PDSF User Meeting

- PDSF performance
- Announcements
- AOB
PDSF Shutdown in 2 months (soft date)

Instead of retiring components piecemeal, we propose a simpler model: keep all hardware DNR till agreed date, then shut down all at once.

While we considered scenarios to retire individual racks at different times based on support contracts, with service nodes distributed all over the racks move of all these nodes was going to cause NERSC staff and PDSF experts significant effort and PDSF users service interruptions.

Assume services running on Mendel end April 2019.

Contingency period of 5 months to Aug. 2019.
SLURM CPU*h aggregated over last month

SLURM: **completed** jobs in last month

http://portal.nersc.gov/project/mpccc/ebasheer/jobbygroup.php

3800 jobs * 24 h = 91k cpu*h/day
→ 640k cpu*h/week
→ 2.7 M cpu*h per month
PDSF system changes

- pd2015 (pdsfdtn1) - shut down for good
- 8 nodes (x 16 CPU) converted to -p nucori
  - Open for end-user testing and validation
- 5 nodes are DNR
## Existing Slurm Shifter queues

<table>
<thead>
<tr>
<th>partition</th>
<th>OS provider</th>
<th>TotalCPUs</th>
<th>Time limit</th>
<th>MaxJobPA (per account)</th>
<th>MaxJobPU (per user)</th>
<th>Relative priority</th>
<th>remarks</th>
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<tbody>
<tr>
<td>shared-chos</td>
<td>chos</td>
<td>3352</td>
<td>2 days</td>
<td></td>
<td>250</td>
<td>0</td>
<td>Share 94% of hardware</td>
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<tr>
<td>alice</td>
<td>chos</td>
<td>3224</td>
<td>2 days</td>
<td></td>
<td>1500</td>
<td>0</td>
<td></td>
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<tr>
<td>realtime-chos</td>
<td>chos</td>
<td>128</td>
<td>4 hours</td>
<td>50</td>
<td></td>
<td>0</td>
<td></td>
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<tr>
<td>debug-chos</td>
<td>chos</td>
<td>128</td>
<td>30 min</td>
<td>2</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>long</td>
<td>shifter</td>
<td>240</td>
<td>2 days</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>short</td>
<td>shifter</td>
<td>288</td>
<td>5 hours</td>
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<tr>
<td>nucori</td>
<td>shifter</td>
<td>128</td>
<td>2 days</td>
<td></td>
<td></td>
<td>0</td>
<td>Cori-like OS</td>
</tr>
<tr>
<td>realtime</td>
<td>shifter</td>
<td>128</td>
<td>4 hours</td>
<td>50</td>
<td>0</td>
<td>share common hardware</td>
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<tr>
<td>debug</td>
<td>shifter</td>
<td>128</td>
<td>30 min</td>
<td>2</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The following changes were enforced on Slurm all queues:

- Use true RAM per node
- compute high mem use tax: nCPU= mem/4 GB
- Num job slots per node: 2x phys cores, but ...
- Each job locks 1 physical core by default but is available by using --oversubscribe
- Default mem per task: 2.5 GB (was 4, changed on June 13)
- Used cpu*h half decay time: 4 days (was 14 days)
- Cap of 250 jobs/user is enforced, pseudo-user alicesgm is an exception
- --mem → cpus conversion is 2.5 GB for all partitions, except -p long, -p short use 5 GB
Load test for -p nucori (1)

Test 1: RAM bound, sbatch --mem 4GB
Task: 1 cpu, 4.4GB virt RAM, 3.2 res RAM, IO: 1MB/min/task

Performance:
- 300 tasks launched
- Occupancy: 11 tasks/node
- All tasks completed w/o crash
- Execution time:
  - 240 tasks 25-26 min
  - 60 task [30-45] min

Loaded node occupancy
$ scontrol show node mc0122
CfgTRES=cpu=32,mem=61000M
AllocTRES=cpu=28,mem=56G

11 concurrent tasks

```
PID  USER   PR NI VIRT    RES   SHR  %CPU %MEM     TIME+ COMMAND
37938 balewski 20  0  4416468 3.225g 2772 R 100.00 5.131  1:00.06  vet3.exe
38036 balewski 20  0  4416464 3.225g 2788 R 100.00 5.131  0:43.80  vet3.exe
37993 balewski 20  0  4416468 3.225g 2680 R  94.118 5.131  0:57.35  vet3.exe
37999 balewski 20  0  4416468 3.225g 2752 R  94.118 5.131  0:56.98  vet3.exe
38005 balewski 20  0  4416468 3.225g 2800 R  94.118 5.131  0:50.30  vet3.exe
38011 balewski 20  0  4416468 3.225g 2796 R  94.118 5.131  0:48.72  vet3.exe
38017 balewski 20  0  4416468 3.225g 2792 R  94.118 5.131  0:47.57  vet3.exe
38023 balewski 20  0  4416464 3.225g 2788 R  94.118 5.131  0:46.76  vet3.exe
38030 balewski 20  0  4416468 3.225g 2780 R  94.118 5.131  0:45.85  vet3.exe
38042 balewski 20  0  4416468 3.225g 2772 R  94.118 5.131  0:42.72  vet3.exe
38049 balewski 20  0  4416468 3.225g 2800 R  94.118 5.131  0:41.60  vet3.exe
38057 balewski 20  0  34144  3320 2568 R  5.882 0.005  0:00.02  top
```

Mem:  62  49  13  0  0  8
-/+ buffers/cache:  40  21
Swap:  0  0  0
Load test for -p nucori (2)

**Test 2: CPU bound**, sbatch --mem 2GB
Task: 1 cpu, 2.3GB virt RAM, 1.2 res RAM, IO: 20MB/min/task

Performance:
- 1000 tasks launched
- Occupancy: 16 tasks/node
- 11 tasks crash at start
- 16 task crashed mid run
- 973 tasks completed, all with execution time 25-26 min

Loaded node occupancy
$ scontrol show node mc0122

CfgTRES=cpu=32,mem=61000M
AllocTRES=cpu=32,mem=32G
Proposed PDSF change

Convert 50% of PDSF to \(-p\) nucori

We would convert all non-Haswell nodes

Conversion date: Wednesday Feb 20 - it will take 2-3 working days (Pending OK from Craig)

Since the conversion process is manual (costly) there is no coming back
### /project(a) utilization - snapshot

The following data was obtained from the NERSC project utilization snapshot page. The data represents the usage and quota for various projects on the PDSF system.

- [http://portal.nersc.gov/project/star/jthaeder/diskUsage/overview/indexExt.html](http://portal.nersc.gov/project/star/jthaeder/diskUsage/overview/indexExt.html)
- [https://my.nersc.gov/data-mgt.php](https://my.nersc.gov/data-mgt.php)
- [./quota_pdsf.py](https://my.nersc.gov/data-mgt.php)

#### Project (a) usage for PDSF users, ver 1.1

<table>
<thead>
<tr>
<th>Project</th>
<th>Usage</th>
<th>Quota</th>
<th>Percent</th>
<th>Usage</th>
<th>Quota</th>
<th>Percent</th>
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<tr>
<td>Alice</td>
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<td>10000000</td>
<td>229</td>
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</tbody>
</table>

FillStatus (Quota): PROJECT (2018-11-15 08:11)

- **star - size**: 1027100.000 TB (97.27%)
- **star - inodes**: 220823925000000 (88.29%)

FillStatus (Quota): PROJECTA (2018-11-15 08:11)

- **starpro - size**: 14491000.000 TB (96.70%)
- **starpro - inodes**: 216566732000000 (96.26%)
# Announcements

- **Bi-weekly office hours**: Feb 18, Mar 4, 59-4016A
- **PDSF user meeting**: Tuesday, March 12
- **New KNL ‘low’ queue with 50% discount**

<table>
<thead>
<tr>
<th>February 2019</th>
<th>January 2019</th>
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<tbody>
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<td>Su</td>
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<td>16</td>
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</table>

- **Cori KNL Training [1]**
- **IDEAS-ECP Webinar [2]**
- **Presidents Day Holiday [3]**
- **NUG Monthly Webinar [4]**
- **Edison Maintenance [5]**

<table>
<thead>
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- **Cori Maintenance [6]**
- **Kokkos Training [7]**
- **Edison Maintenance [5]**
- **Edison Decommissioned [8]**

<table>
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<th>April 2019</th>
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</tbody>
</table>

- **Cori Maintenance [6]**
- **Cori KNL Train/Hackathon [9]**
- **Kokkos Usergroup Mtg [10]**
- **Edison Maintenance [5]**