Attempt to get a feel of CPU load on DTNs that we use for PanDA running.

Attempt to get a feel of CPU load on DTNs that we use for PanDA running. first 5 days of March 2017
Used sar monitoring data (daily data with 10 minute polling rate)

DTN35
Avg. load over 5 days ~3% (Average of daily averages)

Mar 05, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	0.73	0.00	1.30	0.20	0.00	97.77
01:20:02 AM	all	4.60	0.00	6.16	0.28	0.00	88.95

Mar 04, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	4.20	0.00	1.57	0.40	0.00	93.84
12:30:01 AM	all	12.22	0.00	14.78	4.10	0.00	68.90

Mar 03, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	7.20	0.00	2.53	0.52	0.00	89.75
05:30:01 AM	all	11.55	0.00	8.66	0.26	0.00	79.53

Mar 02, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	4.45	0.00	1.66	0.55	0.00	93.34
04:50:01 PM	all	**18.62**	0.00	4.34	0.80	0.00	76.23

Mar 01, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	1.33	0.00	6.56	0.29	0.00	91.81

10:50:01 AM   all   5.39   0.00   19.81   0.31   0.00   74.49

DTN36
Avg. load over 5 days ~5.5%

Mar 05, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	7.47	0.00	1.68	0.29	0.00	90.57
01:20:01 AM	all	12.01	0.00	6.74	0.17	0.00	81.08

Mar 04, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	7.22	0.00	1.96	0.34	0.00	90.48
11:50:01 PM	all	13.08	0.00	7.12	0.17	0.00	79.63

Mar 03, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	7.62	0.00	2.10	0.56	0.00	89.72
02:50:01 AM	all	**15.25**	0.00	6.59	2.07	0.00	76.09

Mar 02, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	3.64	0.00	2.55	0.36	0.00	93.45
07:10:01 PM	all	10.85	0.00	5.33	0.23	0.00	83.59

Mar 01, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	1.16	0.00	1.66	0.34	0.00	96.84
10:50:01 AM	all	7.47	0.00	7.49	0.24	0.00	84.80

DTN37
Avg. load over 5 days ~6%

Mar 05, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	0.47	0.00	0.63	0.12	0.00	98.78
09:20:01 AM	all	1.96	0.00	3.57	0.58	0.00	93.89

Mar 04, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	1.15	0.00	1.46	0.31	0.00	97.08
12:20:01 AM	all	5.86	0.00	8.19	1.25	0.00	84.70

Mar 03, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	8.84	0.00	2.58	1.53	0.00	87.06
03:10:01 AM	all	26.19	0.00	6.28	9.40	0.00	58.13

Mar 02, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	12.38	0.00	4.95	1.55	0.00	81.13
03:30:01 PM	all	**29.48**	0.00	16.56	1.16	0.00	52.80

Mar 01, 2017 Average and peak CPU load

09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	9.50	0.00	5.95	2.93	0.00	81.62
05:20:01 PM	all	18.14	0.00	23.39	9.17	0.00	49.30

DTN38
Avg. load over 5 days ~1%

Mar 05, 2017 Average and peak CPU load
09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	0.56	0.00	0.59	0.19	0.00	98.67
09:50:02 AM	all	2.85	0.00	2.88	0.77	0.00	93.51

Mar 04, 2017 Average and peak CPU load
09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	0.90	0.00	0.89	0.29	0.00	97.92
12:30:01 AM	all	5.50	0.00	6.96	3.92	0.00	83.63

Mar 03, 2017 Average and peak CPU load
09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	1.15	0.00	1.80	1.15	0.00	95.90
03:40:01 AM	all	6.55	0.00	3.97	0.53	0.00	88.95

Mar 02, 2017 Average and peak CPU load
09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	1.33	0.00	1.89	0.78	0.00	96.01
04:00:01 AM	all	**10.20**	0.00	2.35	17.80	0.00	69.65

Mar 01, 2017 Average and peak CPU load
09:40:01 PM	CPU	%user	%nice	%system	%iowait	%steal	%idle
Average:	all	1.00	0.00	1.46	0.32	0.00	97.22
10:40:01 AM	all	4.83	0.00	4.38	0.21	0.00	90.57

Some observations from the DTN monitoring data:

1) Average CPU load on the observed DTNs is light and varies from 1% to 6% over the period of observation

2) Peak CPU loads on some nodes can reach ~30%

3) DTN 37 was the most loaded node with ~6% average load and ~30% load at maximum peak

4) DTN 38 was the least loaded node with ~1% average load and ~10% load at maximum peak

5) Note that these observations did not separate ATLAS activities but included load of all DTN users

6) Over the period of observation ATLAS jobs were using on average ~9k cores, with max peak of ~70k cores and several peaks at ~30k cores
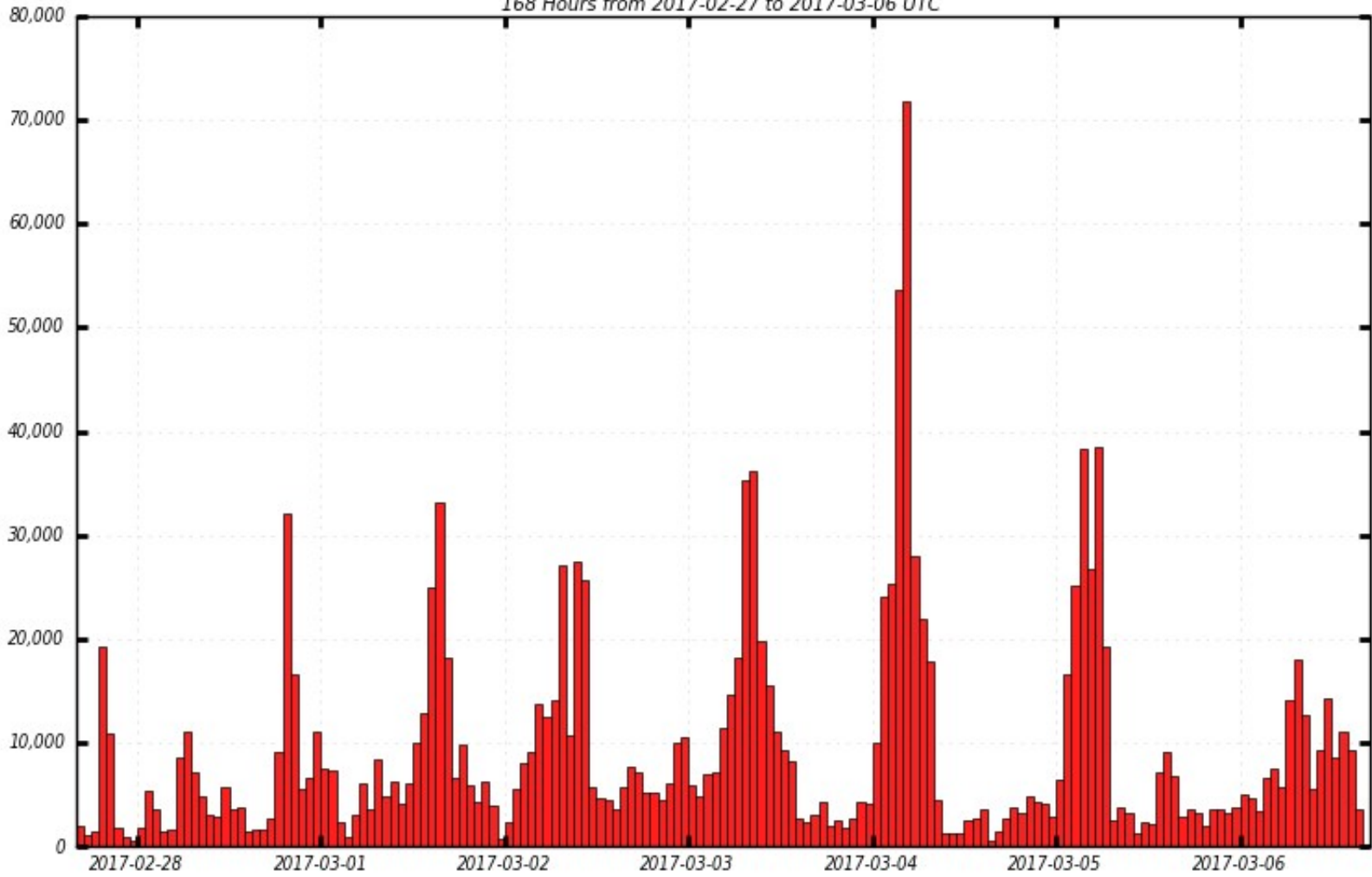
Conclusion:

From these observations it looks like DTNs can run approximately three times more PanDA pilots without reaching noticeable system load (~90%) at peaks.

Corresponding plot of running slots (cores)

Slots of Running Jobs

168 Hours from 2017-02-27 to 2017-03-06 UTC

■ ORNL_Titan_MCORE

Maximum: 71,856 , Minimum: 576.00 , Average: 9,092 , Current: 3,616