Running, Using, and Maintaining a Cluster

From a software viewpoint
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What’s involved?

• A cluster.
• People to use that cluster.
• Software for those people to use.
• Ways to keep the cluster working.

• Libraries and User applications
• Schedulers and resource managers
• Monitoring and Maintenance tools
Goals?

1. Reliability
   - Maintains high utilization by people getting “real” work done, and not by system time. Should also be optimized for your users’ work load.

2. Availability
   - But not so secure as to lock out users.

3. Efficient*

4. Secure**

5. AFAP***

*** A.F.A.P: As Fast As Possible
Compilers

- GNU Compiler suite
- Intel Compiler suite
- Portland Group Compilers
- Cray Compilers
- ....
Libraries

- mpiBLAST
- BLAS
- LAPACK
- ScaLAPACK
- PETSc

- MPI
- ATLAS
- ScalaBLAST
- CUDA
- Gaussian

Ad nausium...
Job Managers

- TORQUE/PBS, LSF, LoadLeveler, Condor, Sun Grid Engine
- Usually tied into scheduler like FIFO, Maui
- Separate queues based on needs
  - E.g., CUDA, Debug, “normal,” intpar
Monitoring tools

Ganglia

Cacti
Maintenance tools

• C3 Tools
• Nagios
• Cron
• IPMI
• Modules
• ...
Questions?