BLUE WATERS

SUSTAINED PETASCALE COMPUTING

Blue Waters User Monthly Teleconference

NCSA NSF GREAT LAKES CONSORTIUM FOR PETASCALE COMPUTATION CRAY

Agenda

- Recent changes to system and policies.

- Upcoming changes to the programming environment.

- Taking advantage of backfill.

- Update on Data Sharing service.

- Save the date Blue Waters Advanced User workshop.

- Upcoming XSEDE14 and SC14 Conferences and VSCSE events.

- Requests for Science Successes.

Recent System Events and Updates

- Current maintenance
    - Testing of topology aware scheduling (coming soon).
    - Updates to Lustre server supporting software to improve stability.
    - Patches to improve high-speed network (HSN) stability.
    - Hardware replacement beyond what can be done during weekly warm-swap periods.

Recent Changes

- Previously
  - Weekday reservation for small number of nodes for small, short jobs in debug queue and high queue:188 XE and 64 XK but the reservation allows up to 64 XE nodes and 32 XK with wall clock times < 4 hours. Should improve turn-around for debugging and development.
- Recently
  - Increase of the minimum time before preemption of "low" queue jobs to 4 hrs (up from 30 minutes).
  - June 5th through July 8th: Jobs submitted to the debug, low, normal, high and training queues that start running by July 8th are eligible for a 50% discount. An additional discount of 50% (on top of other discounts) for all jobs that use 1/4 or more of the total available XE nodes (> 5599 nodes). Jobs using XK nodes are not eligible for this discount.
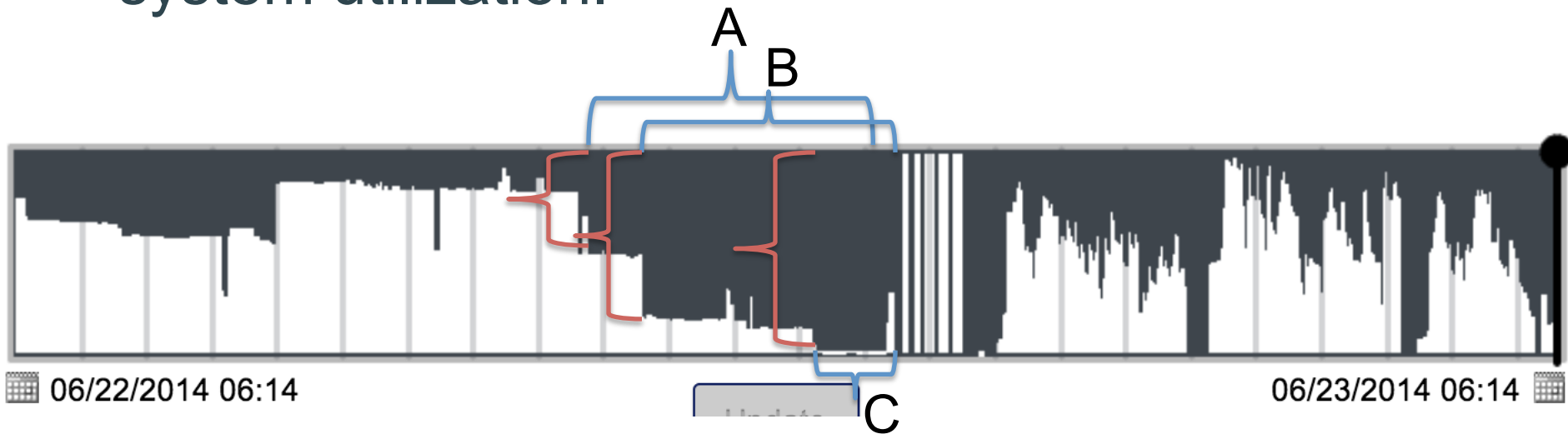
Upcoming changes

- Planned Programming Environment (PE) changes
  - Next PE will require rebuild of MPI based applications.
  - MPT 7.0.0 release adheres to the "MPICH ABI Compatibility Initiative" - https://www.mpich.org/abi
  - Support dynamically linked applications between MPICH compatible versions on similar supported processors without recompiling.

Darshan

- Please try Darshan with your application. We will make this a default module in the user environment in a month.
- Automatically profile application IO:
    - No code modification
        - Works with POSIX, HDF5, NetCDF, MPI-IO
    - Low overhead
    - Scalable
    - Must be an MPI application (conflicts with some tools).
- Per-file per-process statistics (organized by file)
    - Counts I/O operations, e.g. unaligned and sequential accesses
    - Times for file operations, e.g. opens and writes
    - Accumulates read/write bandwidth info
    - Creates data for simple visual representation
- For more information see https://bluewaters.ncsa.illinois.edu/darshan

Backfill

- Workload mix, larger jobs or system reservations cause gaps in runnable work which lowers system utilization.
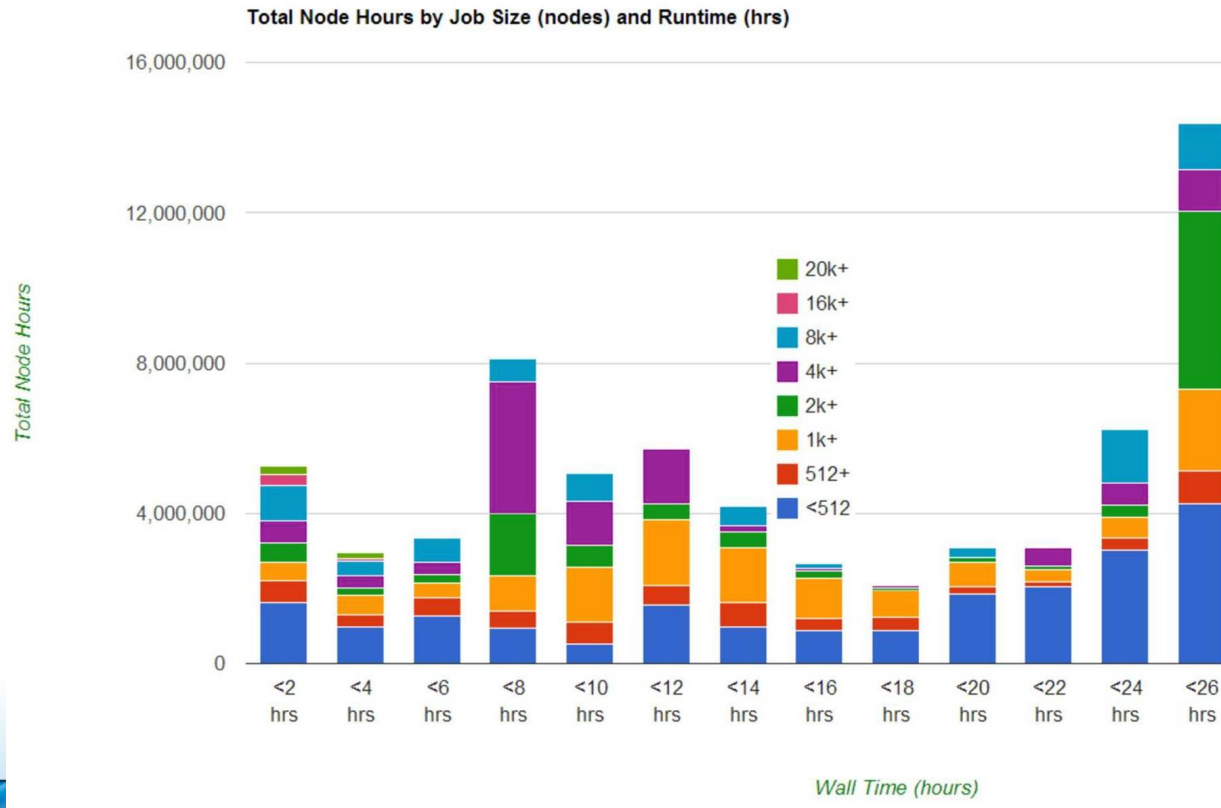
Backfill

- Backfill is an optimization policy that allows a scheduler to make better use of available resources by running jobs out of order.

- It attempts to schedule some of the remaining lower-priority jobs in the gaps left over from the higher-priority jobs.

- Backfill allows a higher utilization than would be otherwise possible, while remaining mostly true to the original job priorities.

- Added a realtime chart of backfill opportunities
  https://bluewaters.ncsa.illinois.edu/why-isn-t-my-job-running#backfill

Backfill

- Avoid specifying longest permitted wallclock time.

Total Node Hours by Job Size (nodes) and Runtime (hrs)
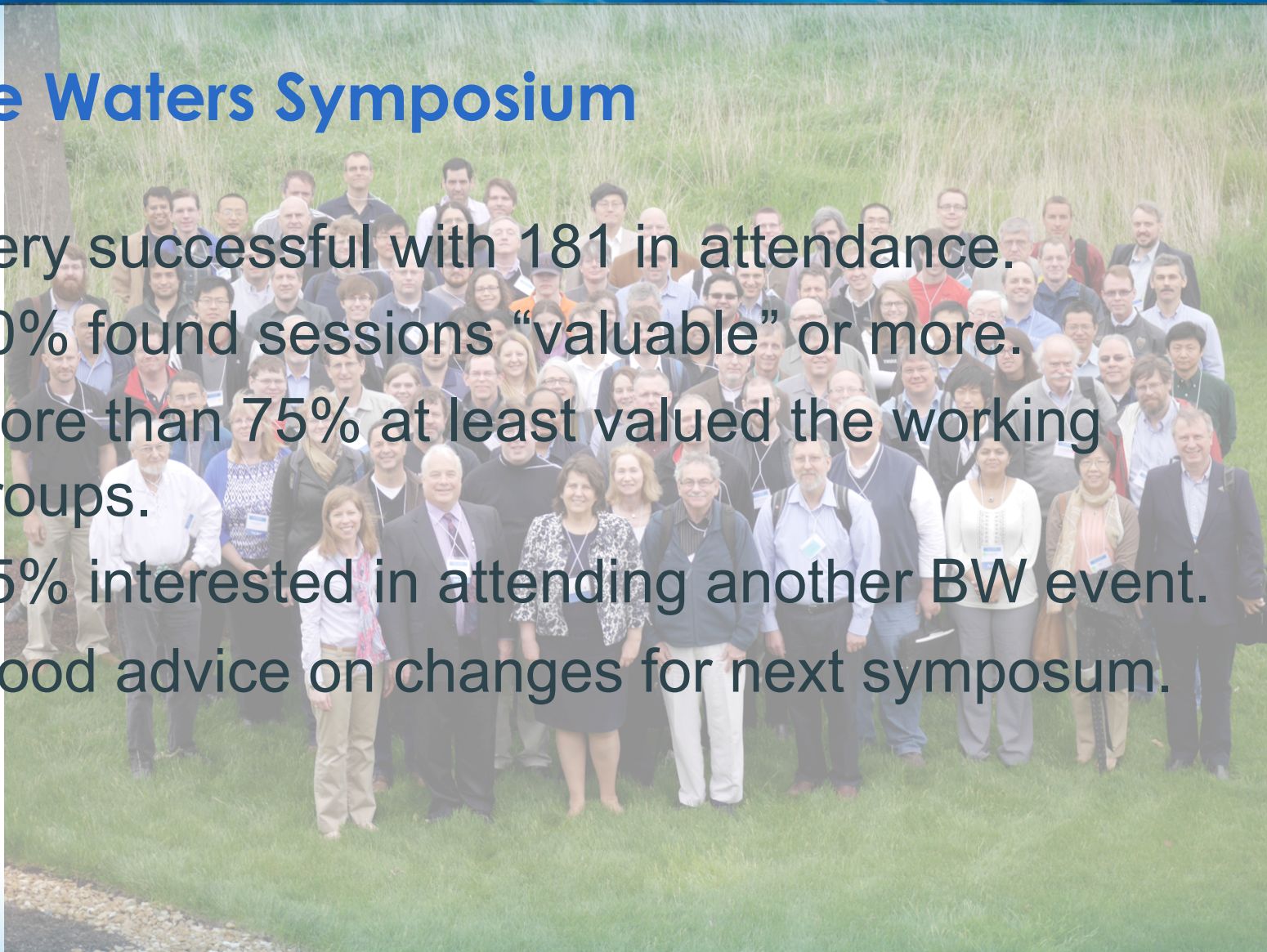
Data Sharing Service

- Nearing delivery of first phase of service.

- Based on Globus Online.

- Working on sharing sponsorship.

- Finalizing procedural aspects.

  - DOI

  - Metadata

  - Agreements and Policies

Blue Waters Advanced User Workshop

- The week of October 13th at NCSA.
- More hands-on sections with Cray, NVIDIA, Allinea, …
- Bring your own code.

- Possible tie in with a YT visualization workshop.

Blue Waters Symposium

- Very successful with 181 in attendance.
- 70% found sessions "valuable" or more.
- More than 75% at least valued the working groups.
- 85% interested in attending another BW event.
- Good advice on changes for next symposum.

XSEDE14 Conference

- July 13-18, 2014 in Atlanta
- Theme is Engaging Communities
- Late registration starts June 28

TO LEARN MORE VISIT
CONFERENCES.XSEDE.ORG/XSEDE14

VSCSE and XSEDE Events

VSCSE
- ~~Harness the Power of GPU's: Introduction to GPGPU Programming (June 16 - 20, 2014)~~
- Data Intensive Summer School (June 30 - July 2, 2014)
- NCSA will host local sites for both
- http://www.vscse.org/summerschool/2014/

XSEDE topical training
- Boot Camp – June 24-27th
- NCSA hosting local site

Request for Science Successes

- We need to be current on products that result from time on Blue Waters such as:
  - Publications, Preprints (e.g. arXiv.org), Presentations.
  - Very interested in data product sharing.
- Appreciate updates sooner than annual reports.
  - Send to gbauer@illinois.edu
- NSF PRAC teams send information to PoCs.
- See the Share Results section of the portal as well.
- Be sure to include proper acknowledgment
  - Blue Waters - National Science Foundation (ACI 1238993)
  - NSF PRAC – OCI award number

Future Topics?

- Please send us your suggestions on topics for future teleconferences / webinars