Overview

- CHPC Services
- Arches (HPC Clusters)
- Access and Security
- Batch (PBS and Moab)
- Allocations
- Getting Help
CHPC Services

- HPC Clusters (talk focus)
- Advanced Network Lab
- Multi-Media consulting services
- Campus Infrastructure Support
- Statistical Support

http://www.chpc.utah.edu/docs/services.html
Arches

http://www.chpc.utah.edu
Arches cont.

- Meta-cluster comprised of several components:
  - Sand Dune Arch (coming soon!)
  - Delicate Arch (Parallel Cluster)
  - Marching Men (Cycle Farm)
  - Tunnel Arch (Data Mining Cluster)
  - Landscape Arch
  - Administrative nodes
Arches Cluster

Parallel Cluster
256 nodes/512 procs
Myrinet and GigE

Cycle Farm
179 nodes/358 procs
GigE

Condominium
176 nodes 386 procs
Myrinet and GigE

Data Mining
64 nodes/128 procs
GigE

Sand Dune Arch
156 nodes/624 procs
Infiniband and GigE

Switch

Administrative Nodes

NFS serial scratch space

parallel scratch space

Home Directories

NFS

4/29/08

http://www.chpc.utah.edu

Slide 6
• Each cluster has its own interactive login nodes
  – sanddunarch.chpc.utah.edu
  – marchingmen.chpc.utah.edu
  – delicatearch.chpc.utah.edu
  – tunnelarch.chpc.utah.edu
  – landscapearch.chpc.utah.edu

• You may interact with queues of any cluster from any interactive node!
Skyline Arch

- 10 Dual Opterons
- “Wall”
- 18 Sanyo LCD projectors
- Distributed visualization
- Chromium/OpenGL
- Contact Sam Liston: stliston@chpc.utah.edu
• **CHPC home directory space** NFS mounted on all HPC platforms
  – `/uufs/chpc.utah.edu/common/home/<uNID>`

• **Global scratch space** for all HPC systems
  – **New!** `/scratch/serial` 16 Tb
  – `/scratch/mm, /scratch/da`
• Filesystem choices
  – Access speed based on connectivity
  – Local disk fastest – local to each node
    • /tmp – not fully supported
  – NFS
    • New 16 Tb /scratch/serial – please use
    • /scratch/mm and /scratch/da
    • /scratch/serial-old
    • home directories (don’t use for large i/o)
      /uufs/chpc.utah.edu/common/home/<uNID>
    • /scratch/parallel (pvfs going away) don’t use
• **Application Procedure**
  - [http://www.chpc.utah.edu/docs/forms/application.html](http://www.chpc.utah.edu/docs/forms/application.html)
  - Fill out form online, print locally and send in or fax

• **Passwords maintained by the campus information system**
Logins

• **Access – interactive sites**
  - `ssh sanddunearch.chpc.utah.edu`
  - `ssh marchingmen.chpc.utah.edu`
  - `ssh delicatearch.chpc.utah.edu`
  - `ssh tunnelarch.chpc.utah.edu`
  - No access to compute nodes
Security Policies

- No clear text passwords use ssh and scp
- You may not share your account under any circumstances
- Don’t leave your terminal unattended while logged into your account
- Do not introduce classified or sensitive work onto CHPC systems
- Use a good password and protect it
Security Policies

• Do not try to break passwords, tamper with files etc.
• Do not distribute or copy privileged data or software
• Report suspicions to CHPC (security@chpc.utah.edu)
• Please see http://www.chpc.utah.edu/docs/policies/security.html for more details
• **CHPC Getting started guide**
  
  – [www.chpc.utah.edu/docs/manuals/getting_started](http://www.chpc.utah.edu/docs/manuals/getting_started)

• **CHPC Environment scripts**
  
  – [www.chpc.utah.edu/docs/manuals/getting_started/code/chpc.tcshrc](http://www.chpc.utah.edu/docs/manuals/getting_started/code/chpc.tcshrc)
  
  – [www.chpc.utah.edu/docs/manuals/getting_started/code/chpc.bashrc](http://www.chpc.utah.edu/docs/manuals/getting_started/code/chpc.bashrc)
Environment

• Running the CHPC environment script will set your path correctly for that cluster using the $UUFSCELL env var.

• But you may access other clusters by specifying full path:
  – If your are logged into one of the marchingmen nodes the path /uufs/$UUFSCELL/sys/bin is added to your PATH env variable
  – $UUFSCELL will be set to marchingmen.arches
  – showq will show you the queues for MM
  – To check the queues on delicatearch, run the command using the full path /uufs/delicatearch.arches/sys/bin/showq
Batch System

• Comprised of two components
  – Torque (OpenPBS )
    • Resource Manager
  – Moab (Maui) Scheduler

• Required for all significant work
  – Interactive nodes only used for short compiles, editing and very short test runs (no more that 15 minutes!)
• Build of OpenPBS
• Resource Manager
• Main commands:
  – qsub
  – qstat
  – qdel
• Used with a scheduler
Simple Batch Script

#PBS -S /bin/bash
#PBS -l nodes=2:ppn=4,walltime=1:00:00
#PBS -M username@utah.edu
#PBS -N myjob
# Create scratch directory
mkdir -p /scratch/serial/$USER/$PBS_JOBID
# Change to working directory
cd /scratch/serial/$USER/$PBS_JOBID
# Copy data files to scratch directory
cp $HOME/work_dir/files /scratch/serial/$USER/$PBS_JOBID
# Execute Job
source /uufs/sanddunearch.arches/sys/pkg/mvapich/std/etc/mvapich.sh
/uufs/sanddunearch.arches/sys/pkg/mvapich/std/bin/mpirun_rsh -rsh -np 8 -hostfile $PBS_NODEFILE ./hello_4
# Copy files back home and cleanup
cp * $HOME/work_dir && rm -rf /scratch/serial/$USER/$PBS_JOBID
• Used on all HPC systems
• Enforces policies
• Sets priorities based on:
  – qos
  – out of allocation (“free cycle”)
• Optimizes throughput on the system
• **Main commands:**
  
  – `showq`
    - `-i` *(idle jobs)*
    - `-r` *(running)*
    - `-b` *(blocked)*
  
  – `showstart <jobnumber>`
  
  – `checkjob <jobnumber>`
Batch Policies

• **Time limits**
  – sandduneearch – 72 hour wallclock
  – delicatearch – 72 hour wallclock limit
  – marchingmen – 72 hour wallclock limit
  – tunnelarch – 5 days (120 hr) wallclock limit

• **Out of allocation (qos=freecycle)**
  – lowest priority
  – subject to all general user restrictions

• **Use “pbsnodes –a“ for node availability**

• **Max cpus is half #nodes per cluster**
Trouble Shooting

• **Won’t start:**
  – showq –i
  – diagnose –p
  – checkjob [–v] <jobnumber>
  – qstat –f <jobnumber>
  – showstart

• **Other Useful commands:**
  – qstat –n <jobnumber>
• **Enforced on arches**
  – 1 SU = 1 Wallclock hour on 2 Ghz node
  – example: 1 hour on 2.4 quad core node (sda) is
    \[ \frac{2.4}{2.0} = 1.2 \times 4 = 4.8 \text{ SUs} \]
  – Node sharing not allowed

• **Requests reviewed quarterly**
Allocations cont.

• Requests for up to 4 quarters at a time due:
  – June 1\textsuperscript{st} (for Jul-Sep period)
  – September 1\textsuperscript{st} (for Oct-Dec period)
  – December 1\textsuperscript{st} (for Jan-Mar period)
  – March 1\textsuperscript{st} (for Apr-Jun period)

• Allocation form available on website
  http://www.chpc.utah.edu/docs/forms/allocation.html

• Next Allocations Due June 1\textsuperscript{st}
Allocations cont.

• Quick allocations may be made for up to 5000 SU’s for the current quarter only
• Unused allocations may not be carried forward to next quarter
• Allocation and Usage data on CHPC web site
Getting Help

• [http://www.chpc.utah.edu](http://www.chpc.utah.edu)

• **Email:** [issues@chpc.utah.edu](mailto:issues@chpc.utah.edu)  
  (Do not email staff members directly)

• [http://jira.chpc.utah.edu](http://jira.chpc.utah.edu)

• **Help Desk:** 405 INSCC, 581-6440  
  (9-5 M-F)

• [chpc-hpc-users@lists.utah.edu](mailto:chpc-hpc-users@lists.utah.edu)
All presentations are on Thursdays INSCC Auditorium

• 4/10  Introduction to Parallel Computing (1:00 p.m.)
• 4/17  Chemistry Packages (1:00 p.m.)
• 4/24  Using Gaussian03 and Gaussview (1:00 p.m.)

http://www.chpc.utah.edu/docs/presentations/

If you would like training for yourself or your group, CHPC staff would be happy to accommodate. Please contact julia.harrison@utah.edu to make arrangements.