



# Singularity @ BNL

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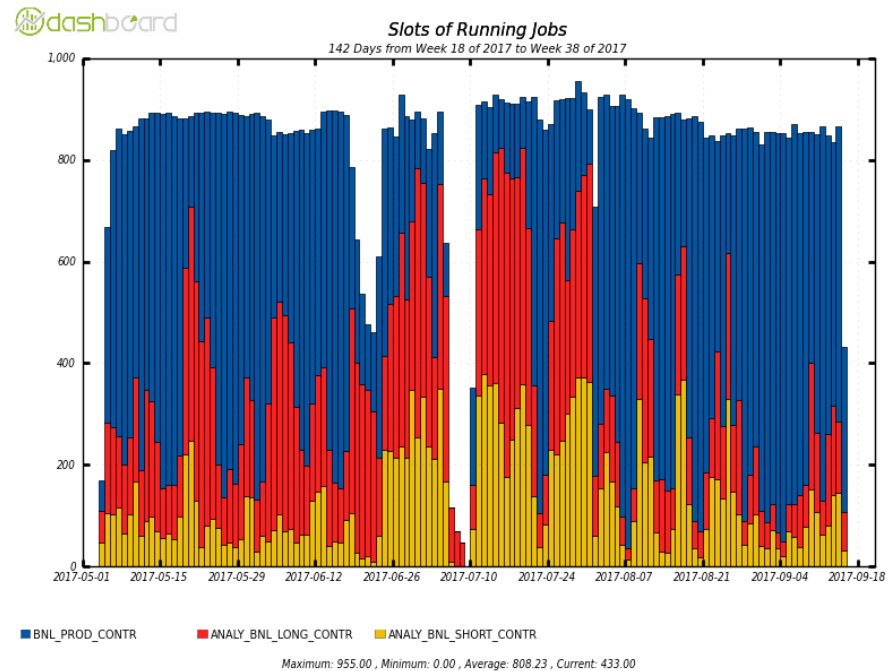
# Outline

- Current status
- Experiences and lessons learned
- Future plans



# Current Status

- Singularity in production
  - Special HTCondor and PanDA queues for running PanDA jobs inside singularity containers
  - 30 farm nodes (1 rack), Xeon E5-2600 (8-core), 64G RAM
  - SL7.2 + singularity 2.2.1
- “catchall” mode
  - Wrap all user jobs inside singularity container, using HTCondor USER\_JOB\_WRAPPER macro





# Current Status (cont.)

- Images
  - Built our own image, installed on local disk of WNs
  - Minimum SL6 OS + HEP\_OSlibs\_SL6
  - Site-specific bindmount points, e.g. /pnfs/, /home/condor etc.
  - ~2GB in size, but can be a sparse file with ~1.5 GB of actual used space
- CVMFS on WNs
  - CERN atlas repos
    - ATLAS software releases and conditions DB
  - Local repo (stratum-0)
    - OSG worker node client, CA/CRL
    - DDM LSM tools



# Experiences and Lessons Learned

- Running fine in general, just some minor issues so far
  - OverlayFS allows automatic creation of bind mount points inside container, but it's buggy with SL7.2
    - solved with upgrade to SL7.3
  - Special characters, like '+' not permitted in bindmount pathnames
    - patch provided and merged into development branch
  - Date/timezone quirkiness inside container
    - date command returns wrong time, due to timezone issue, more details at [https://groups.google.com/a/lbl.gov/forum/#!topic/singularity/YWFsPd3A\\_sg](https://groups.google.com/a/lbl.gov/forum/#!topic/singularity/YWFsPd3A_sg)
    - Fixed in singularity 2.3



# Future Plans

- Migration of computing farm to SL7
  - Singularity provides us with a path to migrate to SL7
  - Will proceed to migrate all WNs, with catchall mode
  - Once singularity support in PanDA is ready and becomes the preferred way, we can always switch to singularity-inside-pilot mode later
- Singularity support on KNL cluster
  - Singularity is installed on KNL WNs
  - Initial test with ATLAS job is done (using the fat ATLAS image)
- Other upgrades
  - To singularity 2.3
  - Use ATLAS official images