KIPAC Computing Resources and Batch Computing

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Overview

- KIPAC community bridges SLAC, SU campus and many off-site collaborators (~200).
- Overlaps many projects (lsst, Fermi,...)
- Provide productive computing environment

Hardware

- MPI clusters (bullet, orange, sherlock)
- Large memory SMP (32c, 256GB)
- Lustre Parallel file system
- 3D visualization
- Display wall (in development)

Software and services

- Shared packages
- Licensed software
- Hardware monitoring (SCS)
- Tape backups (SCS)
- DB and web servers

Staff

- Stuart Marshall
- Ralf Kaehler
- Glenn Morris*
- Jeff Wade (campus)
- Yemi Adesanya and SCS team

KIPAC Computing Resources

- Accounts
  - unix: regular computing, bash shell
  - windows: needed for internal web access (optional)
  - email: generally forward to SU unless slac employee
  - Martha Siegel main contact for new accounts/changes
- Wireless
  - eduroam* or visitor: https://confluence.slac.stanford.edu/display/TAN/SLAC+Visitor+Network
  - conference rooms special LAN supporting collaboration/meetings
- Getting Help
  - Always feel free to contact me via email/phone (marshall@slac)
  - SLAC admin email: unix-admin@slac.stanford.edu and *cc* marshall
  - URL: https://slacprod.service-now.com/ess/help_splash.do

Resources...

- Mailing Lists: KIPAC groups (http://kipac.stanford.edu/mailman/listinfo)
  - students, postdocs, everyone, …
  - openmpi@slac.stanford.edu, unix-community@slac, comp-out@slac
  - Listserv @slac has instructions: https://portal.slac.stanford.edu/public/maillist/Pages/Home.aspx
- unix systems at SLAC: Redhat 6 today, Redhat/Centos 7 future
  - common software in /usr/local but not extensive
  - older gcc on RHEL6 has replacement via “scl enable devtoolset-2 bash”
  - Intel compiler suite available: https://confluence.slac.stanford.edu/display/SCSPub/Intel+Developer+Tools+and+Libraries

Resources...

- Where to login:
  - interactive: ki-ls{07,08,09,10}, ki-ls.slac.stanford.edu chooses automatically
  - http://www.slac.stanford.edu/comp/unix/ssh.html see “known_hosts” note
  - public: http://www.slac.stanford.edu/comp/unix/public-machines.html
  - X2GO for remote display: https://confluence.slac.stanford.edu/display/SCSPub/x2go+-+Remote+access+for+X11+based+applications
  - Batch head nodes: (internal only), more on batch later..
    - bullet.slac.stanford.edu
    - orange.slac.stanford.edu
  - Desktops: various ki-rhNN desktops in Kavli Building.
  - All hosts are nearly equivalent as far as OS and environment.

Resources...

- Storage
  - AFS: home directories and various system-wide uses (openAFS)
    - Limited size, starts at 2GB but can ask for more, ask me when needed
    - Well backed up, self recovery from path “~/.backup”
    - Recommend for code, papers, figures, individual stuff but NOT data or any files used by batch jobs
  - NFS: Our principal storage type
    - Path is generally /nfs/slac/g/ki/<partition>/<username or group>
    - Backed up but requires admin assist to recover files
    - Contact me for allocation. Generally 100s GB to several TB.
    - Newest systems are GPFS with additional features.
  - Lustre: Parallel file system for parallel batch jobs
    - If you need high throughput on parallel batch jobs this is the appropriate space to use.

Resources...

- Software
  - /afs/slac/g/ki/software/<package> has many packages intended for general use at kipac. (/afs/slac/g/ki/software/local/bin in PATH)
  - Mathematica network license for ~7 concurrent users. See me about how to use remotely.
  - IDL network license for ~13 concurrent users. See me about remote useage. Also about using in batch w/out using licenses.
  - Python is in transition: Will install a kipac anaconda with the expected packages pre-installed. SLAC has anaconda in /usr/local/bin. KIPAC has python 2.7.9 vanilla. See /afs/slac/g/ki/software/python/README. Feedback welcome on what is needed.
  - Other packages occasionally obtained for individual uses.

Batch computing

Slac provides batch computing systems for both serial jobs (single core) and parallel. The batch management system is LSF.

- Main page: https://confluence.slac.stanford.edu/display/SCSPub/High+Performance+Computing+at+SLAC
- Recommended practices: https://confluence.slac.stanford.edu/display/SCSPub/Batch+Compute+Best+Practices
- Parallel Computing documentation: https://confluence.slac.stanford.edu/display/SCSPub/Parallel+Computing

Batch continued...

- Monitoring
  - Ganglia: http://ganglia.slac.stanford.edu:8080/
  - RTM: https://farmrtmweb.slac.stanford.edu/cacti/plugins/grid/grid_bhosts.php
  - command line: http://www.slac.stanford.edu/exp/glast/wb/prod/pages/installingOfflineSW/usingSlacBatchFarm.htm#commands

Research Computing at Stanford's SRCF

Heavily parallel KIPAC research computing is migrating to the **Sherlock Cluster** at the SRCF.

- http://sherlock.stanford.edu/mediawiki/index.php/Main_Page
  - ~120 nodes of 16 core Intel with Infiniband, Lustre FS etc.
  - SLURM batch management (see docs)
  - Ongoing expansion with KIPAC share increasing by >1000 cores and >300TB Lustre space.
- Future effort will concentrate on coordinating data management and analysis at SLAC with simulation outputs from Sherlock and others (eg. NERSC).
- Quick start page on using bbcp: https://confluence.slac.stanford.edu/display/~marshall/Using+bbcp+between+SLAC+and+SU%27s+sherlock+cluster

Links

- http://www.slac.stanford.edu/comp/unix/unix.html (old but not wrong)
- http://www.slac.stanford.edu/comp/unix/ssh.html (see note about known_hosts file)
- https://confluence.slac.stanford.edu/display/SCSPub/High+Performance+Computing+at+SLAC
- https://confluence.slac.stanford.edu/display/SCSPub/Batch+Compute+Best+Practices
- https://confluence.slac.stanford.edu/display/SCSPub/Parallel+Computing
- http://www.slac.stanford.edu/comp/unix/public-machines.html
- https://portal.slac.stanford.edu/public/ITHelp/ (many links off of here)
- https://confluence.slac.stanford.edu/display/SCSPub/x2go+-+Remote+access+for+X11+based+applications
- https://confluence.slac.stanford.edu/display/SCSPub/User+Documentation