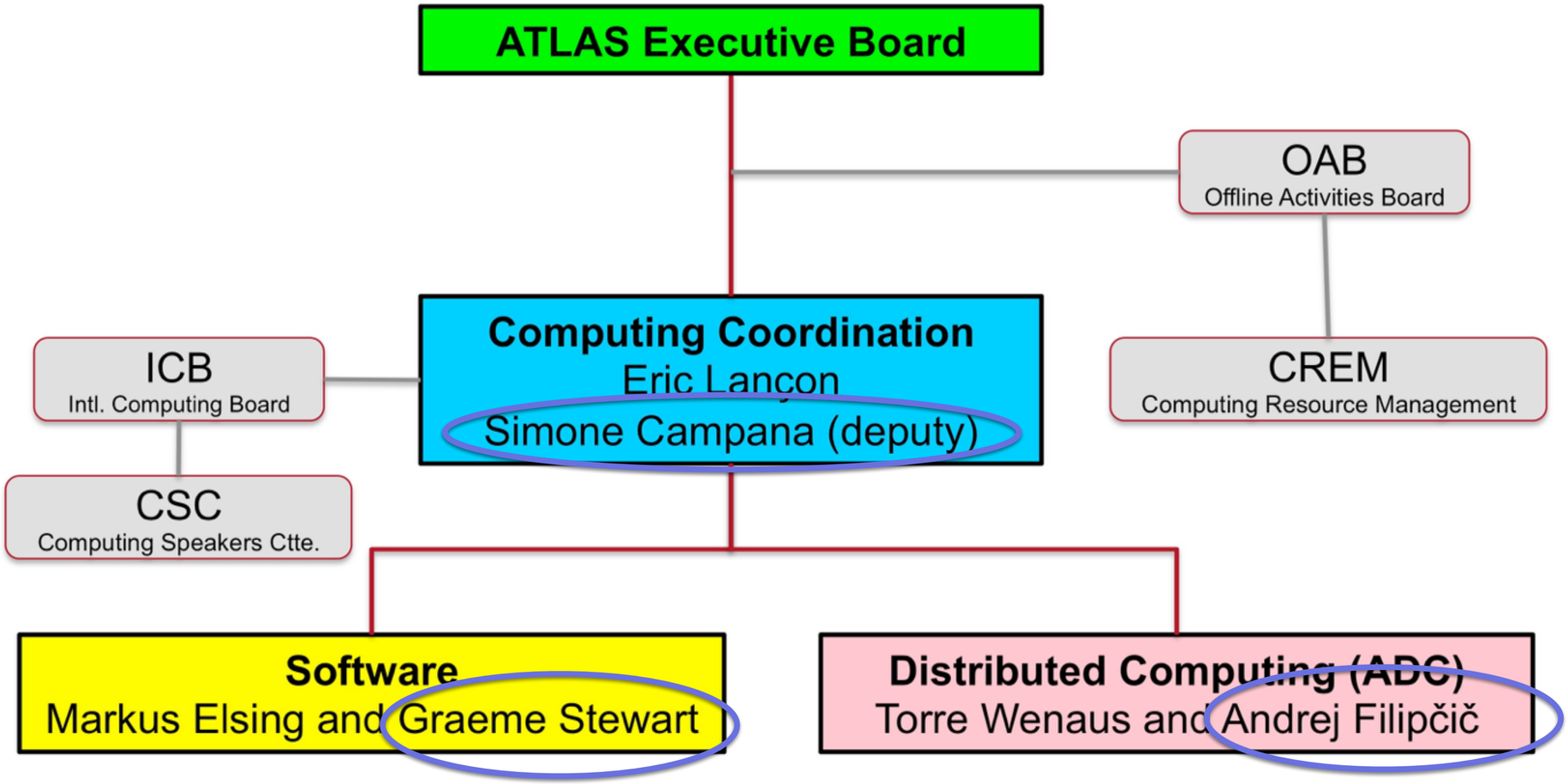
# S&C coordinator report

ICB May 6, 2015

# Items of the day

- What happened since last meeting (Feb. 5)
- Readiness for data taking
- Manpower issues
- Planing for the next months

# Changes


ATLAS Executive Board
OAB
Offline Activities Board
Computing Coordination
Eric Lançon
Simone Campana (deputy)
ICB
Intl. Computing Board
CREM
Computing Resource Management
CSC
Computing Speakers Ctte.
Software
Markus Elsing and Graeme Stewart
Distributed Computing (ADC)
Torre Wenaus and Andrej Filipčič

# Readiness for data taking

- Rucio / ProdSys2 commissioned
- Life time model in operation
- MC15 simulation started with release 19
- MC15  digitisation & reconstruction started with release 20
- AthenaMP the default…
- Derivation framework almost there

# Major S&C events

- Past events
  - Computing RRB : interactions with LHCC and C-RRB scrutiny group
  - CHEP 2015 and collocated WLCG and HEP software foundation workshops
- Next events
  - S&C week (June 29-July 3)
  - Site Jamboree end January 2016 (exact date TBD)

# ATLAS & CRSG

- Report to CRSG available on the computing document page together with CRSG report
- Updated ATLAS MC statistics and full usage of fastsim delayed to 2016
  - With no change in Disk & CPU requirements
- Need of beyond pledge resources (for 2015 & 2016) quoted for the first time
- Increased request for tape resources: +32 PB in 2016 (+101 PB in 2017)
  - More MC simulation
  - Longer Run1 analysis life cycle
- **2017 total budget still lower than 2016 and below 2012!**

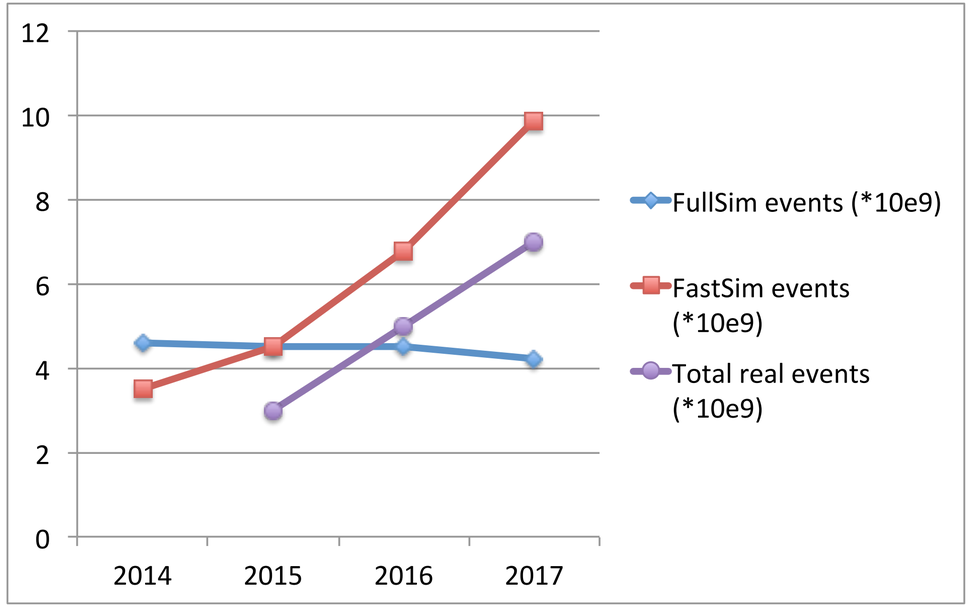



Figure 7: The revised requirements for Run-2 Simulation compared with the rising annual acquisition of data. The sum of full and fast simulation in each run 2 year increases more slowly than the number of events acquired. Also shown is the simulation production in 2014. The previous requirements submission requested 2 x $10^9$ full simulation and 5 x $10^9$ fast simulation in 2015, 2016 and 2017

| | Additional goal | |
|---|---|---|
| Resource | 2015 | 2016 |
| CPU (kHS06) | 470 | 800 |
| Disk (PB) | 0 | 0 |
| Tape (PB) | at least 11 | TBD |

**Table 12** ATLAS beyond-pledge resources required to meet ATLAS simulation needs in 2015 and 2016 and to achieve acceptable data lifetimes during Run 2. Additional storage is needed for simulation in 2015 and reflected in the new concept of a 'beyond-pledge tape' request.

# Interactions with CRSG

- ATLAS presented 2016 requests; they were **approved** by the CRSG
  - Might be reviewed in October in light of LHC performances
- ATLAS should provide monitoring informations about tape usage and performance for next round of scrutiny

| Resource | Site | 2015 ATLAS | 2015 CRSG | 2016 ATLAS | 2016 CRSG |
|---|---|---|---|---|---|
| CPU (kHS06) | T0+CAF | 205 | 205 | 257 | 257 |
| | T1 | 462 | 450 | 520 | 520 |
| | T2 | 530 | 520 | 566 | 566 |
| Disk (PB) | T0+CAF | 14 | 14 | 17 | 17 |
| | T1 | 39 | 37 | 47 | 47 |
| | T2 | 55 | 52 | 72 | 72 |
| Tape (PB) | T0+CAF | 33 | 33 | 42 | 42 |
| | T1 | 65 | 65 | 116 | 116 |

**Table 13** ATLAS resources request and CRSG recommendations.

We'd like this to be final for 2016, but we appreciate that this is the start of a new run.

The impact on tape systems will have to be monitored and future reports will need figures to show how tape systems are being used, such as: data volumes recalled, measures of turnover and thrashing.

# CRSG general comments

## Overall assessment

- WLCG resources intensively used
- Computing models evolved
- Offline use of HLT farms established
- Benefit from beyond-pledge resources and resources outside WLCG
- CRSG strongly supports software development to optimise resource use and take advantage of changing architectures
- Requests keep in mind nominal increases in capacity at fixed cost
  - Nevertheless, some big steps in requests
  - Amount of simulation?



# Some specific comments

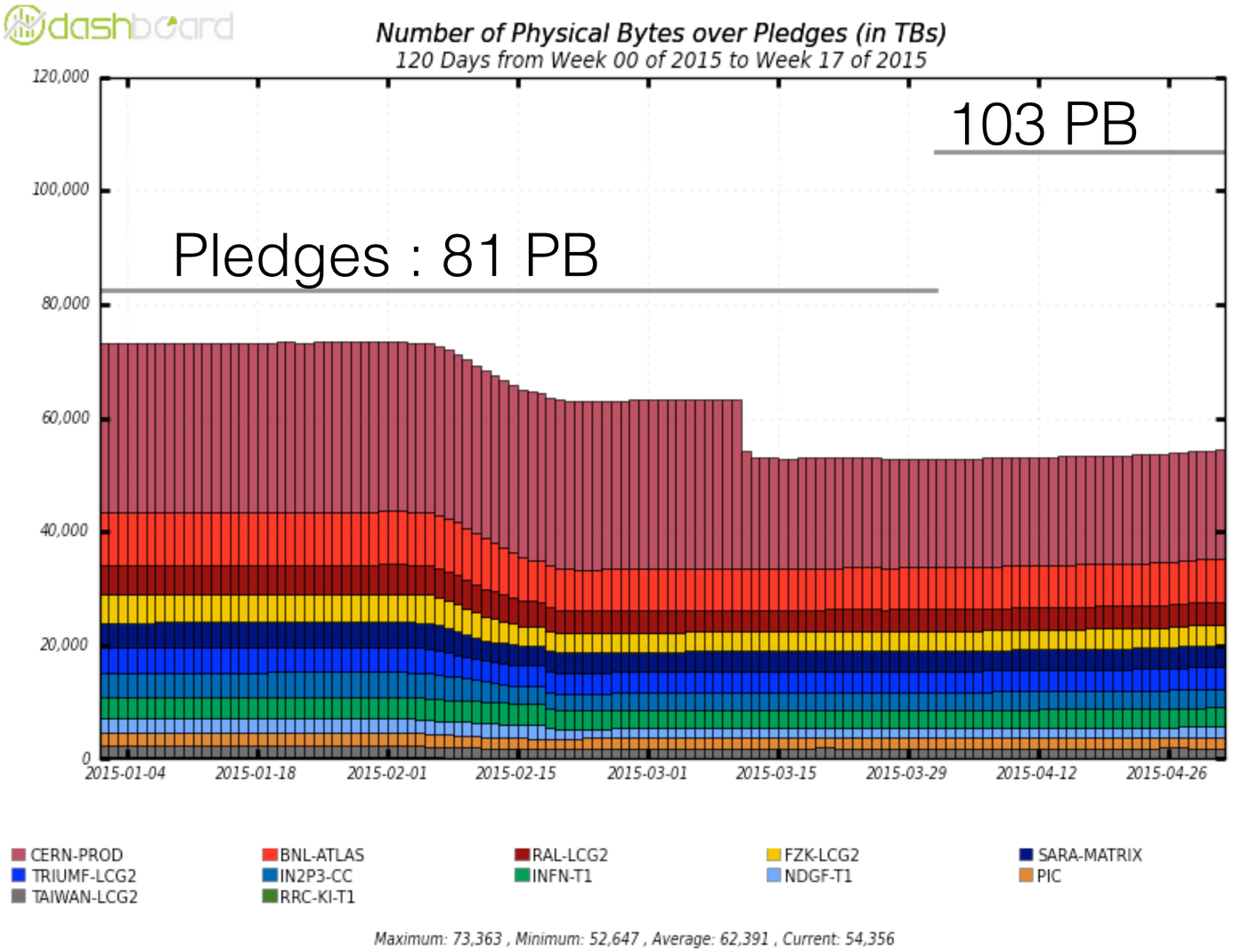
- Strong support for software developments
- Beyond pledged CPU resources acknowledged
  - Difference between ATLAS & CMS in MC/Data needs may be looked at by LHCC
- Lighter Tier hierarchy and cost of network

2. The CRSG strongly supports software engineering development and recommends that sufficient effort be funded to support this. Improving the efficiency of software, including making optimal use of new hardware designs is essential to mitigate the growth in resource use. There have been substantial improvements made for Run 2. In the longer term, with orders-of-magnitude increases in the expected computing needs for Run 3, this work is even more essential.

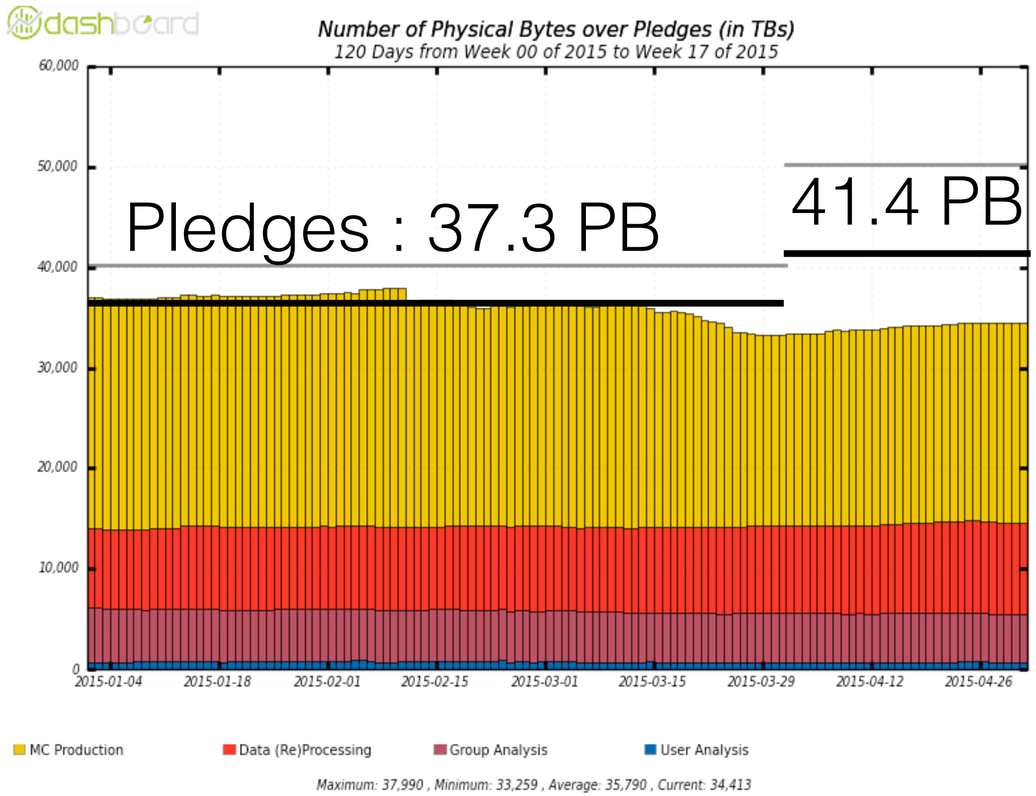
6. We note that there are differences in assumptions between the GPDs: ATLAS uses the T0 for all prompt reconstruction while CMS assumes 40–50% of the prompt reconstruction will need to be done at the T1s; ATLAS depends on beyond-pledge resources to meet its simulation needs while CMS uses beyond-pledge resources only to cut off peaks in demand; the two experiments assume different ratios of simulated to real events with ATLAS using 3:1 and CMS using 1.5:1.

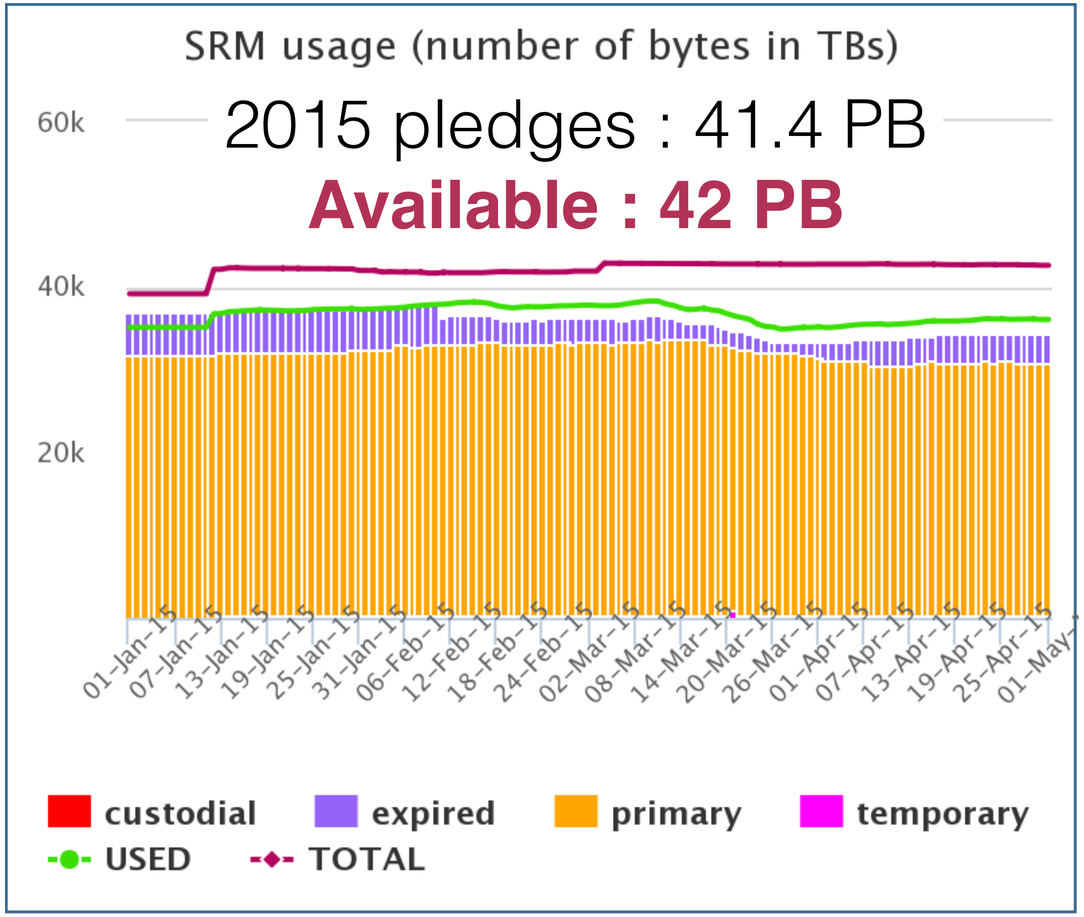
7. Good networking between and within tiers has been exploited to help dissolve the tier hierarchy. This leads to underuse of resources at sites with poor networking and could have future implications on the cost of providing network capacity.

# Tape usage : lifetime model in practice



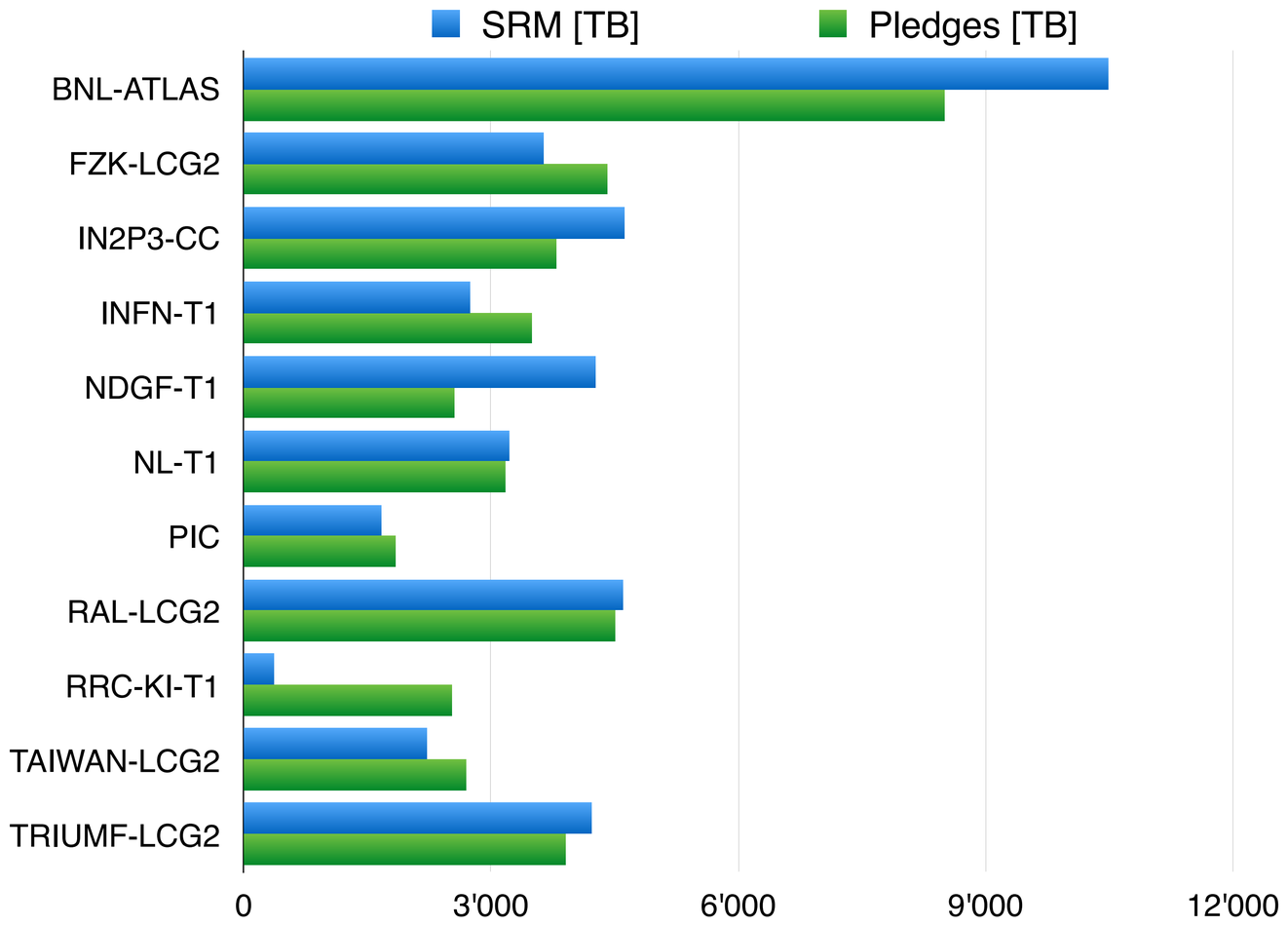
# T1 disks



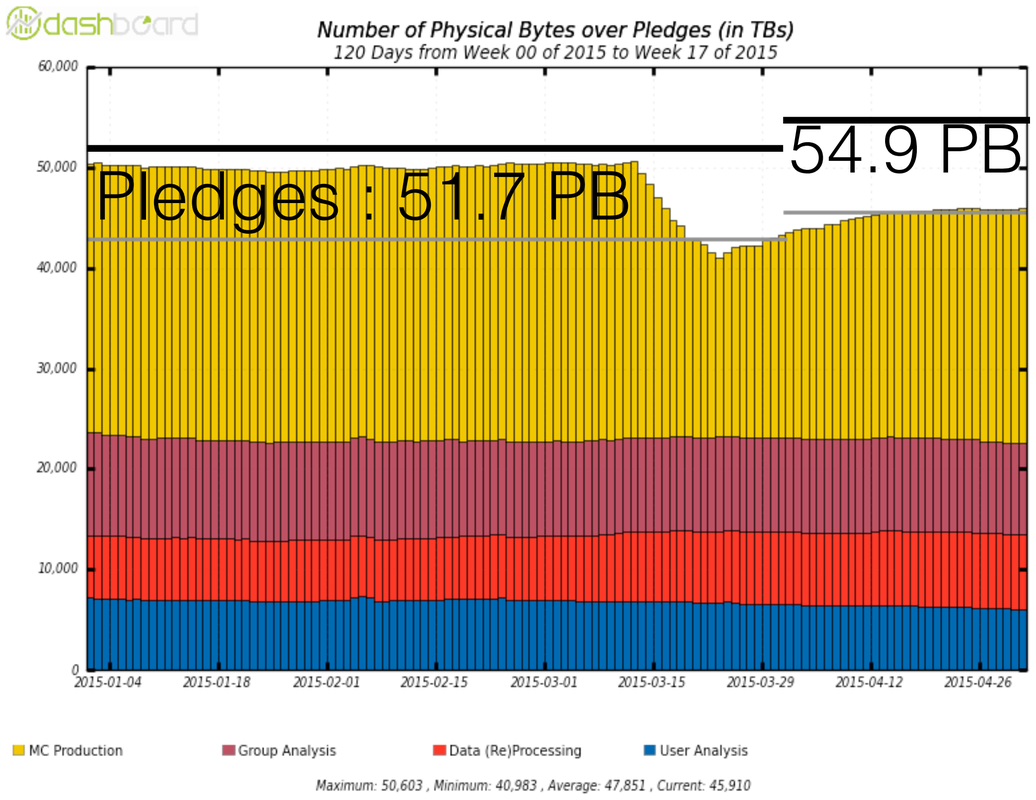

Less critical issue but need to be monitored

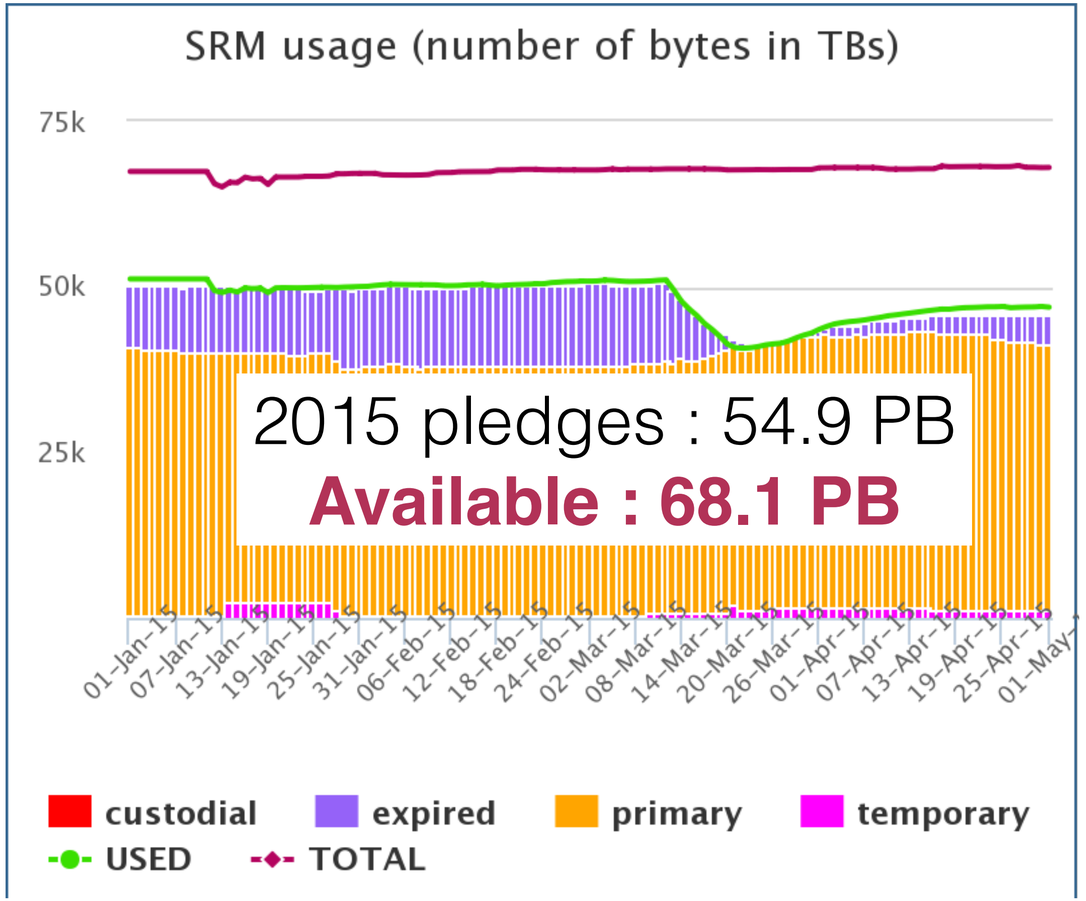
# Available disk space at T1s




**Thank you to sites providing more than pledges!**

# T2 disks



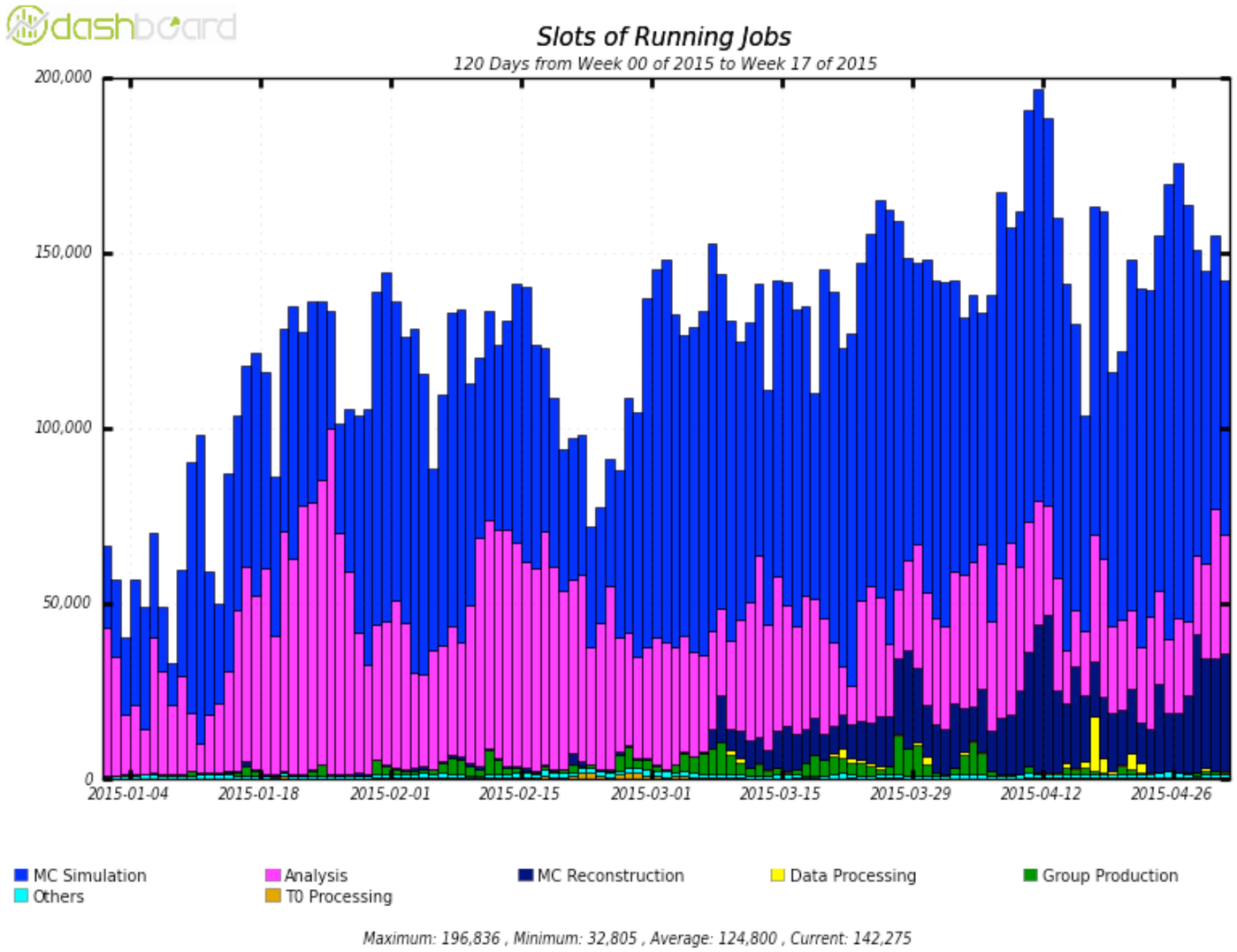




Not all available disk space usable (ASAP metric)

Disk space at T2s to be more efficiently used (unbalanced between T1 and T2 usage)

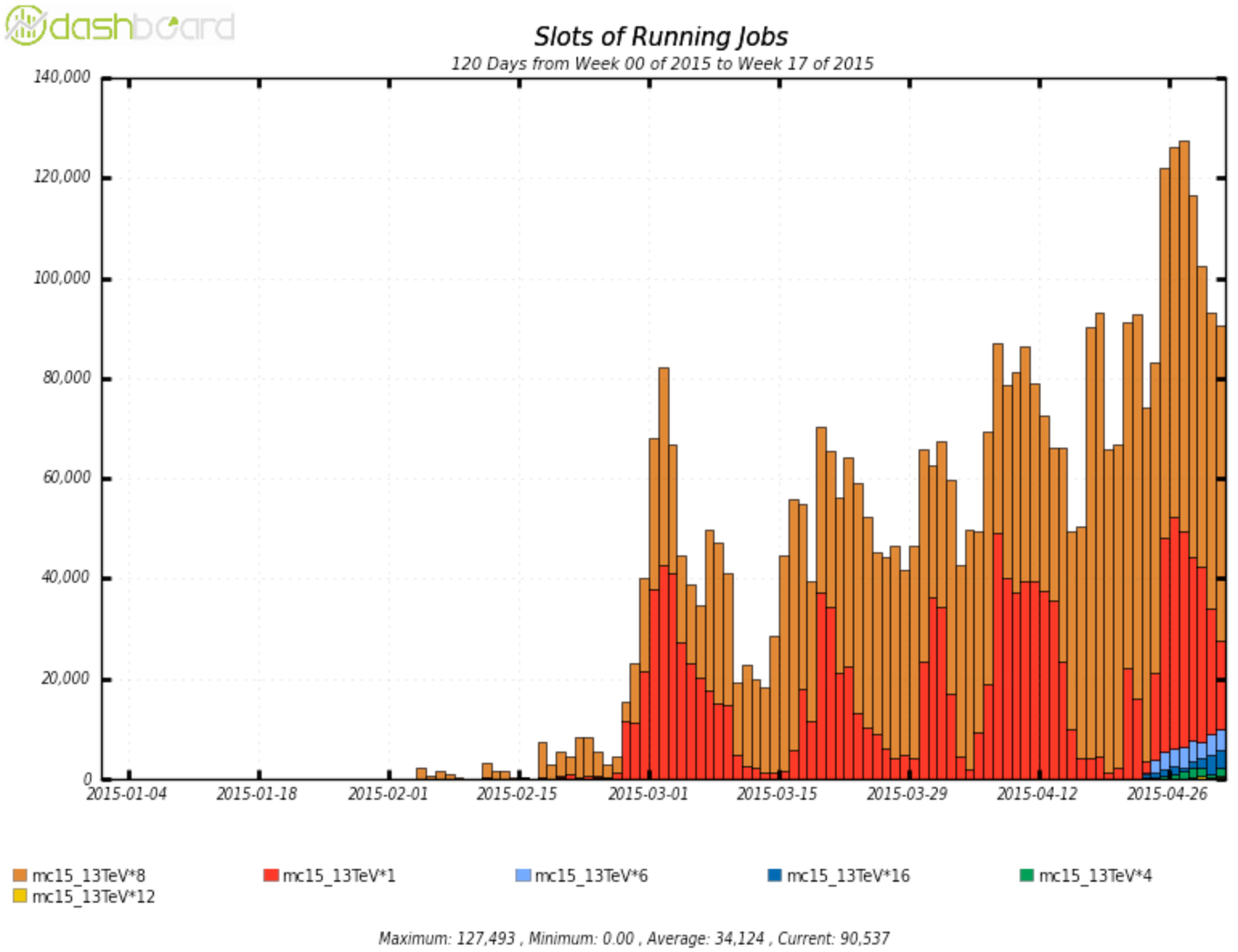
# Grid activity

- Back to ‘standard’ level of activity
- But not at full power
- Some difficulties to fill sites



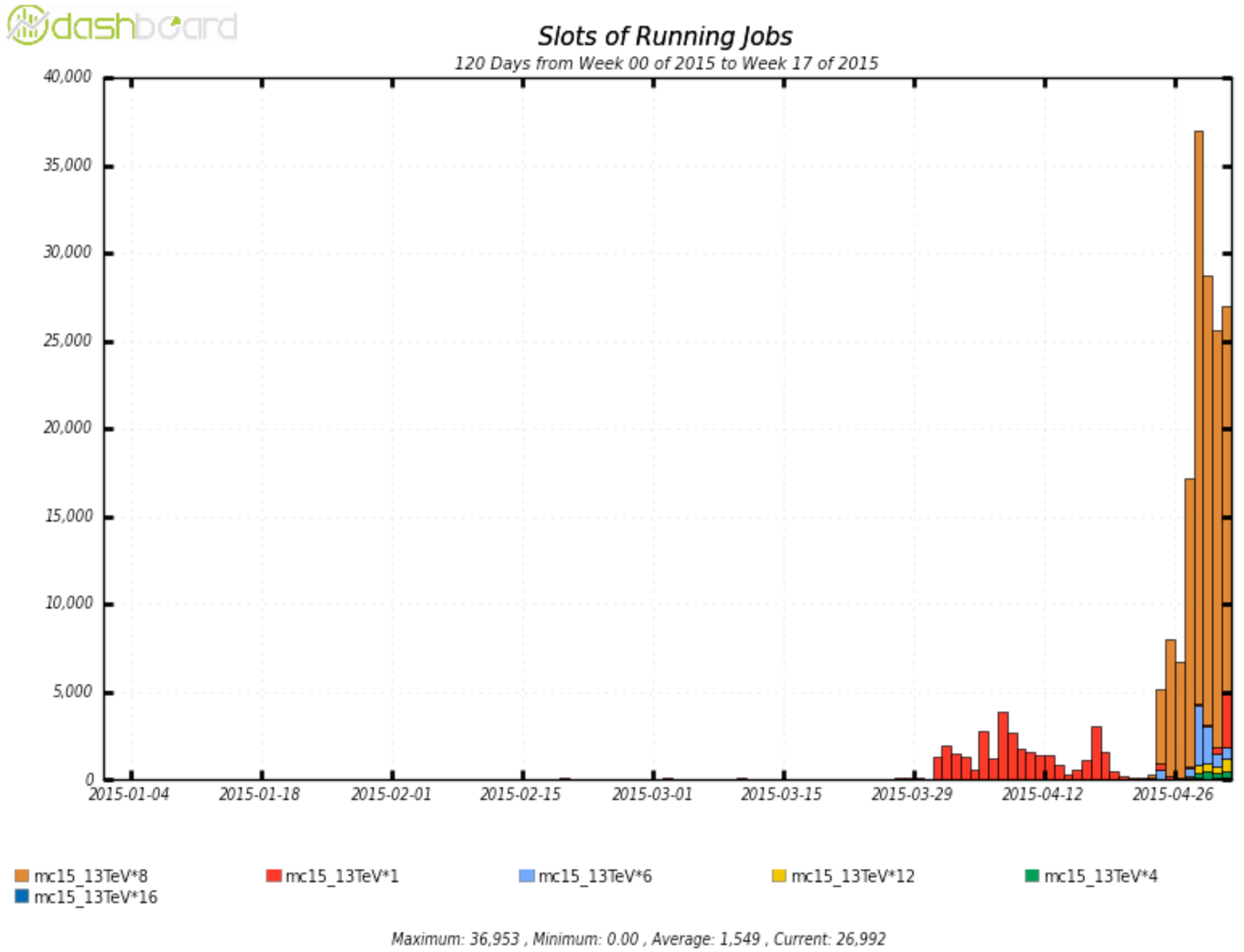
# MC15 simulation

- Simulation launched beg. of March
- Took some time to ramp up
- Only a fraction of the jobs are **multi-core**
- 710 M evts full-sim processed ( over 1B to do)



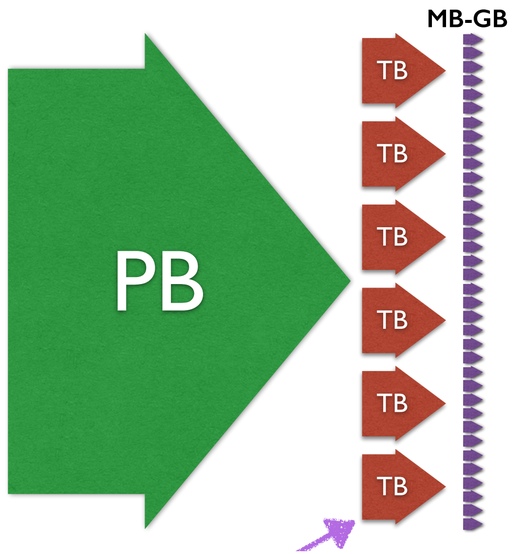
# MC15 digi. + reco.

- Launched end of April
- 3 steps : digitisation/trigger simulation/ reconstruction (new in 2015; to same memory)
- 510 M evts reconstructed



# Derivation framework

- Organised DxAOD production
- Vital for quick turn around and robustness of analyses
- Details in James Catemore  presentation at ATLAS weekly last week
- On track but final implementation and testing still needed




| | | |
|---|---|---|
| | Full output of reconstruction, ~PB size | One format |
| | Intermediate analysis format ~TB size | ~100 formats |
| | Final n-tuple ~MB-GB size | ~1000 formats |

# Manpower

- Desperately looking for a release coordinator & trf responsible for months
  - No success with ‘standard’ calls
  - Funding agencies not contributing to ‘nominal’ share to S&C will be contacted individually
- CRC : your help is needed
- AF II aka Fast Simulation : effort needed
  - For developing code & tuning
- Software development
  - Code porting to new architectures
  - New framework

# Next months

- Short term
  - Efficiently process data and MC
  - Optimisation of Tier architecture and production workflows
  - Derivation framework to timely deliver ready for analysis data format
  - Preparation of release 21 for end of year reprocessing and 2016 data taking
- Medium term
  - Setup computing model group for Run3 and beyond
  - New multi-threaded software framework to be delivered end of 2016
    - Possibly setup collaboration / share expertise with LHCb &/or CMS

# Let’s go for Run 2