Overview

• Login Nodes, File Systems, and Dot Files
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• Software Modules
  – Doug Jacobsen

• Compilers
  – Mike Stewart
Login Nodes

• **Edison**
  – Six nodes
    • 16 cores, 2.0GHz Intel Sandy Bridge
    • 512GB

• **Hopper**
  – Eight nodes
    • 16 cores, 2.4GHz AMD Opteron
  – Four nodes
    • 32 cores, 2.0GHz AMD Opteron
    • 128GB

• **Carver**
  – Four nodes
    • 8 cores, 2.66GHz Intel Nehalem
    • 48GB
Login Node Access

• **Connect (via ssh) to load balancer**
  – edison.nersc.gov
  – hopper.nersc.gov
  – carver.nersc.gov

• **Load balancer selects login node based on:**
  – Number of connections
  – Memory of previous connections from same IP
    • If you login everyday, you’ll probably end up on the same login node every time.
Login Node Usage

• Login nodes are shared by many users, all the time
• Edit files, compile programs, submit batch jobs
• Some post-processing/data analysis
  – IDL
  – MATLAB
  – NCL
  – python
• Some file transfers
  – Use data transfer nodes for large/long-running transfers
• Please use discretion
  – All users get frustrated by sluggish interactive response
Login Node Guidelines

• Determine number of available cores
  % grep processor /proc/cpuinfo | wc -l
• Determine amount of physical memory
  % grep MemTotal /proc/meminfo
• Use “top” command to view process activity
• Limit use of parallel “make”
  % make -j 4 all
• Use *no more* than 50% of available cores
• Use *no more* than 25% of available memory
• NERSC will kill user processes if response becomes unacceptable
Long-Term File Systems

• Global home directories
  – Source/object/executable files, batch scripts, input files, configuration files, batch job summaries (*not* for running jobs)
  – Backed up
  – 40GB permanent quota
  – $HOME

• Global project directories
  – Sharing data between people and/or systems
  – By PI request
  – Backed up if quota less than 5TB
  – 4TB default quota
Short-Term File Systems

• **Local scratch directories**
  – Cray (Edison, Hopper) only
  – Large, high-performance parallel Lustre file system
  – Not backed up; files purged after 12 weeks
  – Hopper: 5TB default quota; Edison: 10TB default quota
  – $SCRATCH, $SCRATCH1, $SCRATCH2, $SCRATCH3

• **Global scratch directories**
  – All systems
  – Large, high-performance parallel GPFS file system
  – Not backed up; files purged after 12 weeks
  – 20TB default quota
  – $GSCRATCH
File System Suggestions

• Use $SCRATCH for running Hopper/Edison batch
• Use $GSCRATCH for running Carver batch
• Performance can be limited by metadata
  – Do not store 1000s of files in single directory
• Use “tar” to conserve inodes
• Use HPSS to archive important data
  – Protection against hardware failure
  – Quota management
Shell Initialization Files

• **Standard dot files**
  – .bashrc, .profile, .cshrc, .login, etc.
  – Symbolic links to read-only files
    • Allows NERSC to provide common environment

• **Personal dot files**
  – Aliases, environment variables, modules, etc.
  – Use “.ext” files
    – .bashrc.ext, .profile.ext, .cshrc.ext, .login.ext, etc.

• **Use “fixdots” to start over**
  – Creates $HOME/KeepDots.<timestamp>
  – Restores all dot files to current default state