSEDE

**SuperMIC** (LSU) Intel Ivybridge nodes with MIC coprocessors; 40% cycles to XSEDE

**IU Jetstream** Cloud Computing resource

**PSC Bridges** A connected set of interacting systems offering a flexible mix of gateways (web portals), Hadoop and Spark ecosystems, batch processing (large shared memory and GPU nodes) and interactivity. Regular and large memory resources
20 Storage Building Blocks, implementing the parallel Pylon filesystem (~10PB) using PSC’s SLASH2 filesystem.

4 HPE Integrity Superdome X (12TB) compute nodes

42 HPE ProLiant DL580 (3TB) compute nodes

12 HPE ProLiant DL380 database nodes

6 HPE ProLiant DL360 web server nodes

20 “leaf” Intel® OPA edge switches

6 “core” Intel® OPA edge switches: fully interconnected, 2 links per switch

Intel® OPA cables

32 RSM nodes with NVIDIA next-generation GPUs

16 RSM nodes with NVIDIA K80 GPUs

800 HPE Apollo 2000 (128GB) compute nodes

Purpose-built Intel® Omni-Path topology for data-intensive HPC

http://psc.edu/bridges

© 2015 Pittsburgh Supercomputing Center
Jetstream at IU/TACC

Jetstream can be used in several different virtual machine (VM) sizes which are charged in service units (SUs) based on how much of the total system resource is used. The table below outlines the VM sizes created for Jetstream.

<table>
<thead>
<tr>
<th>VM SIZE</th>
<th>VCPUS</th>
<th>RAM (GB)</th>
<th>LOCAL STORAGE (GB)</th>
<th>SU COST PER HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiny</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Small</td>
<td>2</td>
<td>4</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Medium</td>
<td>6</td>
<td>16</td>
<td>60</td>
<td>6</td>
</tr>
<tr>
<td>Large</td>
<td>10</td>
<td>30</td>
<td>120</td>
<td>10</td>
</tr>
<tr>
<td>XLarge</td>
<td>22</td>
<td>60</td>
<td>240</td>
<td>22</td>
</tr>
<tr>
<td>XX Large</td>
<td>44</td>
<td>120</td>
<td>480</td>
<td>44</td>
</tr>
</tbody>
</table>
Other Services

- **Visualization**
- **Storage at** TACC, PSC, SDSC, NICS, Indiana
- **Science Gateways**
- **Extended Support**
- **Training**
  - Online, webinars, and in person
  - CHPC satellite site for XSEDE HPC Monthly Workshop and Summer Boot Camps
  - [https://www.xsede.org/web/xup/online-training](https://www.xsede.org/web/xup/online-training) for listing of all online offerings
Getting Started

https://www.xsede.org/for-users/getting-started

- Get XSEDE Portal account
- Learn about resources and figure out which meets your computing needs
  - Can start with a champion allocation if your institution has a champion
- Get an allocation – XRAS online submission
  - Startup allocations - Quick and Easy
    - Project abstract and CV
    - can do any time of year
  - Research allocation - very competitive
    - submission schedule (4X per year)
    - Main proposal, Progress report if renewal, Code performance & scaling section, CV
    - Reviewed by XSEDE Resource Allocations Committee (XRAC)
- Educational Allocations
  - Abstract, CV, course syllabus
  - Can do anytime of the year
- See https://www.xsede.org/web/xup/online-training for New User Tutorial and for Writing and Submitting a Successful XSEDE Proposal
The Portal provides a single location for information on and access to XSEDE resources

- Continually updated information about your allocations
- Access to your XSEDE accounts and allocated resources
- Interfaces for data management, data collections, etc

- Access to:
  - Help Desk
  - Allocation and queue stats
  - User management
  - Documentation/training
Creating an XSEDE portal account (XUP)

• Fill in personal information
• Choose a registration key
• System will send you email with a confirmation number
• Use confirmation number together with passkey to verify your account
Your XSEDE portal account

Welcome, Anita!
Last login: Thu 02/24/13 at 11:05:45 AM CST

Profile
Allocations
Accounts
Training

NEW! Share your XSEDE Science Achievements

In The Past 7 Days

My XSEDE Resources

<table>
<thead>
<tr>
<th>Resource</th>
<th>Status</th>
<th>Load</th>
<th>Username</th>
<th>My Jobs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stampede</td>
<td>Healthy</td>
<td></td>
<td>amorandt</td>
<td>R 0 Q: 0</td>
</tr>
<tr>
<td>Comet</td>
<td>Healthy</td>
<td></td>
<td>amorandt</td>
<td>R 0 Q: 0</td>
</tr>
<tr>
<td>SuperMC</td>
<td>Healthy</td>
<td></td>
<td>amorandt</td>
<td>R 0 Q: 0</td>
</tr>
</tbody>
</table>

XSEDE User Portal on the Go

Share your feedback on XSEDE Extended Collaborative Support Services with a quick 5 question survey!

View Gallery
User Responsibility and Security

• You are responsible for your account and for protecting your passwords.

• [https://portal.xsede.org/usage-policy](https://portal.xsede.org/usage-policy)

• First time you login, you will be asked to accept User Responsibilities
Types of Allocations

- **Campus Champion**
  - Get your feet wet with XSEDE
  - See campus champion for access and limits
  - 2 day lead time

- **Start-Up**
  - Benchmark and gain experience with resources
  - Different limits per resource

- **Education**
  - Class and workshop support
  - Short term (1 week to 6 months)

- **Research**
  - No Limit
  - 10 page request, 4 month lead time

https://portal.xsede.org/allocations-overview
https://portal.xsede.org/allocation-policies
Research Allocation

- Use the new XRAS system to submit request
- [https://portal.xsede.org/allocations/announcements](https://portal.xsede.org/allocations/announcements) for details
- Review occurs four times a year by XSEDE Resource Allocation Committee (XRAC)

<table>
<thead>
<tr>
<th>Submit Requests during</th>
<th>for the Allocation Starting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec 15 through Jan 15</td>
<td>Apr 1</td>
</tr>
<tr>
<td>Mar 15 through Apr 15</td>
<td>Jul 1</td>
</tr>
<tr>
<td>Jun 15 through Jul 15</td>
<td>Oct 1</td>
</tr>
<tr>
<td>Sep 15 through Oct 15</td>
<td>Jan 1</td>
</tr>
</tbody>
</table>

- Documents required: PI CV, Main Document and Code Performance and Scaling
- Look at sample requests provided!
Submit Allocation Requests: XRAS

- Go to XSEDE portal and login:
  - http://portal.xsede.org
- Go to “Submit/Review Request”
- For more details, see:
  - https://portal.xsede.org/allocations/policies
Single Sign On (SSO) Login Hub

- `ssh <XUPlogin>@login.xsede.org`
- `>gsissh <machine-name>`
- Easy to setup host alias file
- [https://portal.xsede.org/web/xup/single-sign-on-hub](https://portal.xsede.org/web/xup/single-sign-on-hub)

```bash
[u0028729@ash1 ~]$ ssh amorendt@login.xsede.org
Please login to this system using your XSEDE username and password:
password:
Last login: Mon Jul 11 11:33:12 2016 from 155.101.26.21

# Welcome to the XSEDE Single Sign-On (SSO) Hub!
# This system is for use by authorized users only, and is subject to the XSEDE
# Acceptable Use Policy, described at https://www.xsede.org/usage-policies.
# All activities on this system may be monitored and logged.
# Your storage on this system is limited to 100MB. Backup is not provided.
# From this system, you may login to other XSEDE system login hosts on which
# you currently have an active account. To see a list of your accounts, visit:
# https://portal.xsede.org/group/xup/accounts
# To login to an XSEDE system login host, enter: gsissh <login-host>
# where <login-host> is the hostname, alias or IP address of the login host.
# The following default gsissh host aliases have been defined:
# bridges comet darter gordon greenfield mason maverick nautilus
# osg stampede supermic wrangler-1u wrangler-tacc xstream
# For example, to login to the Comet system at SDSC, enter: gsissh comet
# E-mail help@xsede.org if you require assistance in the use of this system.
```
# XSEDE Accounts

**XSEDE Single Sign on Login Hub**

You can SSH into any XSEDE system with your PORTAL username and PORTAL password from the convenience of your desktop.

XSEDE recommends you use the XSEDE Single Sign on Login Hub to login to XSEDE resources with your local username and password. Use a local SSH client on your desktop to SSH to login.xsede.org with your portal username and password then easily gsi-ssh to any XSEDE system you have an account on with no additional username or passwords. For more information please visit the [XSEDE Single Sign on Login Hub documentation page](https:// portal.xsede.org/community/docs/login_hub.md).

<table>
<thead>
<tr>
<th>RESOURCE NAME</th>
<th>GSI-SSH LOGIN HOST</th>
<th>INSTITUTION</th>
<th>LOCAL USERNAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gordon ION</td>
<td>gordon.ssc.xsede.org</td>
<td>SDSC</td>
<td></td>
</tr>
<tr>
<td>Maverick</td>
<td>maverick.tecc.xsede.org</td>
<td>TACC</td>
<td>amorendt</td>
</tr>
<tr>
<td>Mason</td>
<td>mason_lx.xsede.org</td>
<td>IU</td>
<td></td>
</tr>
<tr>
<td>SuperMIC</td>
<td>not available</td>
<td>LSU CCT</td>
<td>amorendt</td>
</tr>
<tr>
<td>greenfield.psc.xsede</td>
<td>greenfield.psc.xsede</td>
<td>PSC</td>
<td></td>
</tr>
<tr>
<td>OSG</td>
<td>submit-1.osg.xsede.org</td>
<td>OSG</td>
<td>amorendt</td>
</tr>
<tr>
<td>Comet</td>
<td>comet.sdsc.xsede.org</td>
<td>SDSC</td>
<td>amorendt</td>
</tr>
<tr>
<td>Wrangler</td>
<td>wrangler.tecc.xsede.org</td>
<td>TACC</td>
<td></td>
</tr>
<tr>
<td>Gordon</td>
<td>gordon.ssc.xsede.org</td>
<td>SDSC</td>
<td>amorendt</td>
</tr>
<tr>
<td>Stampede</td>
<td>stampede.tecc.xsede.org</td>
<td>TACC</td>
<td>amorendt</td>
</tr>
<tr>
<td>Darter</td>
<td>gsis.sh.darter.nics.utk.edu</td>
<td>NICS</td>
<td></td>
</tr>
<tr>
<td>Nautilus</td>
<td>gsis.sh.nautilus.nics.xsede.org</td>
<td>NICS</td>
<td></td>
</tr>
</tbody>
</table>
Direct login access via command line

- Traditional way of accessing resources
- Must submit a help ticket requesting a password to that resource in order to login directly.

- `ssh <username>@<machine-name>`

Examples:

- `ssh amorendt@gordon.sdsc.xsede.org`
Other Outside of UU Computing Resources
- Open Science Grid
- FutureSystems (Indiana)
- Blue Waters (NCSA)
- Titan (OakRidge)
- ALCF (Mira, Theta, etc at Argonne)
- Edison (NERSC)
As part of RMACC

• Summit at University of Colorado Boulder
  • General compute
    • Haswell 24 cores/node, 128GB RAM
  • High memory
    • 48 cores/node 2TB
• GPU nodes
  • 24 cores, 2 K80s/node
• KNL Xeon Phi
Campus Chamions
NSF funded program to connect People with CyberInfrastructure

- HPC
- Visualization
- Data Analysis
- Storage
- Training
- Education
- Subject Matter Experts
Champion Program
History of the Champions

• Planning began in Fall of 2007
• 1st Champion selected in May 2008
• August 2011 – 100th institution joined
• May 2012 – Champion Fellows Program begun
• July 2013
  • Student Champion Program introduced
  • Domain Champion Program initiated
• January 2015
  • Regional Champion Program initiated
• August 2015 – 200th institution joined
• August 2017 – 221 institutions, 355 champions
• https://www.xsede.org/web/guest/current-champions -- interactive map
Campus Engagement Mission Statement

The Campus Engagement program promotes and facilitates the effective participation of a diverse national community of campuses in the application of advanced digital resources and services to accelerate scientific discovery and scholarly achievement.
Who are the champions?

- HPC Directors
- System Administrators
- User Support specialists
- Faculty evangelists
- Central IT staff
- Non-academic organization staff, e.g. USGS, USDA-ARS, KINBER, Idaho National Lab
- Plus friends of the family
What do champions do?

• Facilitate computing- and data-intensive research and education
• Help their local researchers and educators to find and use the advanced digital services that best meet their needs
• Share CI challenges and solutions (at all levels: workgroup, institutional, regional, national, and international)
Goals

- Increase scalable, sustainable institutional uptake of advanced digital services from providers at all levels
- Foster a broader, deeper, more agile, more sustainable and more diverse nationwide cyberinfrastructure ecosystem
- Cultivate inter-institutional interchange of resources, expertise and support
- Sustain this community beyond XSEDE