EMSL

Pacific Northwest NATIONAL LABORATORY

U.S. DEPARTMENT OF ENERGY

CView and NWPerf for supercomputer performance collection and display.

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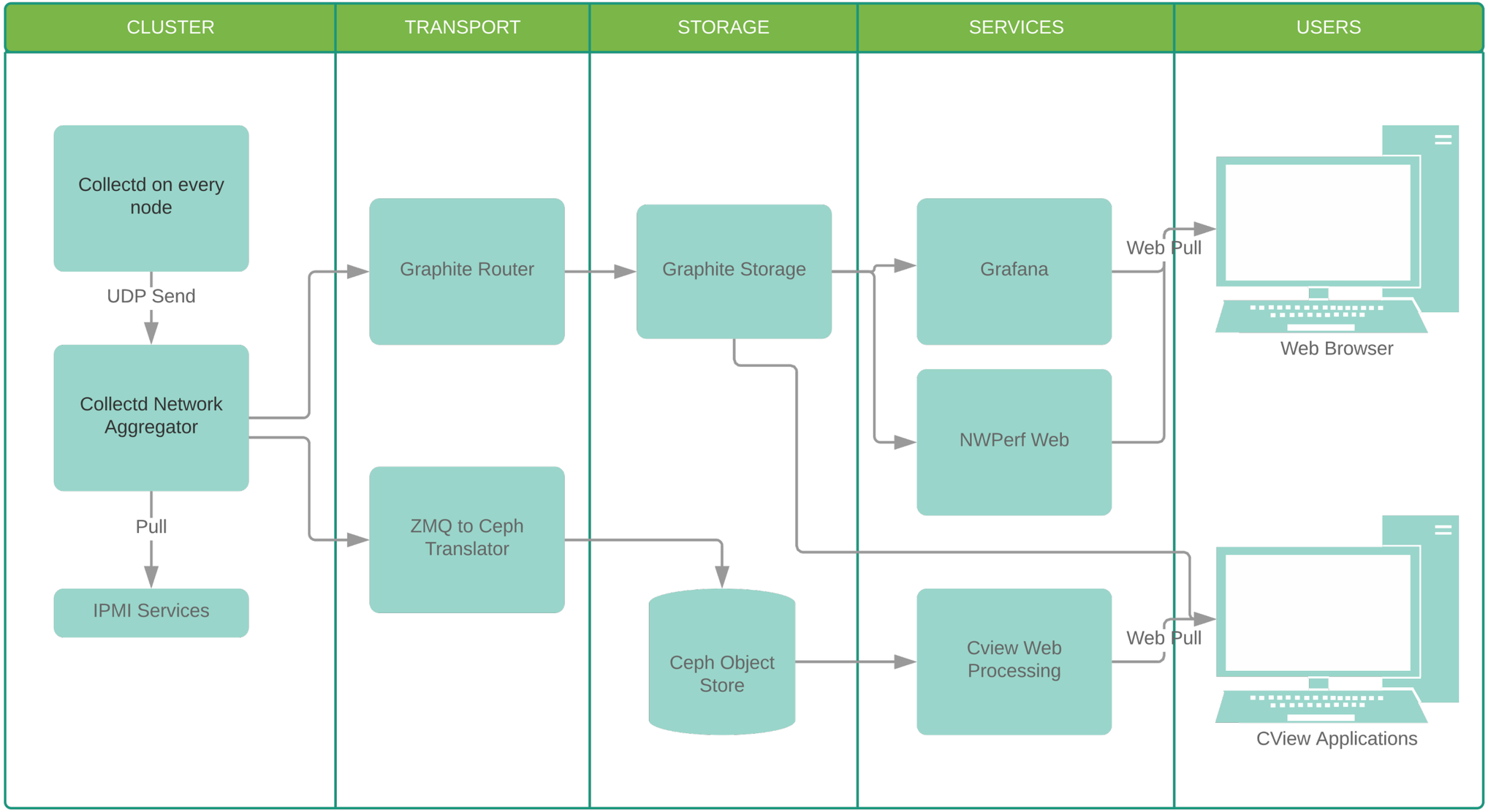
Scientific Innovation Through Integration

PNNL-SA-139642

Why?

- Provide visualization of cluster and job performance metrics for supercomputing sized systems.
  - System Administrators get an overall 3D View
  - Users get a 3D View and 2D Web view
- CView is a interactive 3D graphics engine designed for use in displaying large scientific data sets.
- NWPerf is a performance metrics gathering and routing system.

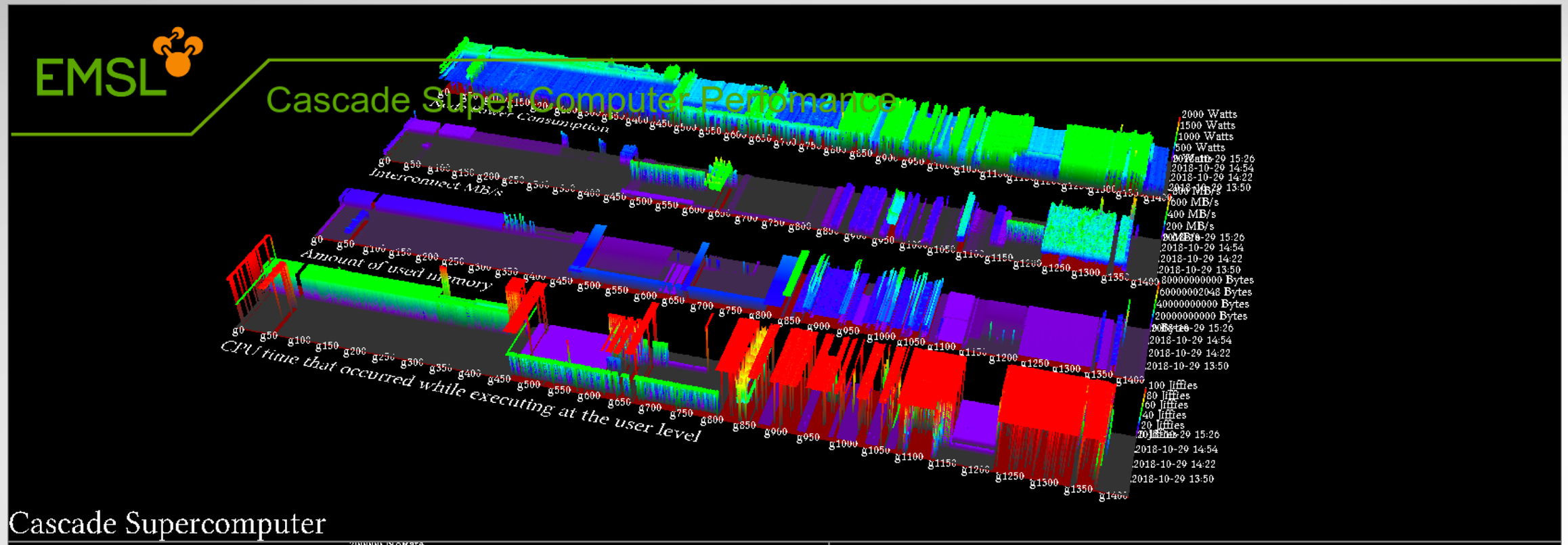
Architecture Diagram



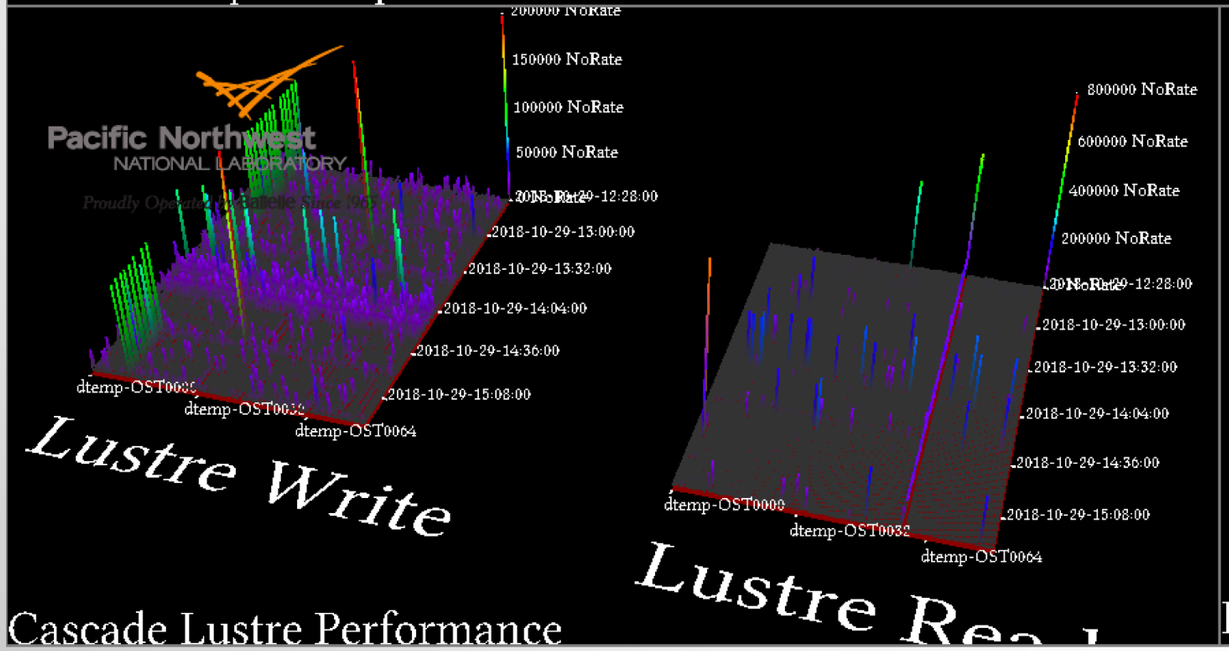
Cview Applications

- Interactive 3D Visualization System
- System Views of short or long term data
- Can display multiple types of data,
  - CView datasets, static or web
  - Graphite queries
  - (x,y,val) data similar to gnuplot
  - Streaming data, such as collectl
- Status dashboards of multiple clusters

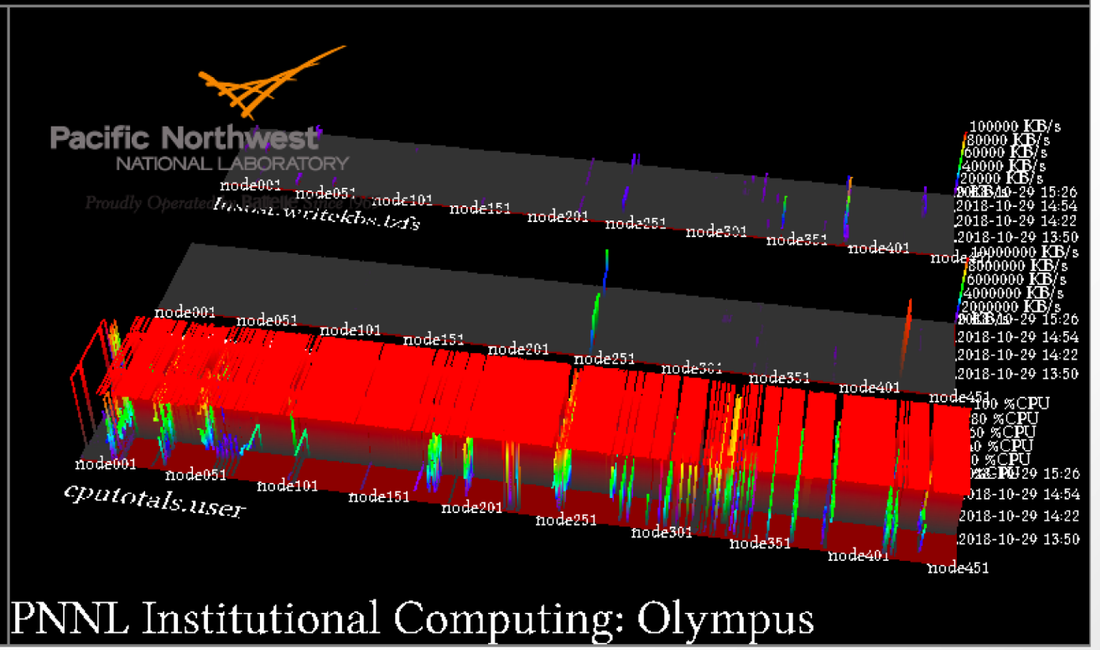
Cascade Super Computer Performance



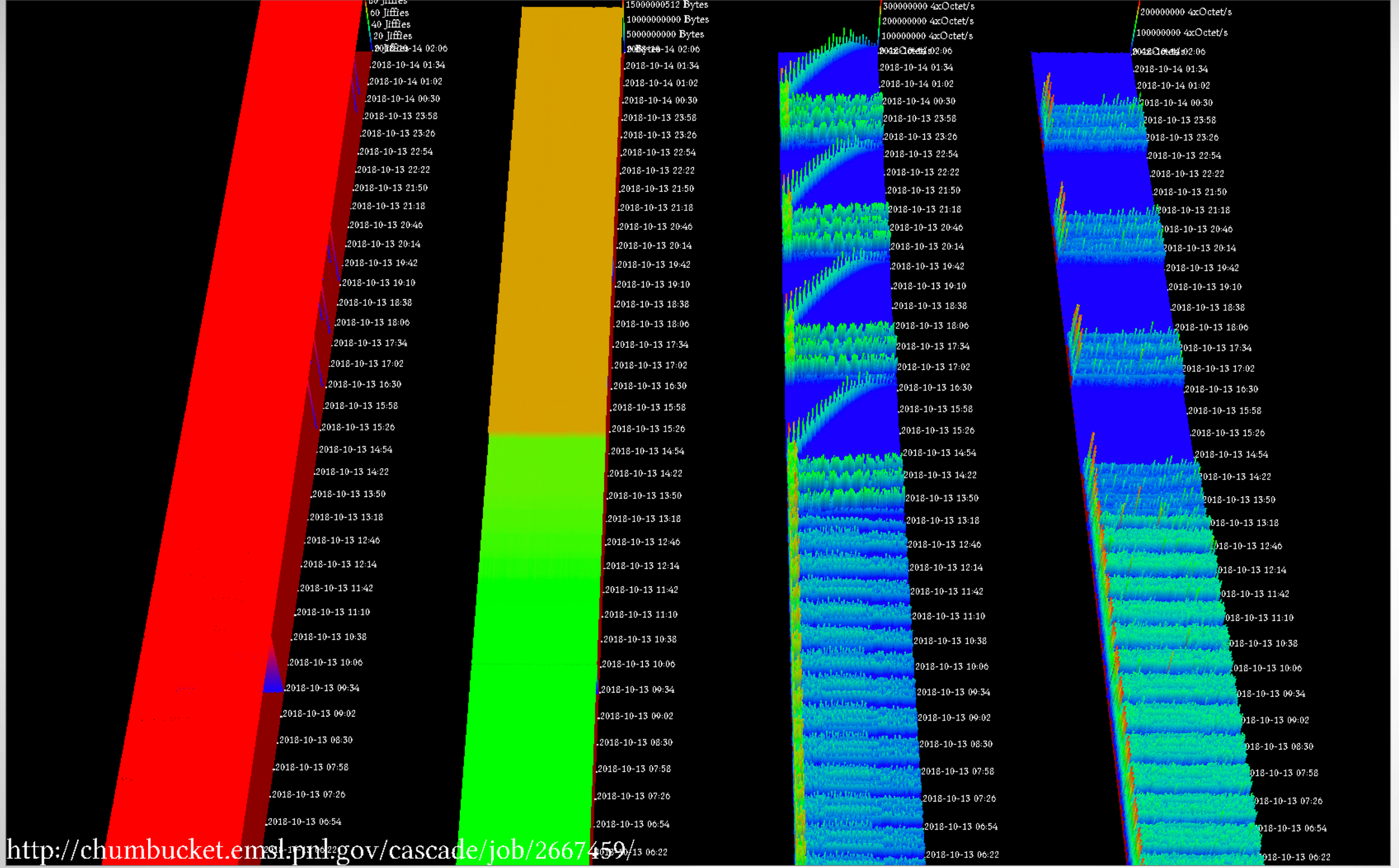
Cascade Supercomputer



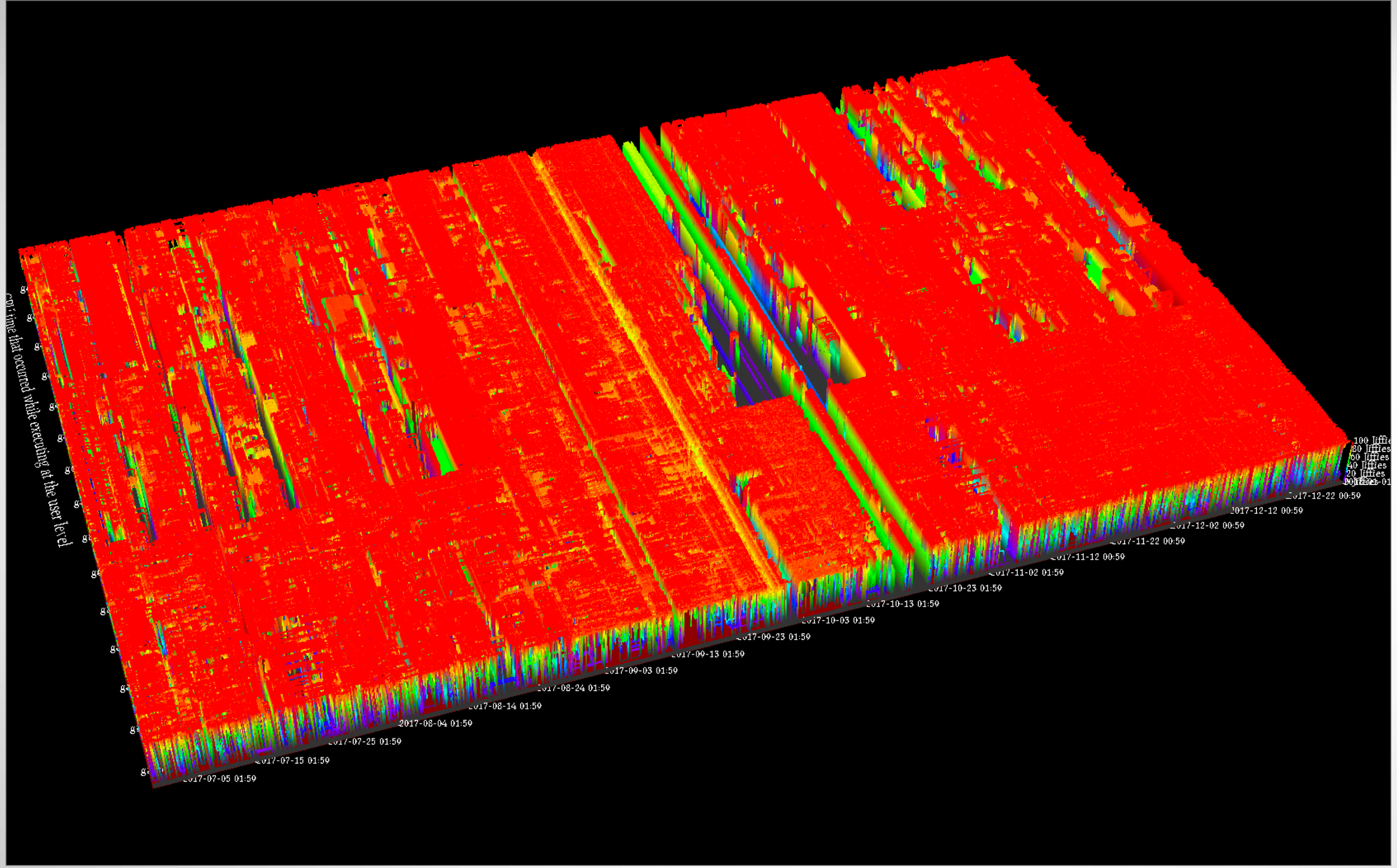
Cascade Lustre Performance



PNNL Institutional Computing: Olympus

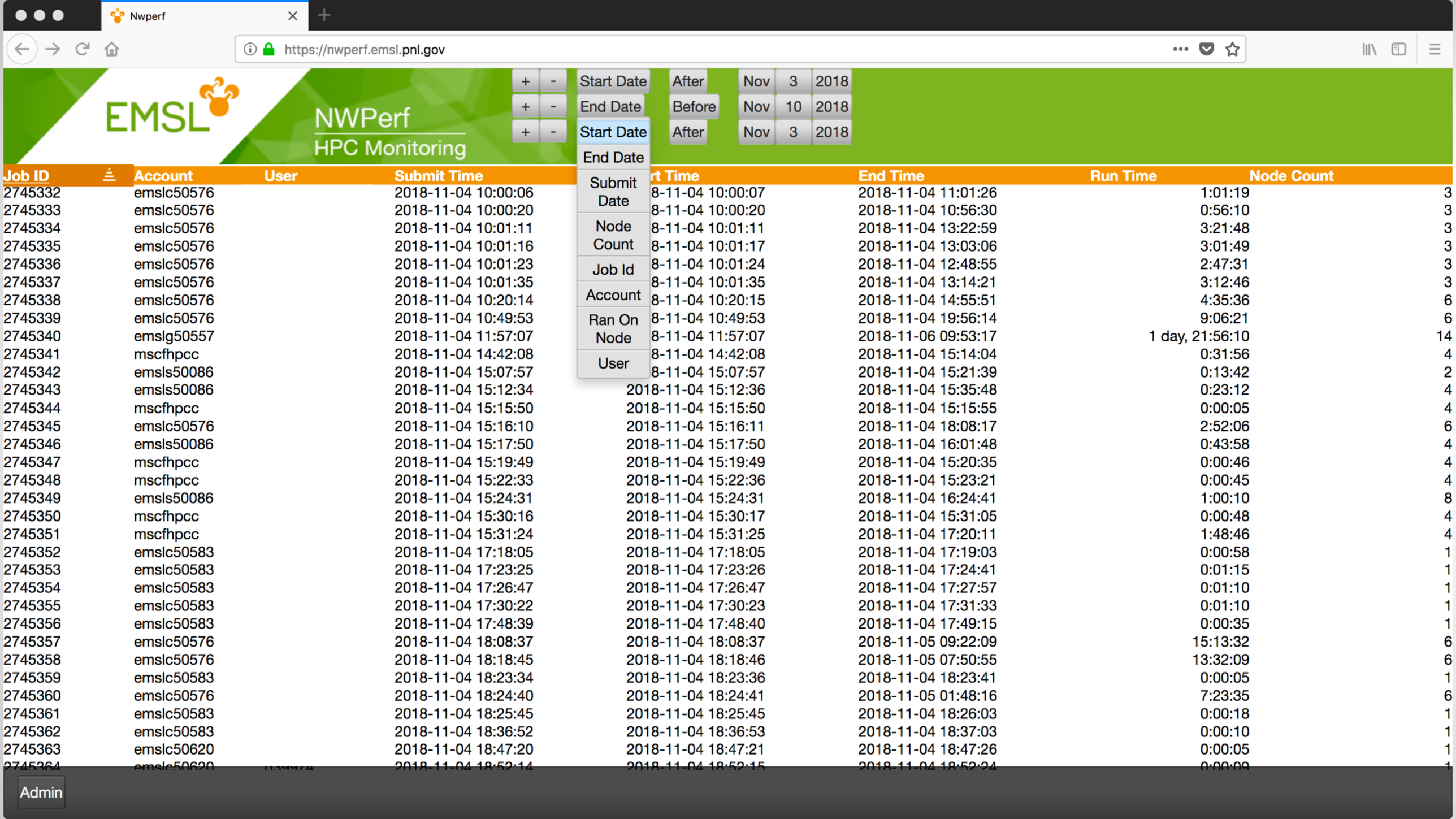


http://chumbucket.emsl.pnl.gov/cascade/job/2667459/


CPU time that occurred while executing at the user level
100 Jiffies
80 Jiffies
60 Jiffies
40 Jiffies
20 Jiffies
2017-12-22 00:59
2017-12-12 00:59
2017-12-02 00:59
2017-11-22 00:59
2017-11-12 00:59
2017-11-02 01:59
2017-10-23 01:59
2017-10-13 01:59
2017-10-03 01:59
2017-09-23 01:59
2017-09-13 01:59
2017-09-03 01:59
2017-08-24 01:59
2017-08-14 01:59
2017-08-04 01:59
2017-07-25 01:59
2017-07-15 01:59
2017-07-05 01:59

NWPerf Web Application

- User Focused
  - No software to install
  - User friendly interface
  - Specifically designed around jobs
  - Jobs performance automatically stored
- Originally based on NWPerf
- Migrated to Graphite backend


Nwperf
https://nwperf.emsl.pnl.gov
EMSL
NWPerf
HPC Monitoring
+ - Start Date After Nov 3 2018
+ - End Date Before Nov 10 2018
+ - Start Date After Nov 3 2018
End Date
Submit Date
Node Count
Job Id
Account
Ran On Node
User
Job ID Account User Submit Time rt Time End Time Run Time Node Count
2745332 emslc50576 2018-11-04 10:00:06 8-11-04 10:00:07 2018-11-04 11:01:26 1:01:19 3
2745333 emslc50576 2018-11-04 10:00:20 8-11-04 10:00:20 2018-11-04 10:56:30 0:56:10 3
2745334 emslc50576 2018-11-04 10:01:11 8-11-04 10:01:11 2018-11-04 13:22:59 3:21:48 3
2745335 emslc50576 2018-11-04 10:01:16 8-11-04 10:01:17 2018-11-04 13:03:06 3:01:49 3
2745336 emslc50576 2018-11-04 10:01:23 8-11-04 10:01:24 2018-11-04 12:48:55 2:47:31 3
2745337 emslc50576 2018-11-04 10:01:35 8-11-04 10:01:35 2018-11-04 13:14:21 3:12:46 3
2745338 emslc50576 2018-11-04 10:20:14 8-11-04 10:20:15 2018-11-04 14:55:51 4:35:36 6
2745339 emslc50576 2018-11-04 10:49:53 8-11-04 10:49:53 2018-11-04 19:56:14 9:06:21 6
2745340 emslg50557 2018-11-04 11:57:07 8-11-04 11:57:07 2018-11-06 09:53:17 1 day, 21:56:10 14
2745341 mscfhpcc 2018-11-04 14:42:08 8-11-04 14:42:08 2018-11-04 15:14:04 0:31:56 4
2745342 emsls50086 2018-11-04 15:07:57 8-11-04 15:07:57 2018-11-04 15:21:39 0:13:42 2
2745343 emsls50086 2018-11-04 15:12:34 2018-11-04 15:12:36 2018-11-04 15:35:48 0:23:12 4
2745344 mscfhpcc 2018-11-04 15:15:50 2018-11-04 15:15:50 2018-11-04 15:15:55 0:00:05 4
2745345 emslc50576 2018-11-04 15:16:10 2018-11-04 15:16:11 2018-11-04 18:08:17 2:52:06 6
2745346 emsls50086 2018-11-04 15:17:50 2018-11-04 15:17:50 2018-11-04 16:01:48 0:43:58 4
2745347 mscfhpcc 2018-11-04 15:19:49 2018-11-04 15:19:49 2018-11-04 15:20:35 0:00:46 4
2745348 mscfhpcc 2018-11-04 15:22:33 2018-11-04 15:22:36 2018-11-04 15:23:21 0:00:45 4
2745349 emsls50086 2018-11-04 15:24:31 2018-11-04 15:24:31 2018-11-04 16:24:41 1:00:10 8
2745350 mscfhpcc 2018-11-04 15:30:16 2018-11-04 15:30:17 2018-11-04 15:31:05 0:00:48 4
2745351 mscfhpcc 2018-11-04 15:31:24 2018-11-04 15:31:25 2018-11-04 17:20:11 1:48:46 4
2745352 emslc50583 2018-11-04 17:18:05 2018-11-04 17:18:05 2018-11-04 17:19:03 0:00:58 1
2745353 emslc50583 2018-11-04 17:23:25 2018-11-04 17:23:26 2018-11-04 17:24:41 0:01:15 1
2745354 emslc50583 2018-11-04 17:26:47 2018-11-04 17:26:47 2018-11-04 17:27:57 0:01:10 1
2745355 emslc50583 2018-11-04 17:30:22 2018-11-04 17:30:23 2018-11-04 17:31:33 0:01:10 1
2745356 emslc50583 2018-11-04 17:48:39 2018-11-04 17:48:40 2018-11-04 17:49:15 0:00:35 1
2745357 emslc50576 2018-11-04 18:08:37 2018-11-04 18:08:37 2018-11-05 09:22:09 15:13:32 6
2745358 emslc50576 2018-11-04 18:18:45 2018-11-04 18:18:46 2018-11-05 07:50:55 13:32:09 6
2745359 emslc50583 2018-11-04 18:23:34 2018-11-04 18:23:36 2018-11-04 18:23:41 0:00:05 1
2745360 emslc50576 2018-11-04 18:24:40 2018-11-04 18:24:41 2018-11-05 01:48:16 7:23:35 6
2745361 emslc50583 2018-11-04 18:25:45 2018-11-04 18:25:45 2018-11-04 18:26:03 0:00:18 1
2745362 emslc50583 2018-11-04 18:36:52 2018-11-04 18:36:53 2018-11-04 18:37:03 0:00:10 1
2745363 emslc50620 2018-11-04 18:47:20 2018-11-04 18:47:21 2018-11-04 18:47:26 0:00:05 1
Admin

Nwperf

https://nwperf.emsl.pnl.gov

Job ID:	2667459	**User:**		**Start Time:**	10/12/2018, 9:33:49 PM
Account:	emsls50086	**Group:**		**End Time:**	10/14/2018, 2:07:56 AM
Number of Hosts:	128			**Run Time:**	1 days 4:34:7

aggregation-cpu-average.cpu-idle () -

aggregation-cpu-average.cpu-interrupt () -

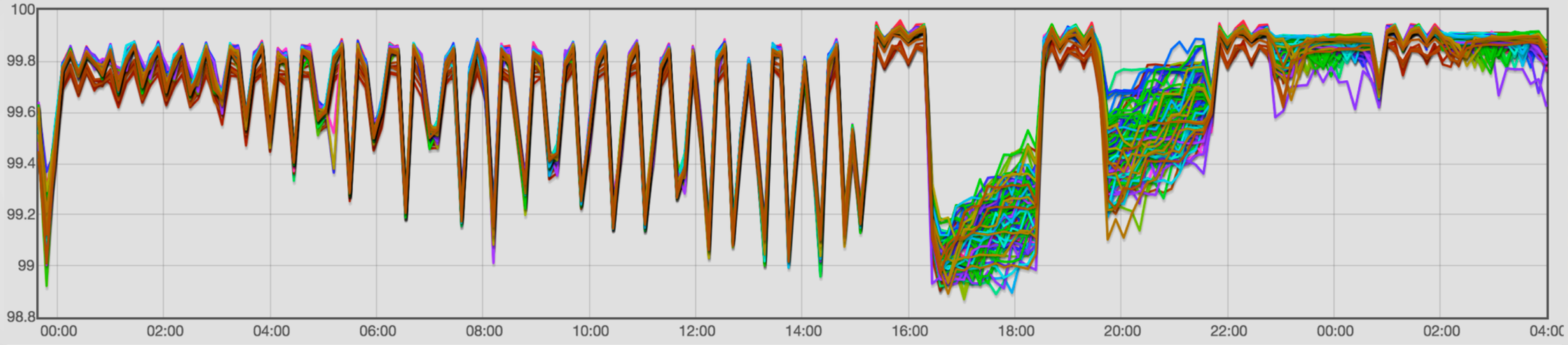
aggregation-cpu-average.cpu-nice () -

aggregation-cpu-average.cpu-softirq () -

aggregation-cpu-average.cpu-steal () -

aggregation-cpu-average.cpu-system () -

aggregation-cpu-average.cpu-user () -



Average: 76.75

Sum: 9824

Select All

- g94 : 99.04
- g95 : 99.13
- g96 : 0.000
- g97 : 99.37
- g98 : 99.28
- g99 : 99.08
- g100 : 99.26
- g101 : 99.28
- g102 : 0.000
- g103 : 99.32
- g104 : 99.24
- g105 : 99.28
- g106 : 99.23
- g108 : 0.000
- g109 : 0.000
- g110 : 99.30
- g111 : 99.23
- g112 : 0.000
- g113 : 99.33
- g115 : 99.21
- g116 : 99.20
- g117 : 99.37
- g118 : 99.23
- g119 : 99.29
- g120 : 99.29
- g121 : 99.33
- g122 : 0.000
- g123 : 99.07
- g129 : 99.21
- g130 : 99.14

aggregation-cpu-average.cpu-wait () -

▶ interface-eth1

▶ interface-eth0

▼ infiniband-mlx4_0_1

infiniband-mlx4_0_1.ib_buffer_overruns () -

infiniband-mlx4_0_1.ib_constraint_errors.rx () -

infiniband-mlx4_0_1.ib_constraint_errors.tx () -

infiniband-mlx4_0_1.ib_data.rx () -

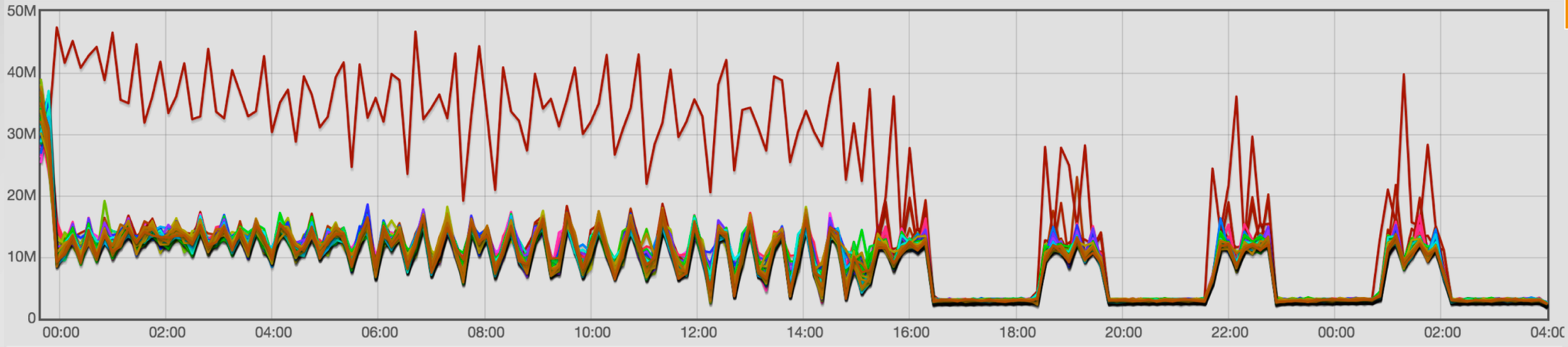
Close

Nwperf

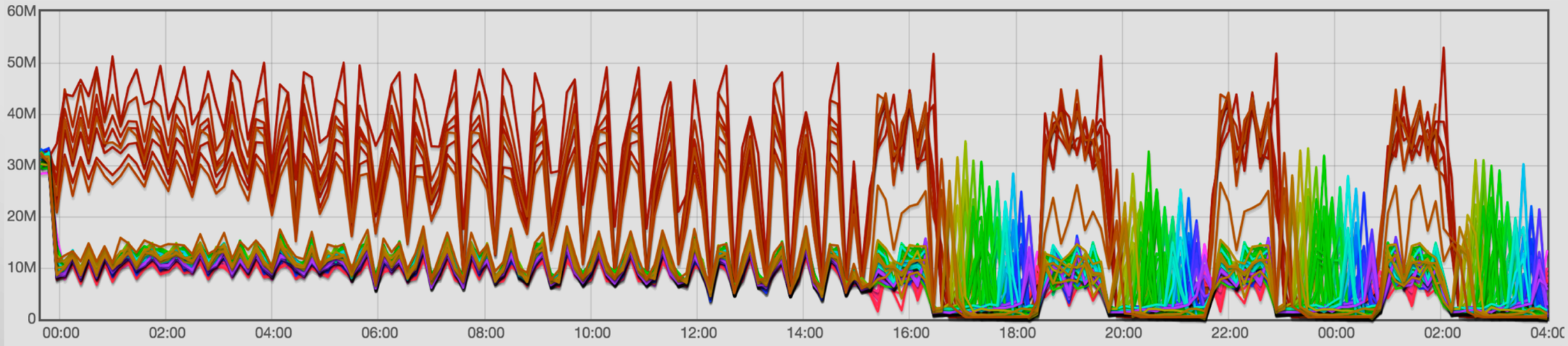
https://nwperf.emsl.pnl.gov

Job ID:	2667459	**User:**		**Start Time:**	10/12/2018, 9:33:49 PM
Account:	emsls50086	**Group:**		**End Time:**	10/14/2018, 2:07:56 AM
Number of Hosts:	128			**Run Time:**	1 days 4:34:7

infiniband-mlx4_0_1.ib_packets.rx () -



infiniband-mlx4_0_1.ib_packets.tx () -



infiniband-mlx4_0_1.ib_remote_phys_errors () -

Average: 2.376e+6

Sum: 3.041e+8

Select All

- g0 : 3.078e+6
- g1 : 3.044e+6
- g3 : 0.000
- g4 : 2.950e+6
- g5 : 2.868e+6
- g6 : 0.000
- g7 : 2.971e+6
- g8 : 2.839e+6
- g9 : 2.887e+6
- g10 : 2.957e+6
- g11 : 0.000
- g12 : 2.907e+6
- g13 : 2.960e+6
- g14 : 0.000
- g15 : 3.123e+6
- g16 : 3.136e+6
- g17 : 3.060e+6
- g18 : 2.939e+6
- g19 : 2.978e+6
- g20 : 3.042e+6
- g21 : 3.044e+6
- g22 : 0.000
- g23 : 3.056e+6
- g24 : 3.033e+6
- g25 : 2.865e+6
- g26 : 2.927e+6
- g27 : 3.083e+6
- g28 : 3.045e+6
- g29 : 0.000
- g30 : 2.984e+6

Close

Nwperf

https://nwperf.emsl.pnl.gov

Job ID:	2082835	**User:**		**Start Time:**	3/1/2018, 8:14:48 PM
Account:	emslc50024	**Group:**		**End Time:**	3/3/2018, 8:14:48 PM
Number of Hosts:	256			**Run Time:**	2 days 0:0:0

aggregation-cpu-average.cpu-idle () -

aggregation-cpu-average.cpu-interrupt () -

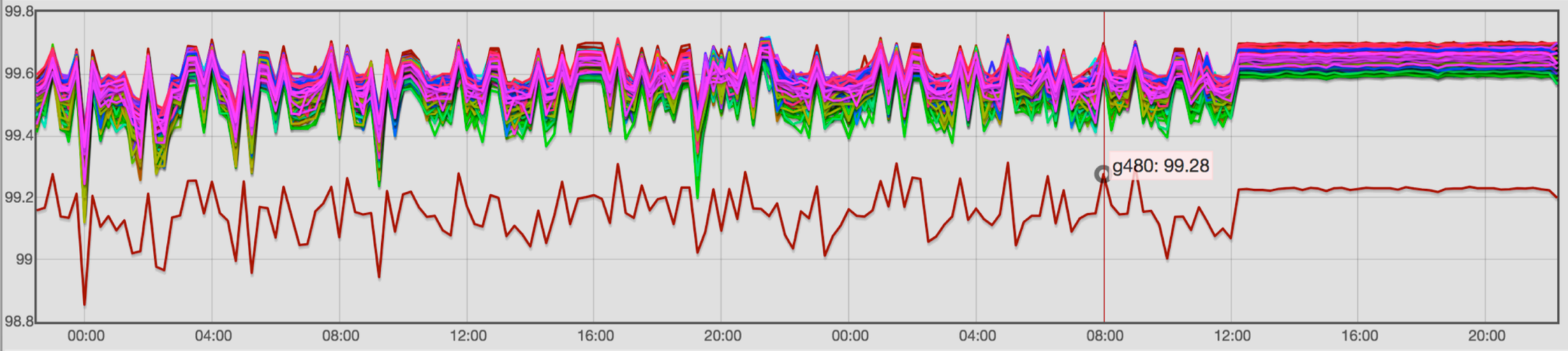
aggregation-cpu-average.cpu-nice () -

aggregation-cpu-average.cpu-softirq () -

aggregation-cpu-average.cpu-steal () -

aggregation-cpu-average.cpu-system () -

aggregation-cpu-average.cpu-user () -



aggregation-cpu-average.cpu-wait () -

Average: 99.63

Sum: 2.551e+4

Select All

g480 : 99.26
g481 : 99.68
g482 : 99.68
g483 : 99.69
g484 : 99.67
g486 : 99.67
g487 : 99.67
g488 : 99.67
g490 : 99.66
g491 : 99.67
g492 : 99.67
g493 : 99.66
g495 : 99.61
g496 : 99.64
g498 : 99.65
g499 : 99.67
g500 : 99.61
g501 : 99.67
g502 : 99.66
g505 : 99.65
g507 : 99.64
g508 : 99.64
g511 : 99.61
g512 : 99.64
g513 : 99.65
g514 : 99.63
g516 : 99.63
g517 : 99.64
g518 : 99.59
g519 : 99.62

▸ interface-eth1

▸ interface-eth0

▸ infiniband-mlx4_0_1

▸ df-home

▸ df-boot

▸ df-run-user

Close

Nwperf

https://nwperf.emsl.pnl.gov

Job ID:	2082835	**User:**		**Start Time:**	3/1/2018, 8:14:48 PM
Account:	emslc50024	**Group:**		**End Time:**	3/3/2018, 8:14:48 PM
Number of Hosts:	256			**Run Time:**	2 days 0:0:0

memory

memory.memory-buffered () -

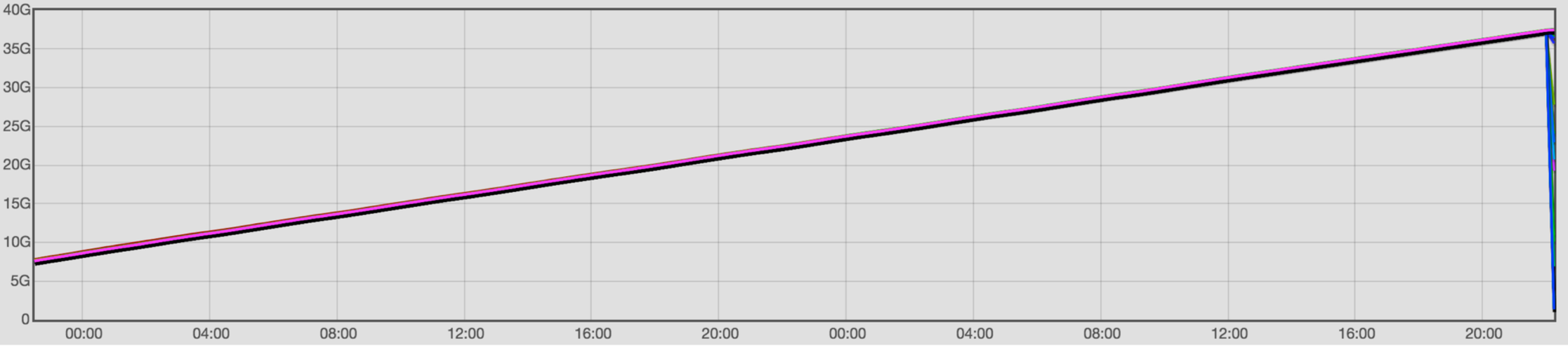
memory.memory-cached () -

memory.memory-free () -

memory.memory-slab_recl () -

memory.memory-slab_unrecl () -

memory.memory-used () -



Average: 2.881e+10

Sum: 7.376e+12

Select All

- g480 : 2.884e+10
- g481 : 2.869e+10
- g482 : 2.869e+10
- g483 : 2.869e+10
- g484 : 2.883e+10
- g486 : 2.883e+10
- g487 : 2.884e+10
- g488 : 2.883e+10
- g490 : 2.883e+10
- g491 : 2.884e+10
- g492 : 2.883e+10
- g493 : 2.881e+10
- g495 : 2.880e+10
- g496 : 2.885e+10
- g498 : 2.881e+10
- g499 : 2.886e+10
- g500 : 2.883e+10
- g501 : 2.883e+10
- g502 : 2.883e+10
- g505 : 2.882e+10
- g507 : 2.882e+10
- g508 : 2.883e+10
- g511 : 2.879e+10
- g512 : 2.881e+10
- g513 : 2.881e+10
- g514 : 2.880e+10
- g516 : 2.882e+10
- g517 : 2.881e+10
- g518 : 2.882e+10
- g519 : 2.882e+10

df-dev-shm

interface-lo

df-opt

interface-enp1s0f1

interface-enp1s0f0

interface-ib0

Close

Questions?

NWPerf – https://github.com/EMSL-MSC/NWPerf

Cview – https://github.com/EMSL-MSC/cview

Collectd – https://collectd.org/

Graphite – https://graphiteapp.org/

Grafana – https://grafana.com/

Thanks!

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