BigPanDA for ATLAS

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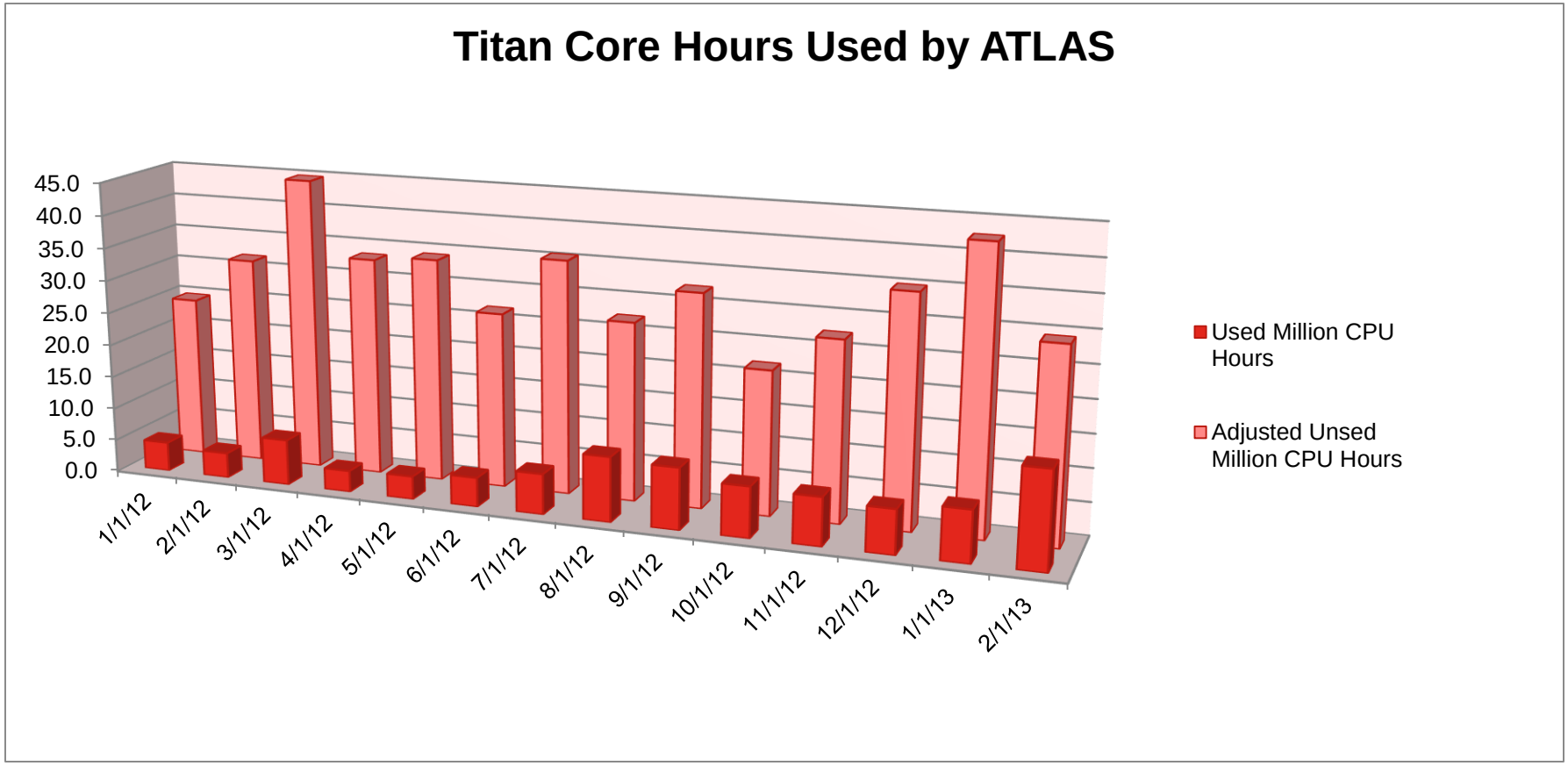
Overview

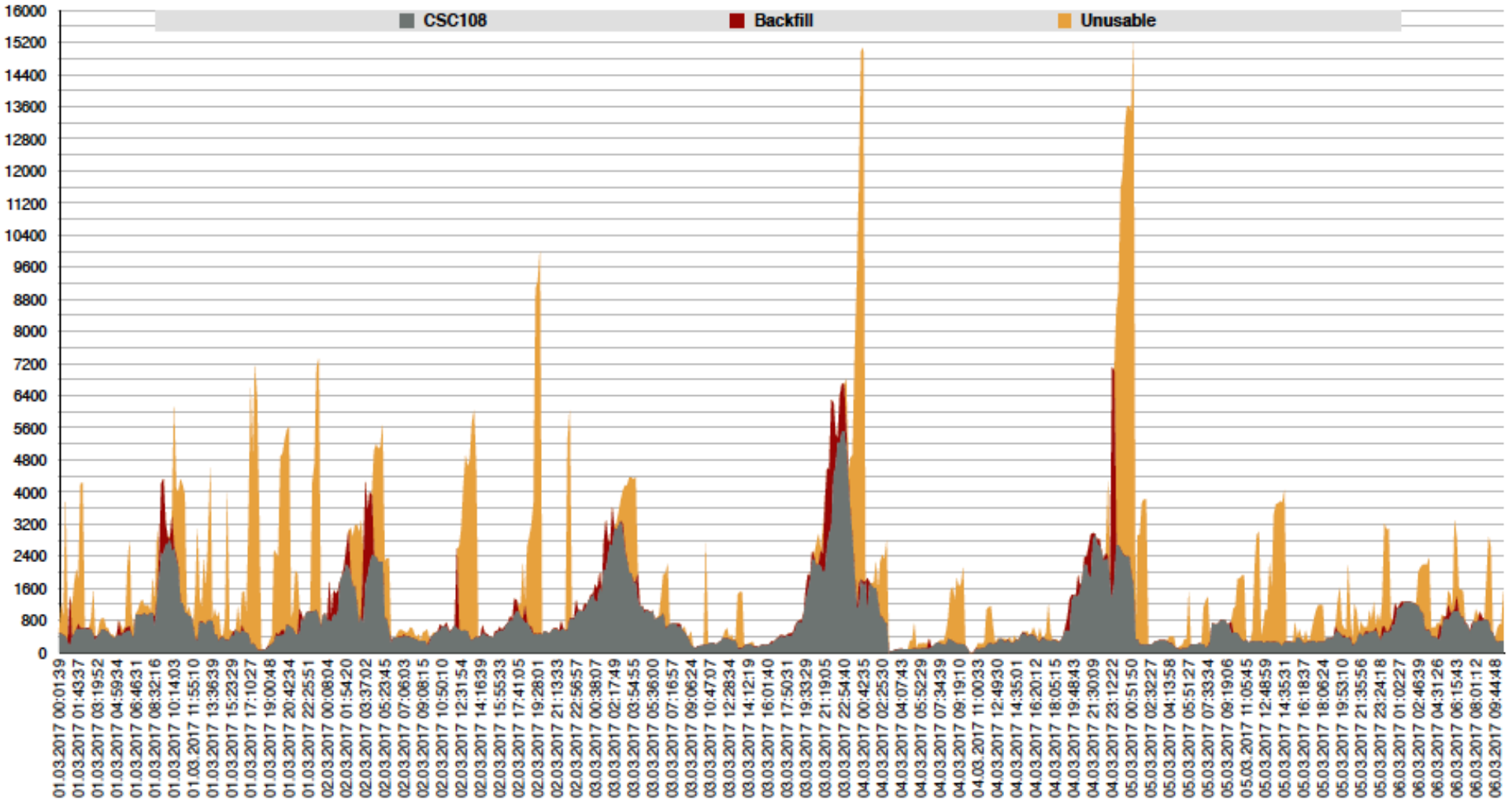
- ATLAS has provided a testbed for BigPanDA development and commissioning for the past 4+ years
  - First to run production in DOE HPC – Titan
  - Scaling up operations on Titan steadily over past 2 years
  - First to integrate network stack with workflow management system
  - Testing of BigPanDA packaging and distribution
  - Many other accomplishments – see Alexei's talk yesterday
- This is a natural role for ATLAS since PanDA grew up here
- ATLAS is unique in it's ability to federate resources
  - Started with grid resources – WLCG
  - Integrated cloud resources 5 years ago – research, Google, AWS…
  - Integrated HPC resources about 3 years ago – DOE, NSF, EU...
  - All of the federation is done through PanDA/BigPanDA

Many Speakers Showed Similar Slide Yesterday

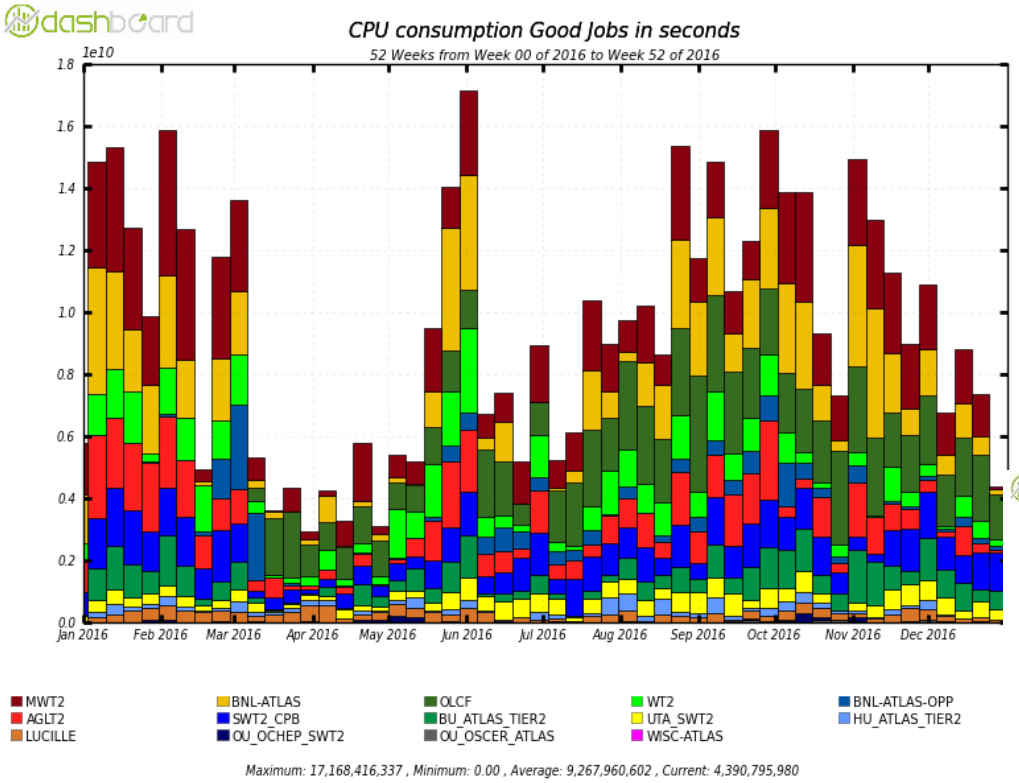


74 Million Titan Core Hours used in calendar year 2016
In backfill mode – no allocation
374 Million Hours remained unused.

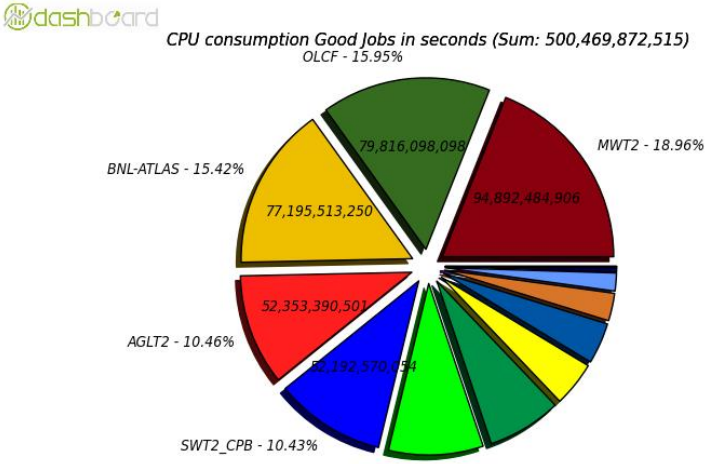
And Details of Backfill Like This



The View from ATLAS (US Centric)



Full Geant4 Simulation Total CPU Usage by ATLAS in US for 2016

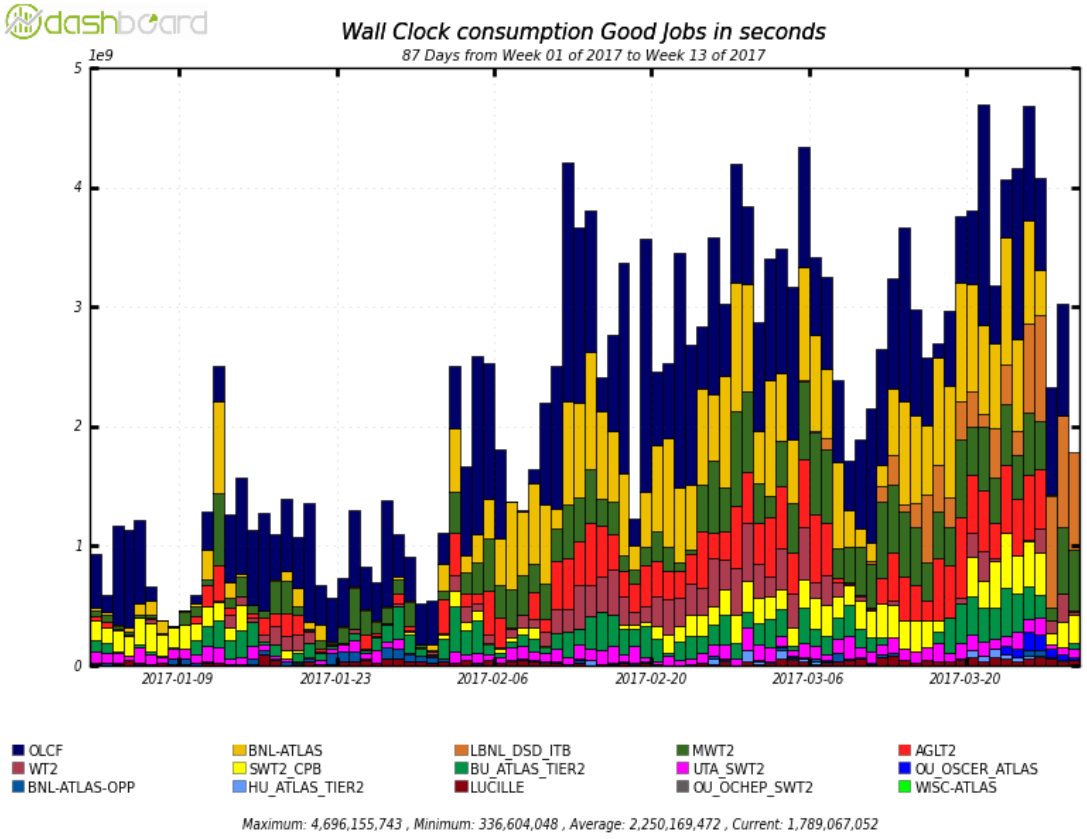


Titan in Dark Green

Titan only runs G4 – other workflows not shown

MWT2 - 18.96% (94,892,484,906)
BNL-ATLAS - 15.42% (77,195,513,250)
SWT2_CPB - 10.43% (52,192,570,054)
BU_ATLAS_TIER2 - 6.98% (34,924,397,648)
BNL-ATLAS-OPP - 3.87% (19,384,574,100)
HU_ATLAS_TIER2 - 1.69% (8,433,312,031)
OU_OSCER_ATLAS - 0.12% (614,232,851)
OLCF - 15.95% (79,816,098,098)
AGLT2 - 10.46% (52,353,390,501)
WT2 - 8.92% (44,642,019,931)
UTA_SWT2 - 4.24% (21,217,242,615)
LUCILLE - 2.60% (12,999,128,216)
OU_OCHEP_SWT2 - 0.36% (1,804,898,456)
WISC-ATLAS - 0.00% (9,858)

And in 2017



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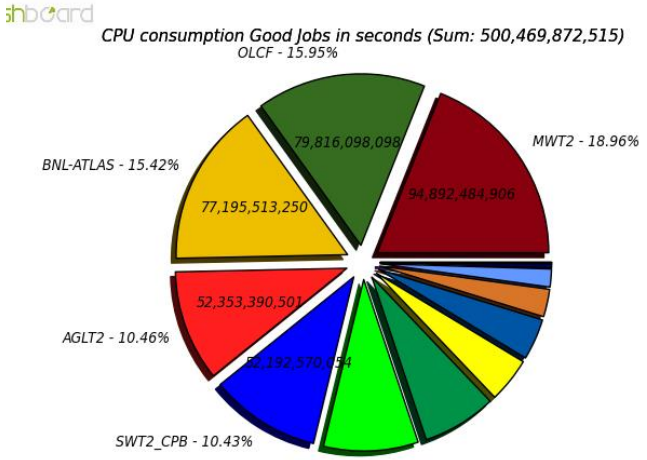

Titan in Dark Green

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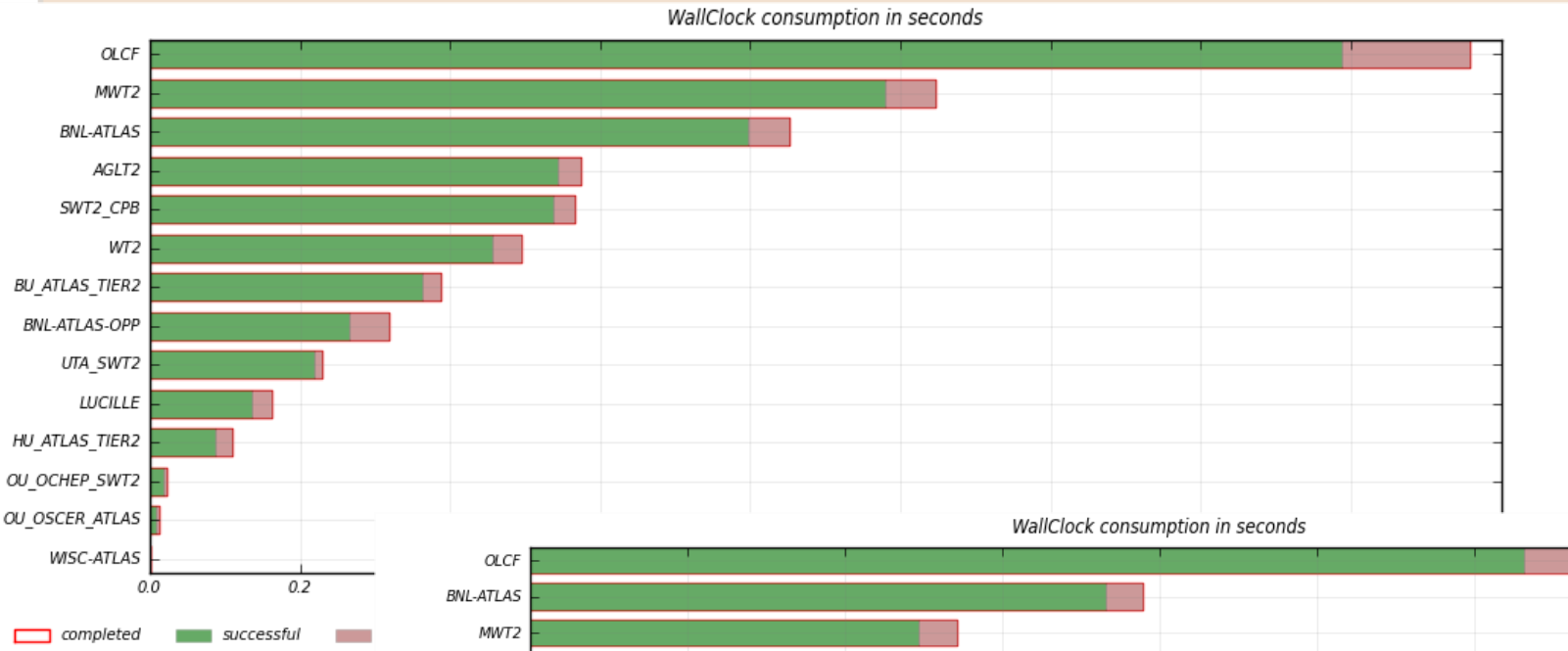
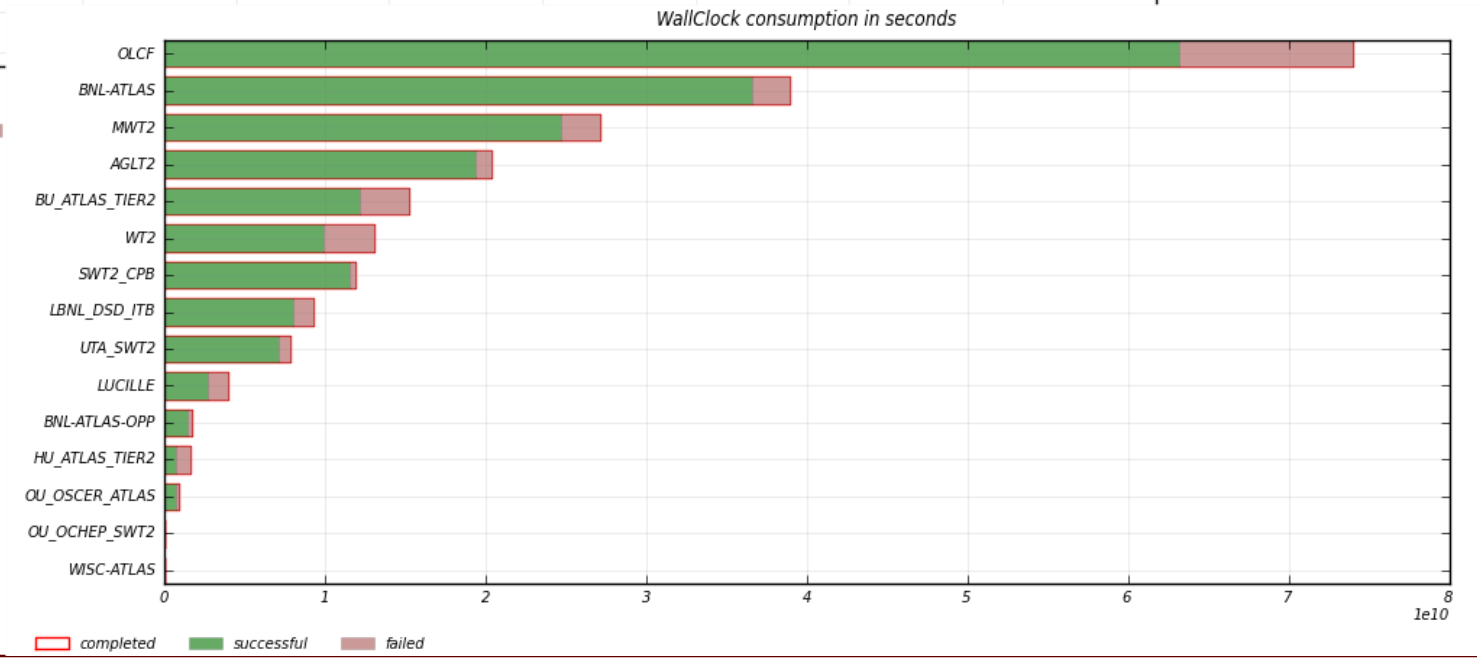
Working on Error Rates

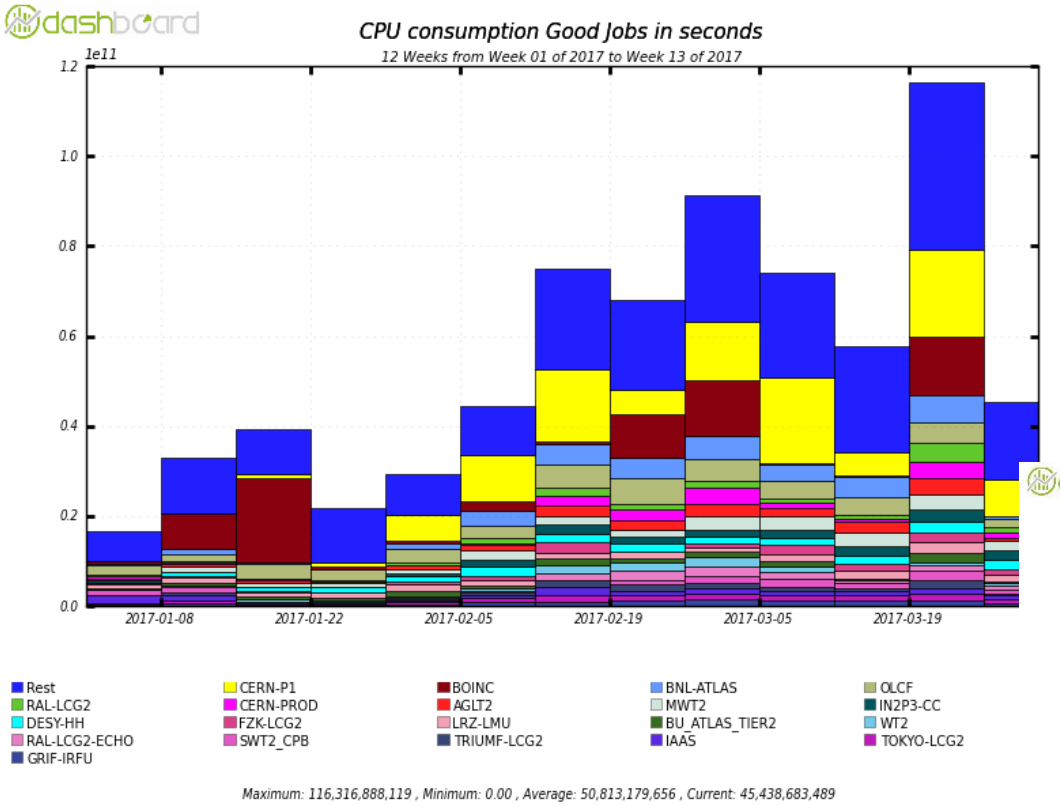


2016



2017

View from the Top of ATLAS



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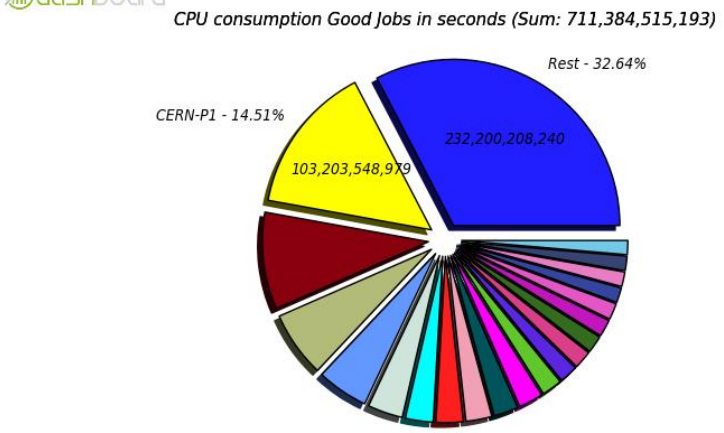
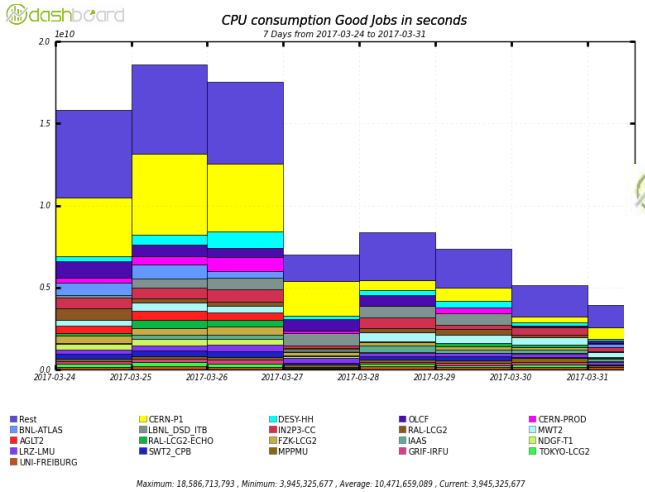
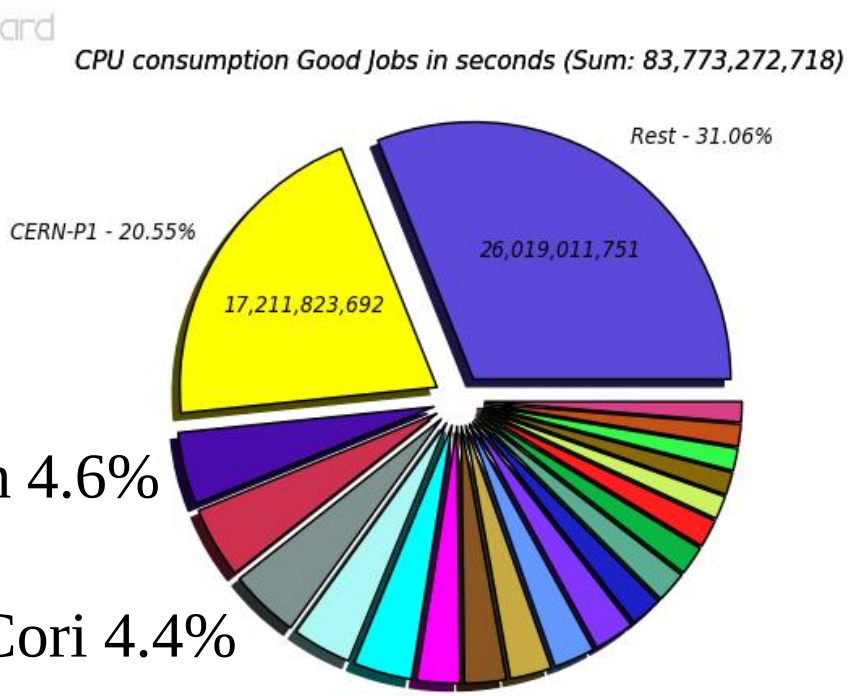


Includes all sites – not only US

Titan only runs G4 – other workflows not shown

Very Good Last Week





Titan 4.6%

Cori 4.4%

Rest - 31.06% (26,019,011,751)
CERN-P1 - 20.55% (17,211,823,692)
OLCF - 4.56% (3,816,628,246)
IN2P3-CC - 4.50% (3,768,091,881)
LBNL_DSD_ITB - 4.39% (3,678,036,281)
MWT2 - 3.74% (3,131,793,626)
DESY-HH - 3.70% (3,100,624,801)
CERN-PROD - 2.70% (2,260,654,233)
RAL-LCG2 - 2.61% (2,189,393,721)
FZK-LCG2 - 2.60% (2,178,977,088)
BNL-ATLAS - 2.59% (2,173,244,694)
LRZ-LMU - 2.55% (2,134,175,747)
SWT2_CPB - 2.00% (1,678,288,617)
IAAS - 1.95% (1,634,461,025)
RAL-LCG2-ECHO - 1.83% (1,535,361,270)
AGLT2 - 1.76% (1,470,543,058)
NDGF-T1 - 1.46% (1,224,989,387)
MPPMU - 1.41% (1,178,988,443)
TOKYO-LCG2 - 1.39% (1,161,851,478)
UNI-FREIBURG - 1.38% (1,154,391,364)
GRIF-IRFU - 1.28% (1,071,942,315)

What can be done Better?

- Exploiting 1-2% of unused cycles on Titan provided about 5% of all ATLAS computing – same as large US sites
  - Great for Titan – improved efficiency at almost no cost
  - Great for ATLAS – huge impact on physics results
- But Titan has a factor of 2-3 more unused cycles
  - ATLAS cannot use them yet – waiting for Event Service
  - New PanDA server at OLCF can be used by others
- Plan for the next 6-12 months
  - Continue ATLAS usage of Titan – LHC is taking data
  - Many of the improvements discussed yesterday (and later today)
    - Harvester on Titan
    - Yoda on Titan
    - AES (using OS) on Titan