

Run: 276731
Event: 876578955
2015-08-22 07:43:18 CES

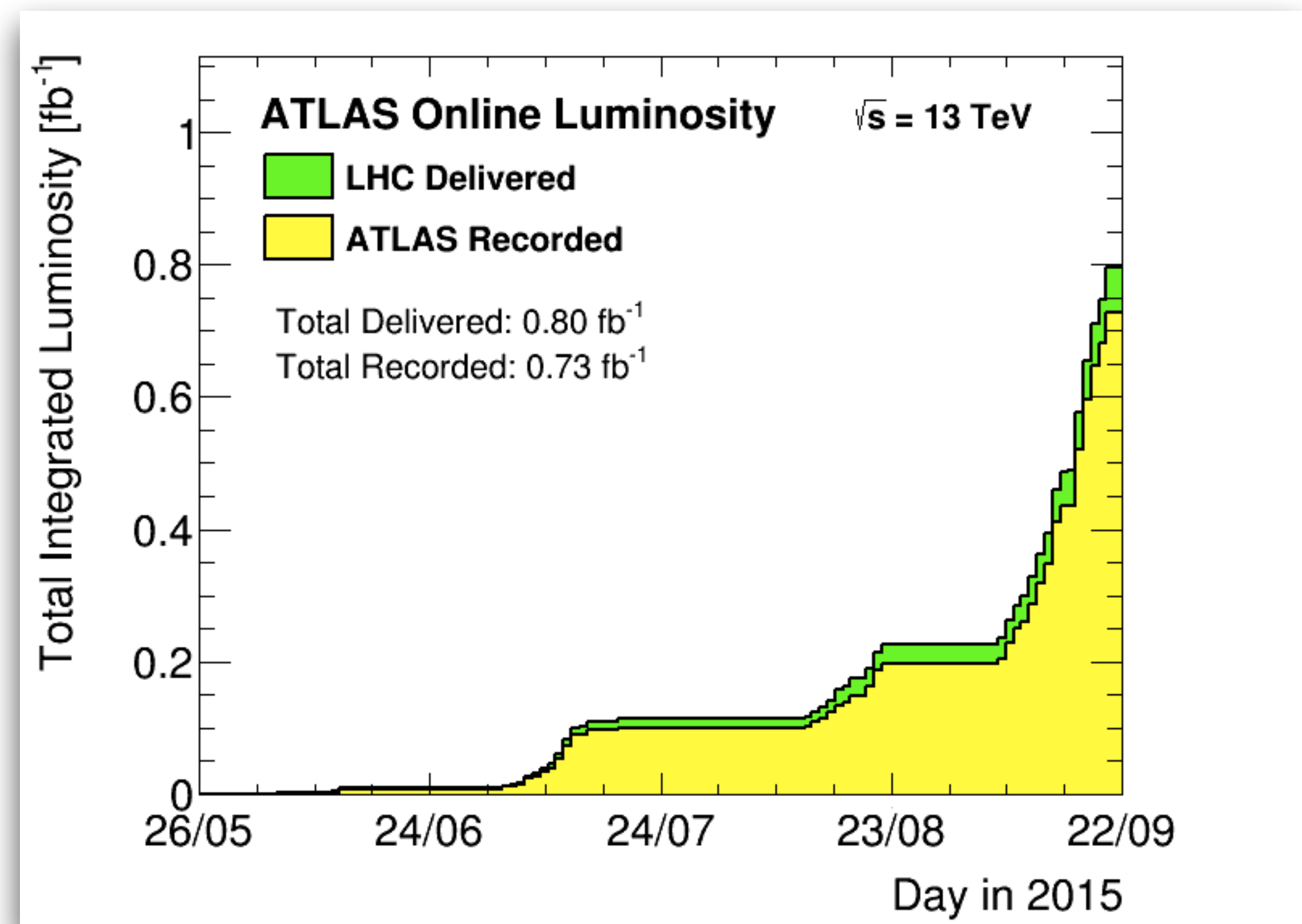
ATLAS computing status

Eric Lançon & Simone Campana
LHCC Sep. 22, 2015

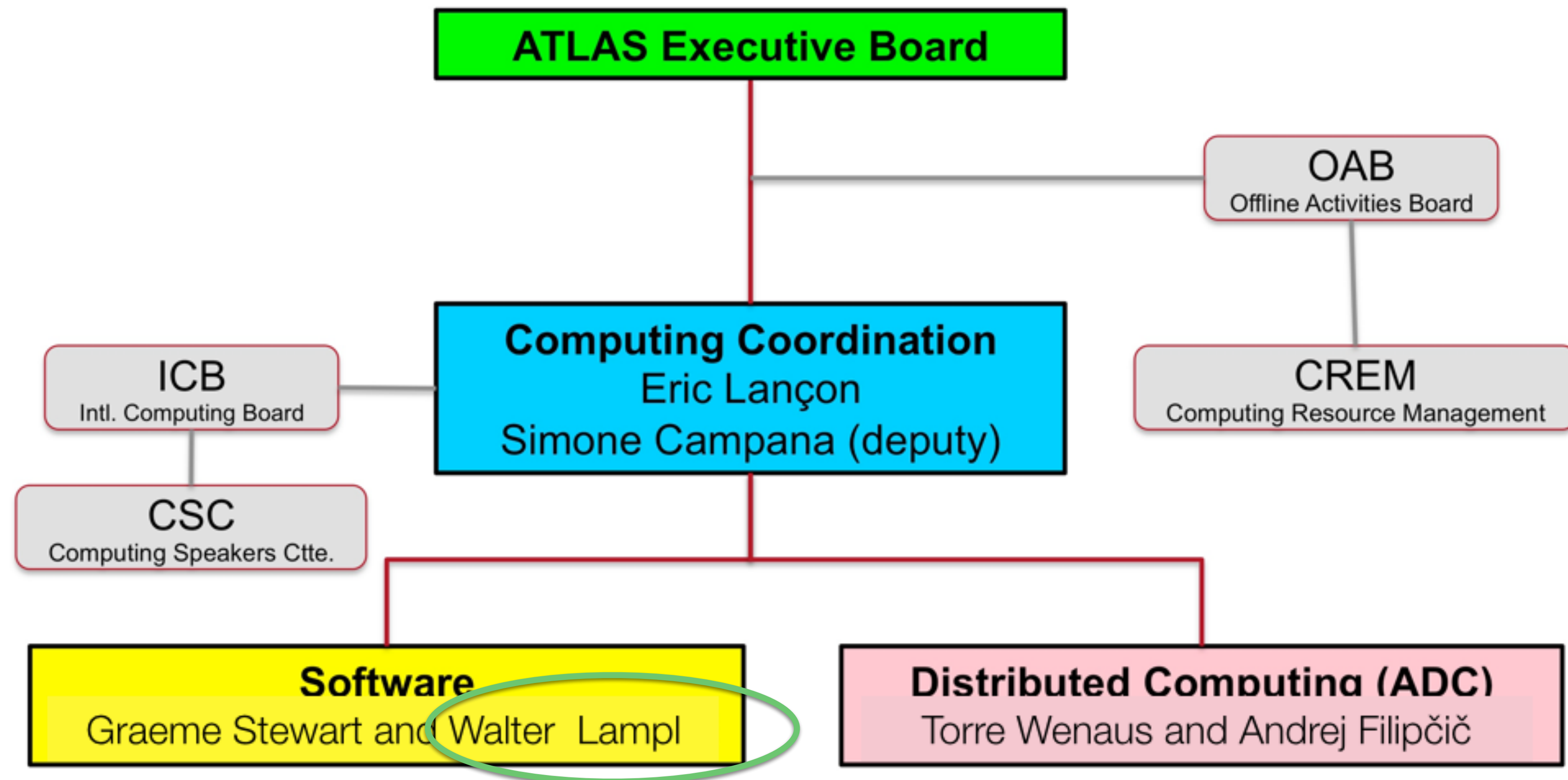
- ▶ What happened since last LHCC
- ▶ Experiences with data taking
- ▶ 2017 resource requests

ATLAS status

- ▶ Over 0.7 fb⁻¹ collected data
 - 92% and increasing data taking efficiency
- ▶ First 13 TeV paper published
 - <http://arxiv.org/abs/1509.04776>

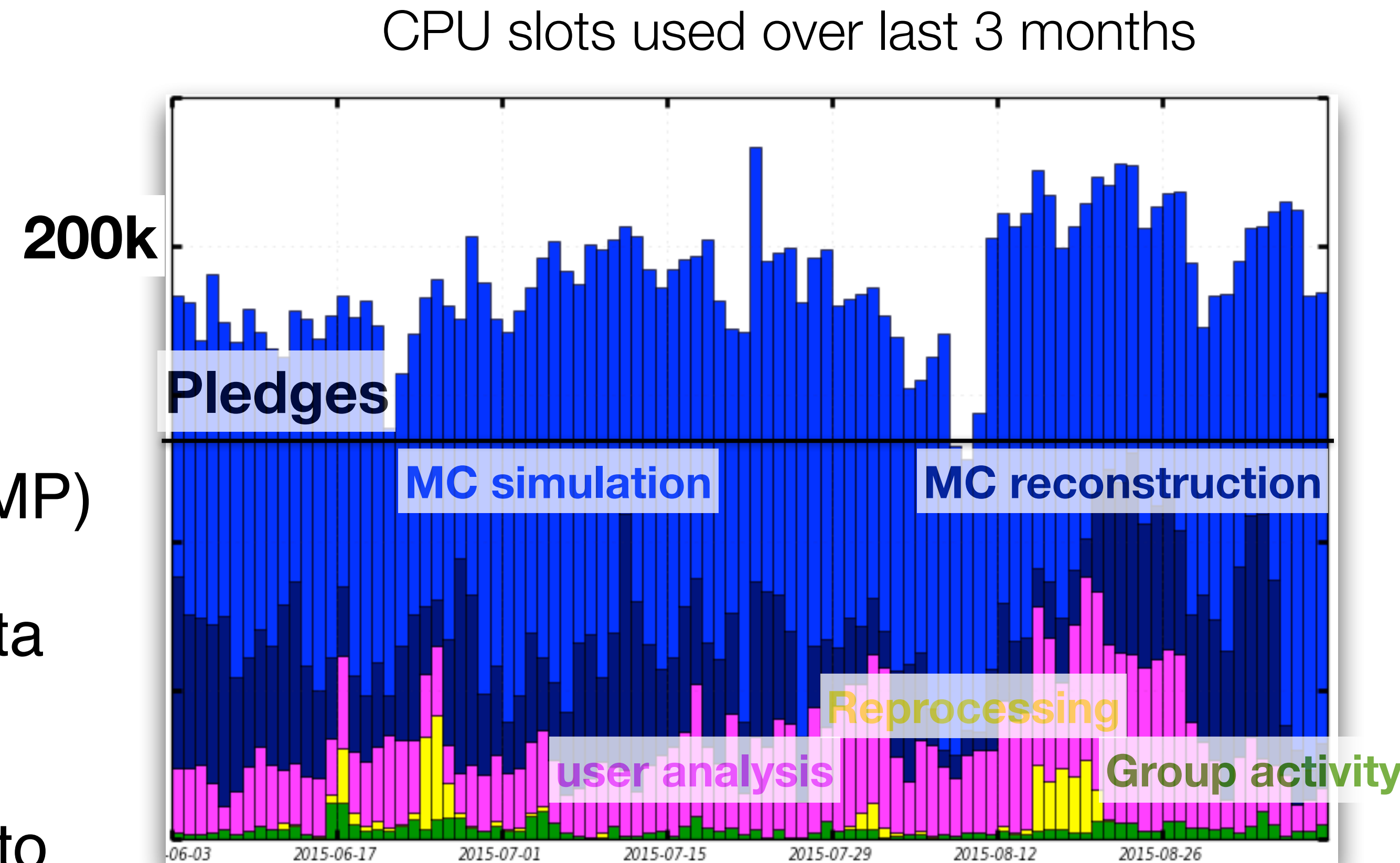


Changes in ATLAS computing

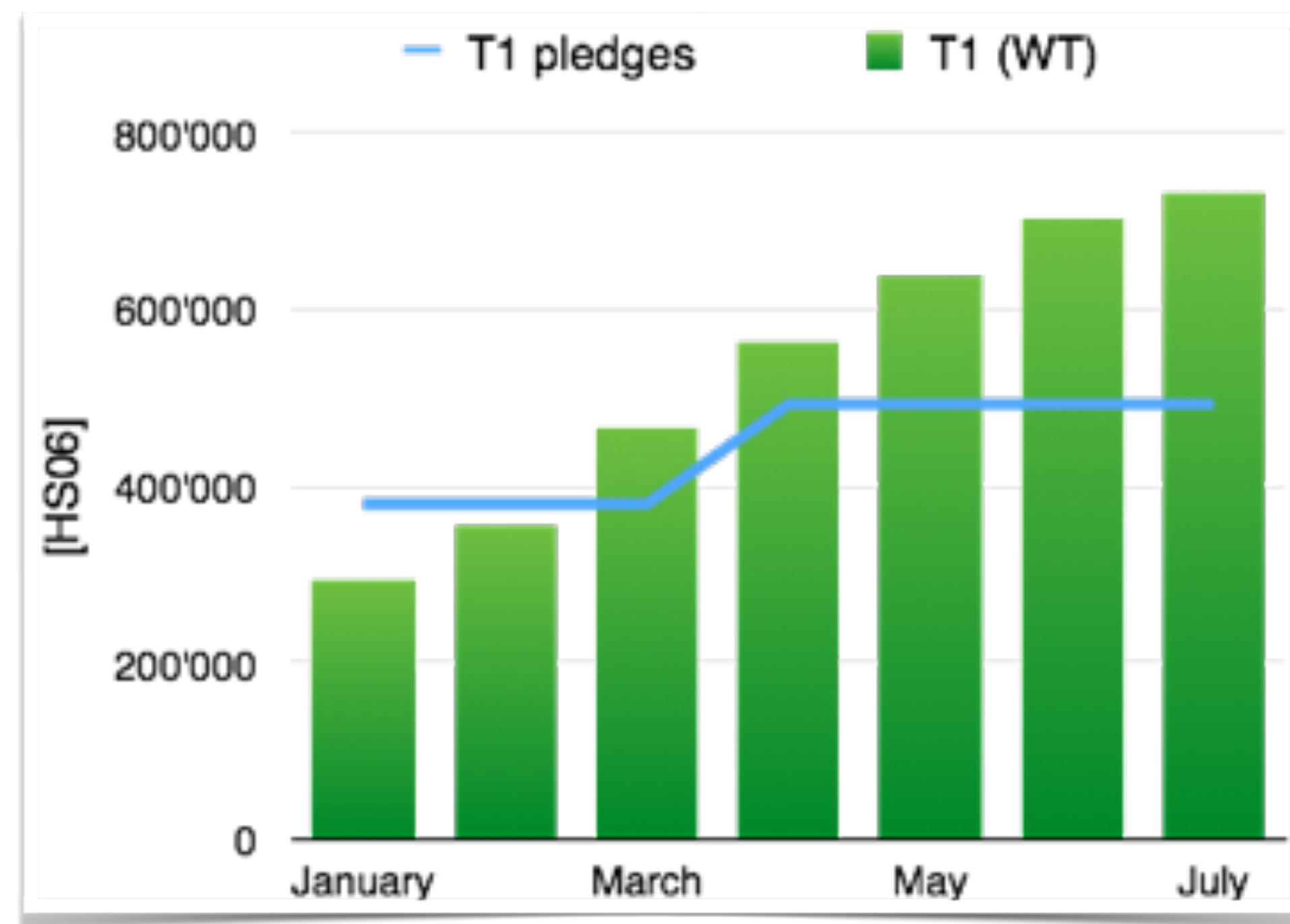


Activities on the grid since Juin

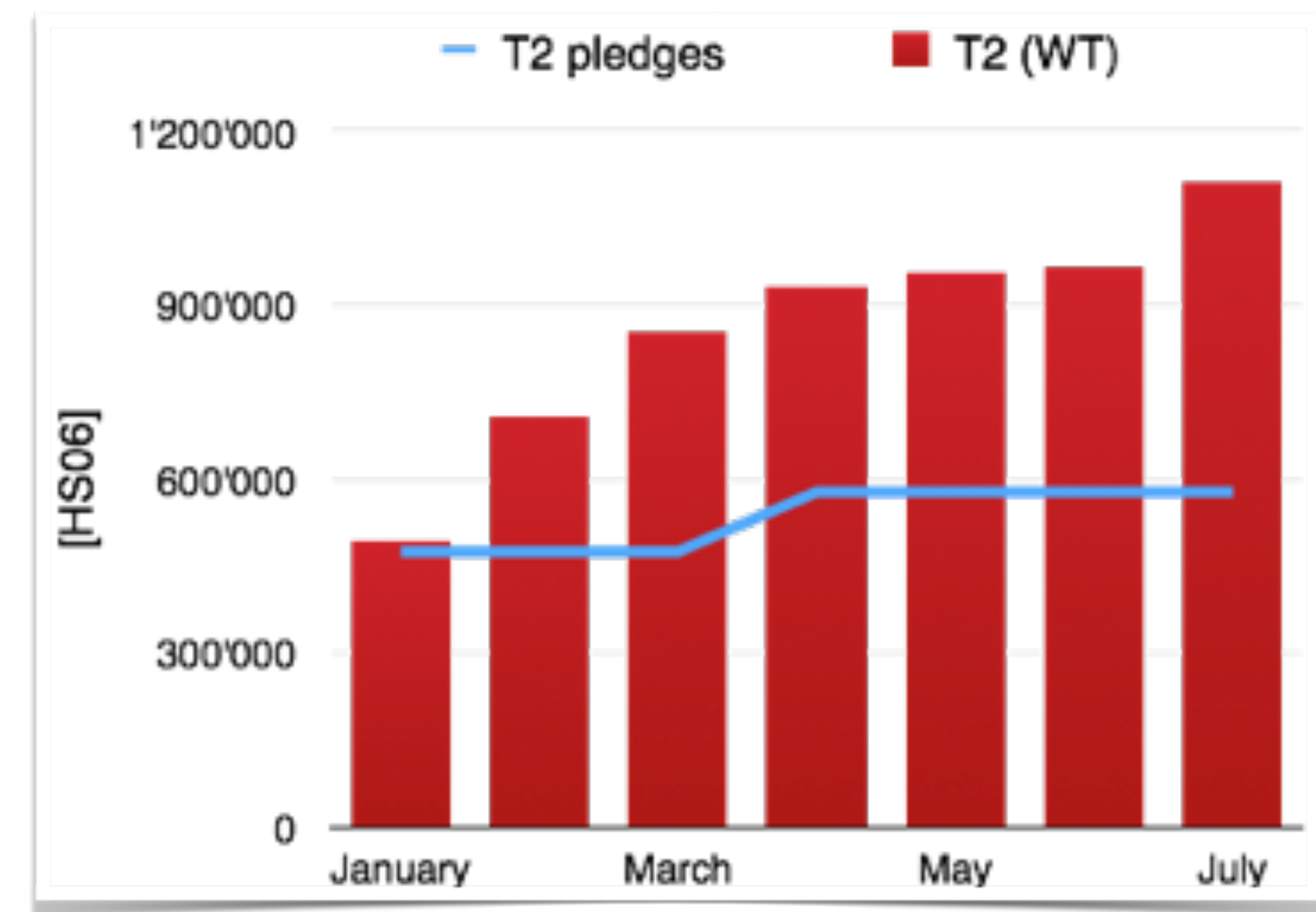
- ▶ Grid utilisation at full :
 - 2.8B simulated events produced
 - ~5B events reconstructed for 50 ns & 25 ns conditions
- ▶ Default is multi-core processing (AthenaMP)
- ▶ No major issue with data transfer and data processing
- ▶ 2015 data have been reprocessed twice to take advantage of improved alignments and calibrations



Consumption continues above pledges at T1s and T2s



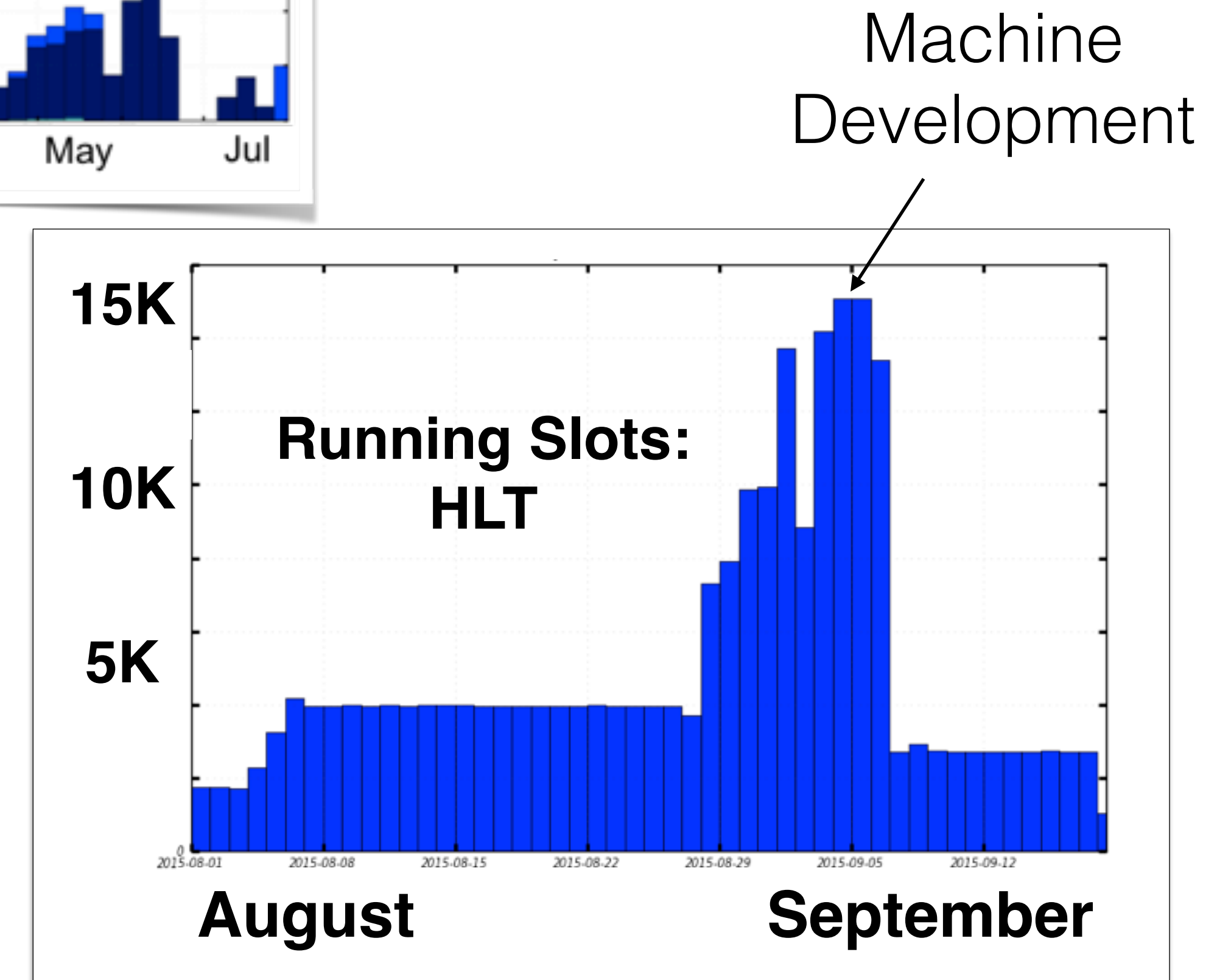
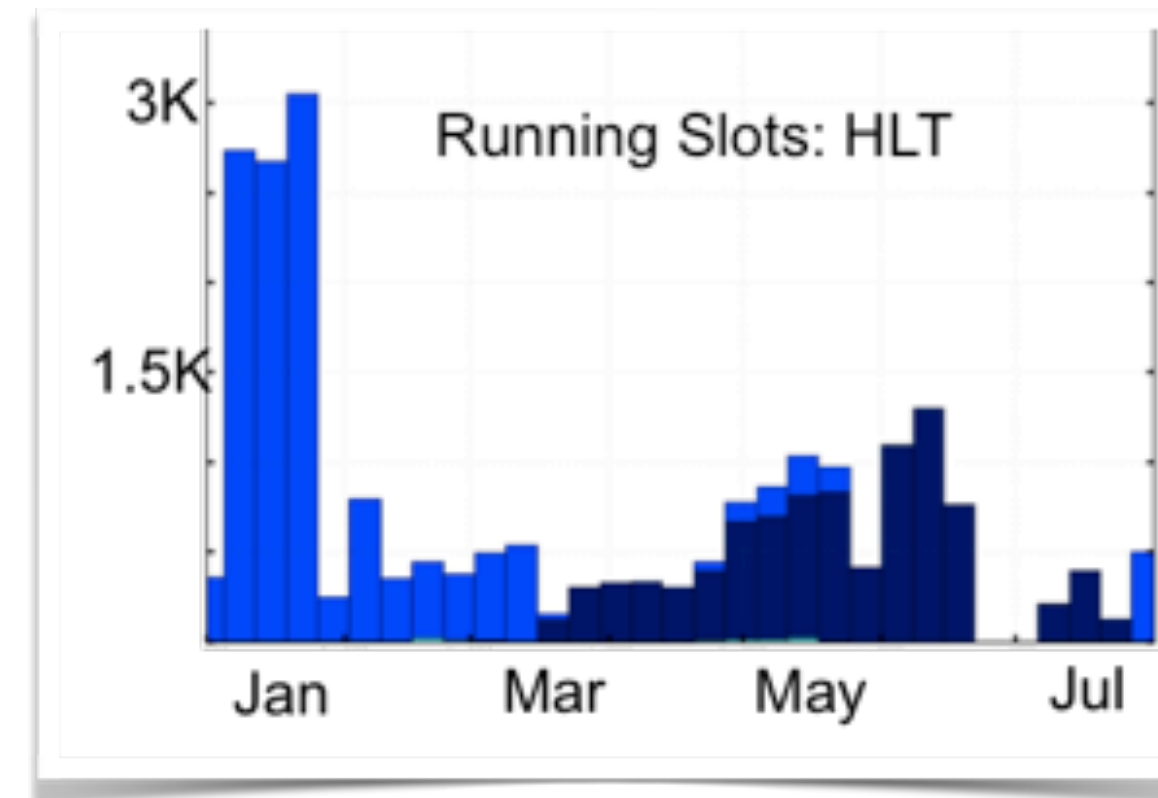
Beyond pledge CPU (T1+T2)
2015 request : 470 kHS06
actual : 675 kHS06



Beyond pledge CPU
introduced in March 2015 document
submitted to CRSG to cope with
desired MC statistic

HLT farm usage

- ▶ New hardware installed in 2015
- ▶ Hardware and software commissioned during first part of 2015: much lower usage of HLT farm than in 2014 until July
- ▶ Increased usage since August
- ▶ Data taking & HLT developments have priorities over MC simulation

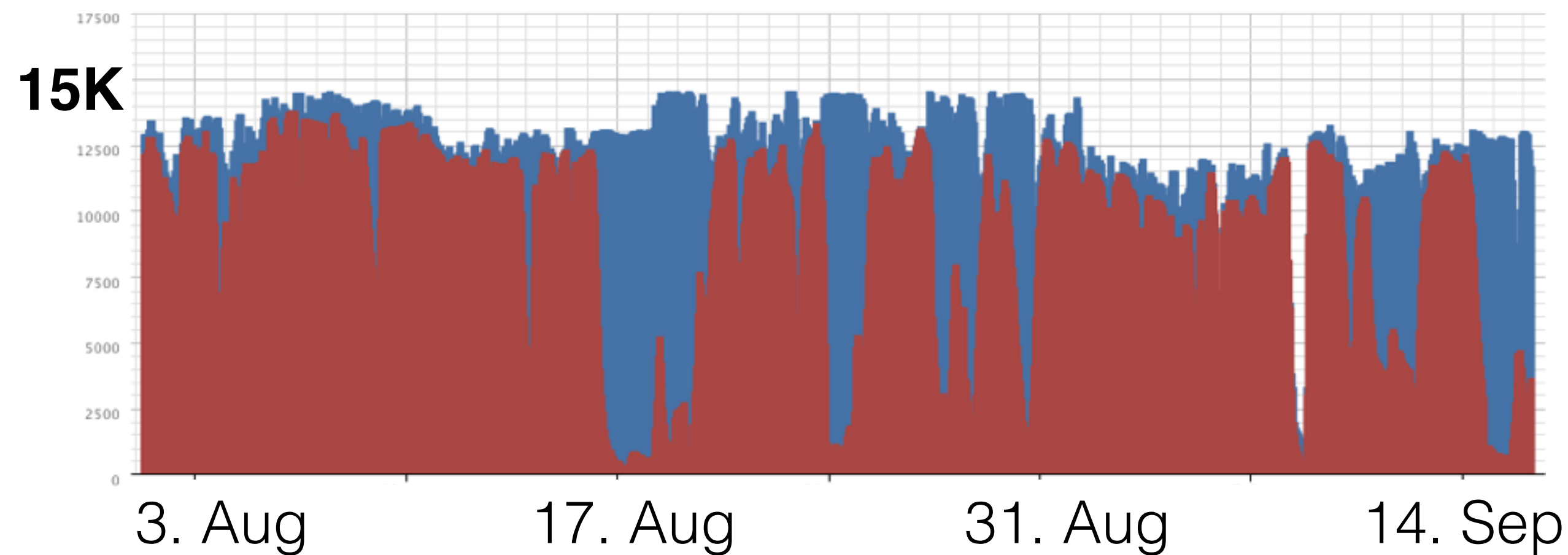


Tier 0 activity

Grid jobs

Data processing jobs

- ▶ Hardware corresponding to 2015 pledges made available and operational mid-June
 - Special thanks to CERN-IT
- ▶ Moved to AthenaMP
- ▶ Coping with current data taking rate
- ▶ Spill-over to Tier 1s being commissioned



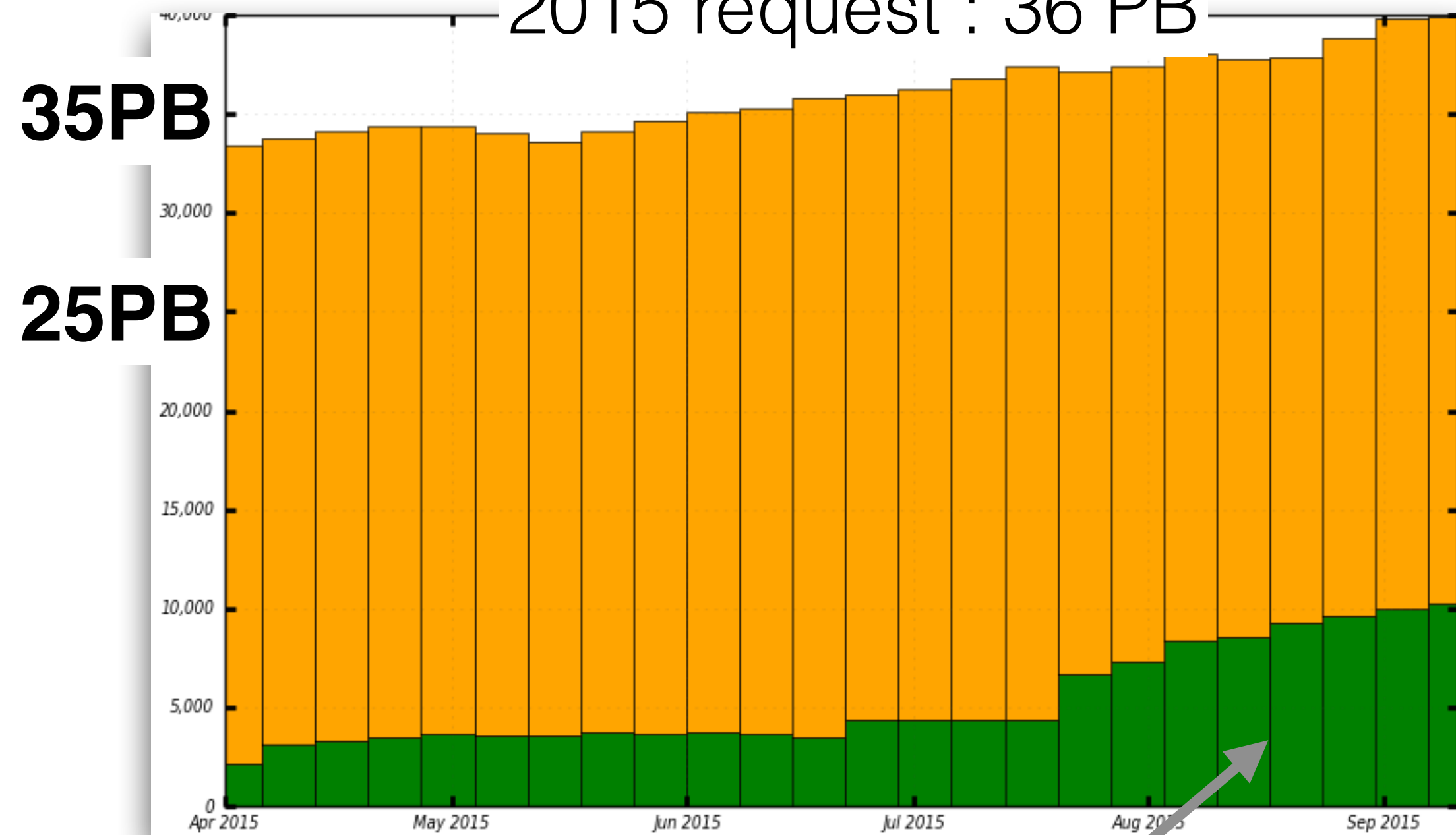
Disk Space Usage

Tier 1s ~full

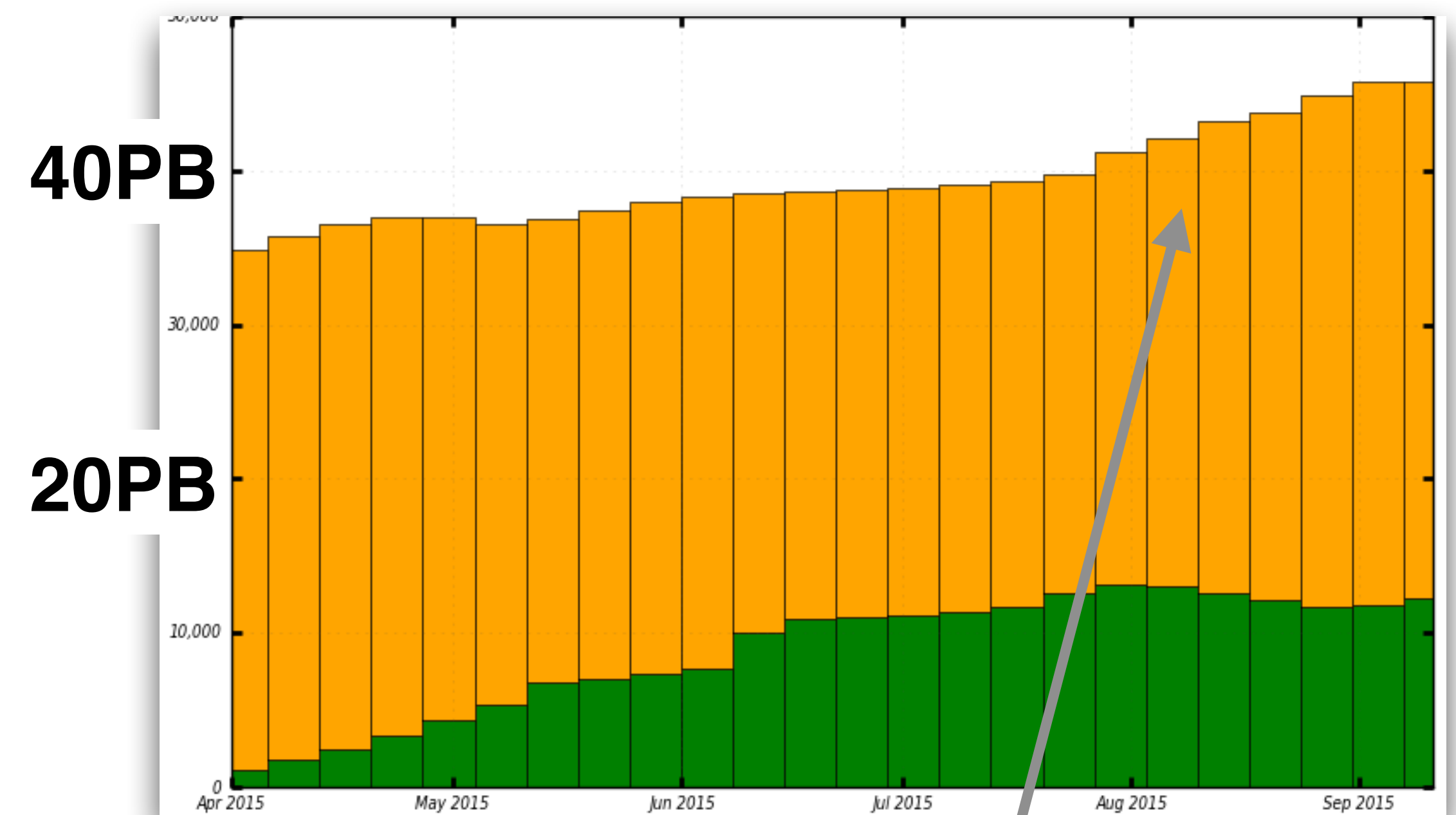
Difficulties to efficiently use
T2 disk space

Tier 1s

2015 request : 36 PB



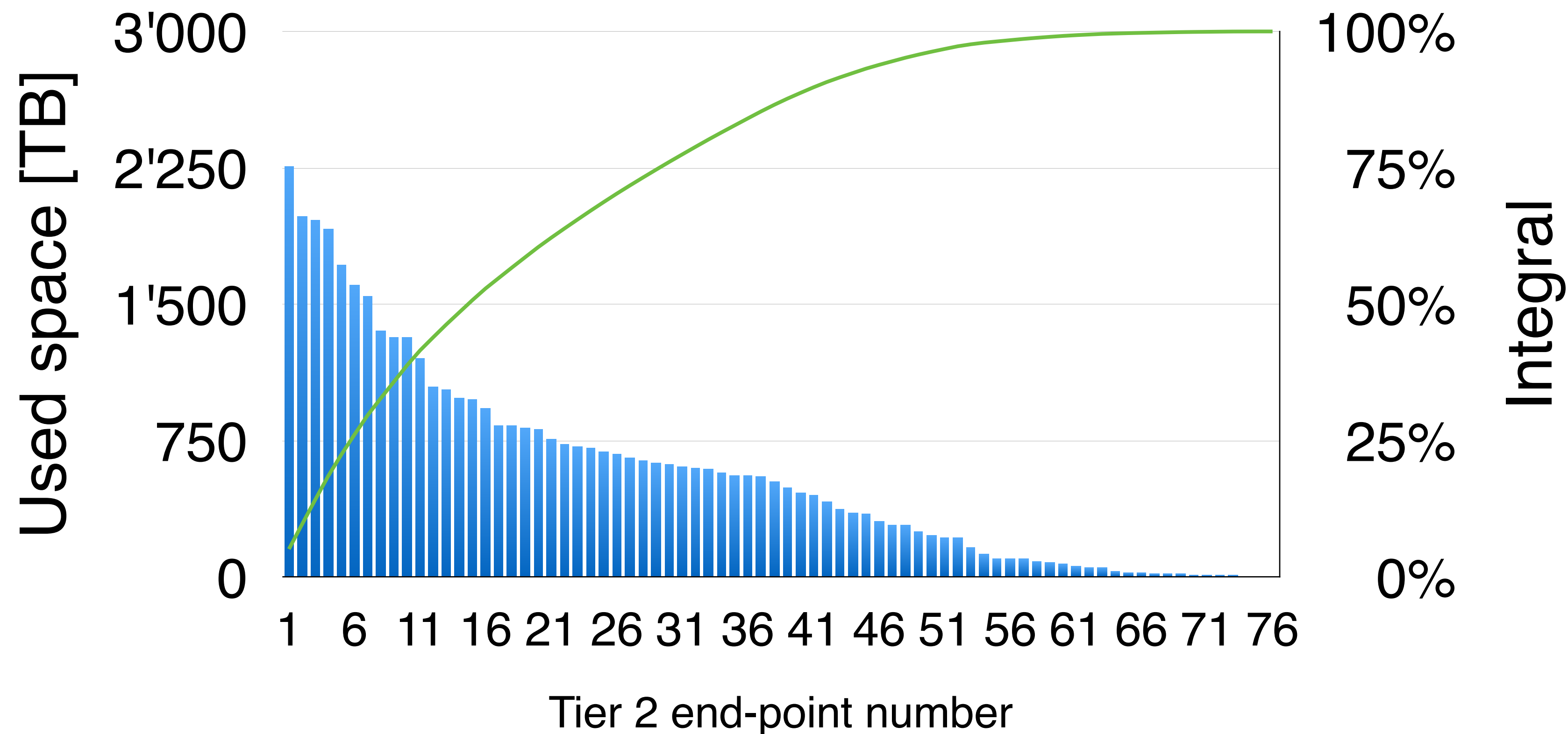
Tier 2s



Reshuffling of data placement between Tier 1s & Tier 2s

Secondary copies
(can be deleted)

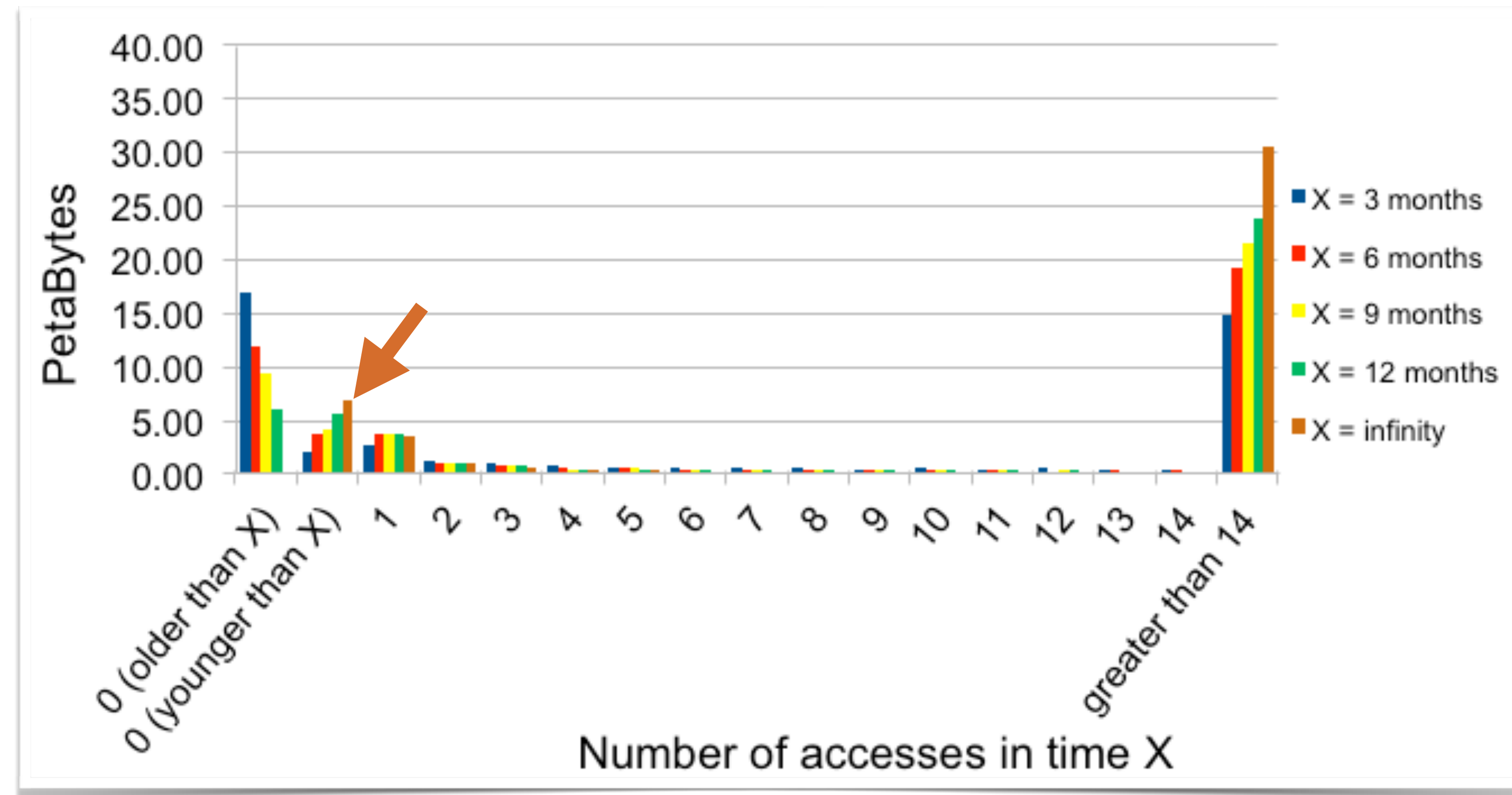
Disk space usage at T2s



50% of Tier 2 storage in ~20% of sites
Large disparity in size of Tier 2s

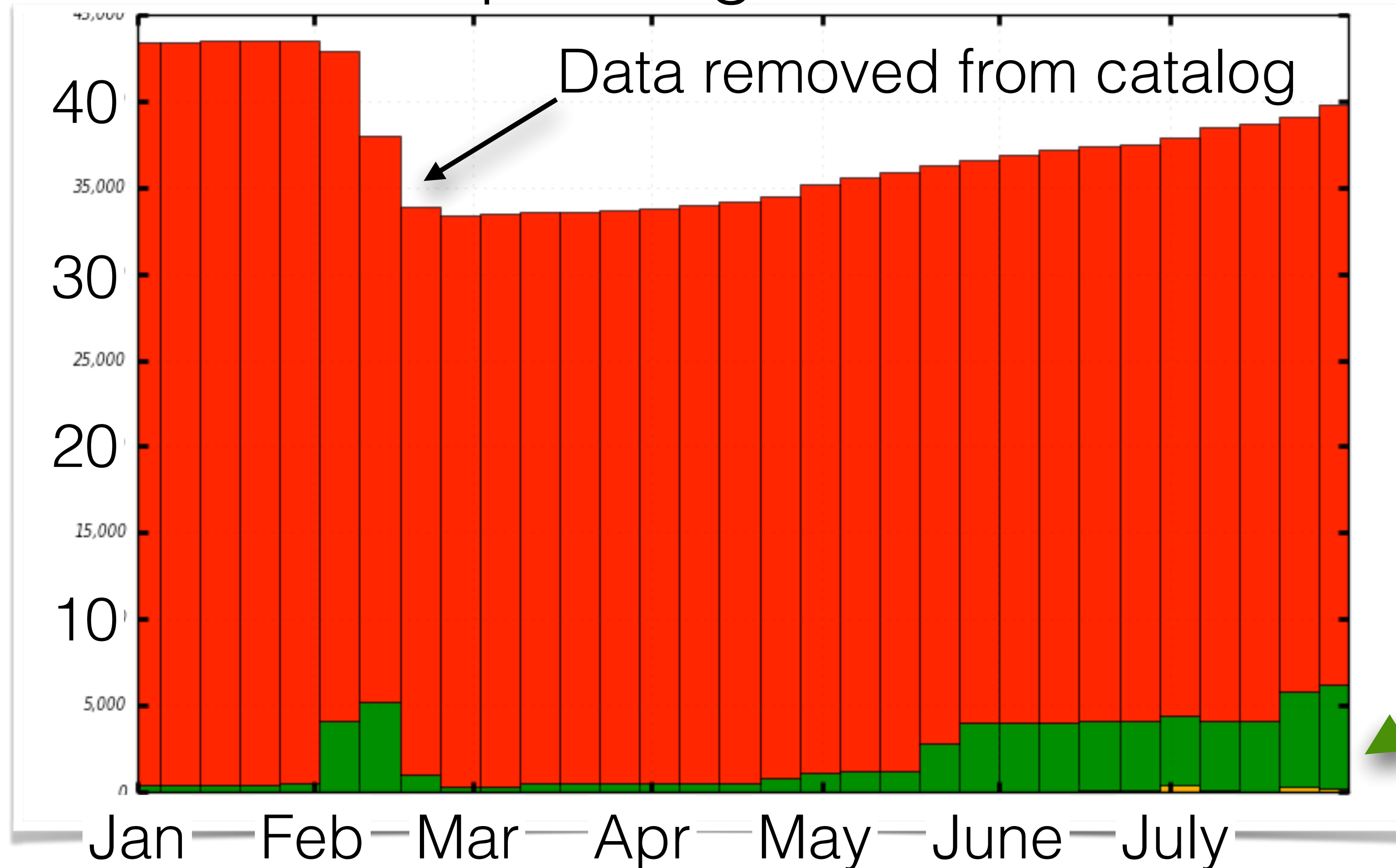
DATADISK access pattern

- ▶ Better access pattern since introduction of data life time policy
- ▶ **6.9 PB** of data never accessed
 - 1.2PB ESDs from 2015 cosmic ray and commissioning data
 - 1.8PB from validation samples needed for Run 2 software validation
 - Will be deleted from disk



Tape usage : lifetime model in practice

Tape usage at T1s



Deleted space
recoverable at next
tape repacking or next
generation of device
... months

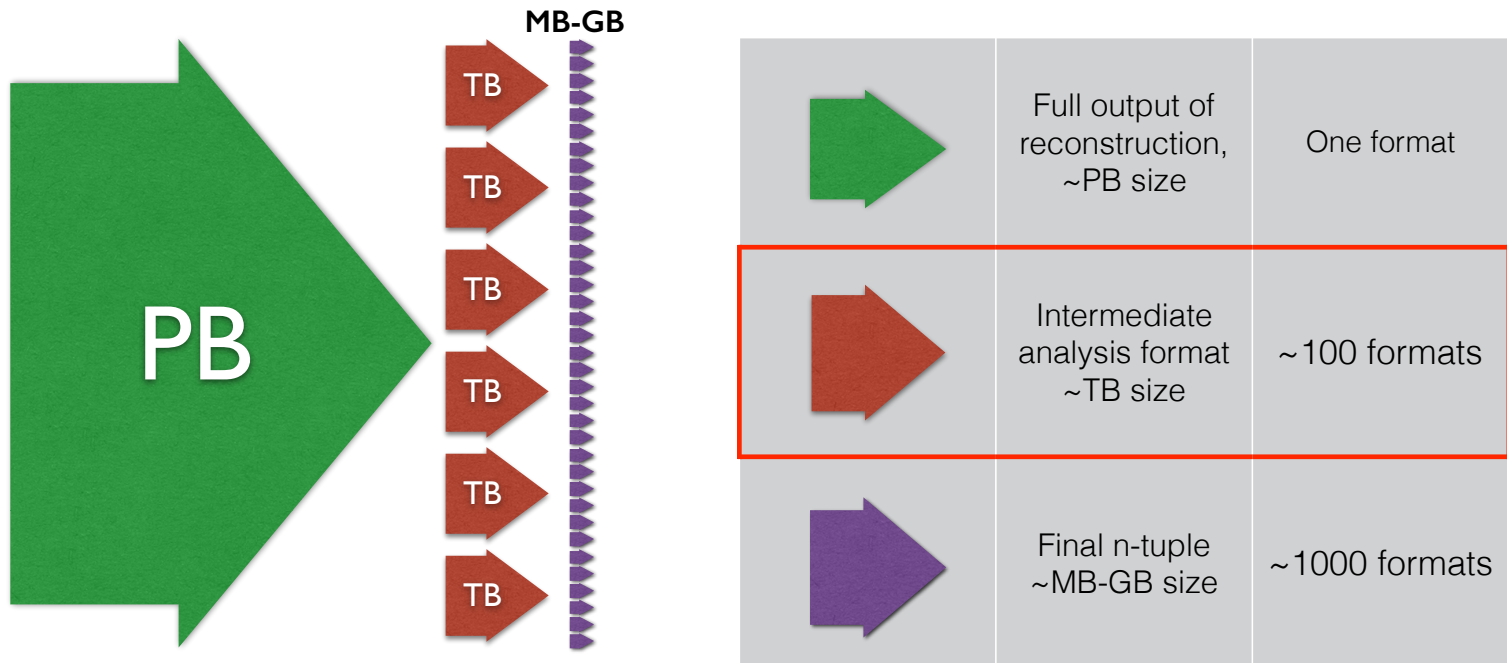
Candidate data
to be removed
from catalog

Derivation framework

- ▶ New analysis model for Run 2: group data format **DxAOD** made using a train model
- ▶ Production of 84 **DxAOD** species by 19 trains on the grid
 - 24h after data reconstruction at Tier-0
 - Working!
 - Vital for quick turn around and robustness of analyses

13 TeV conference notes available :

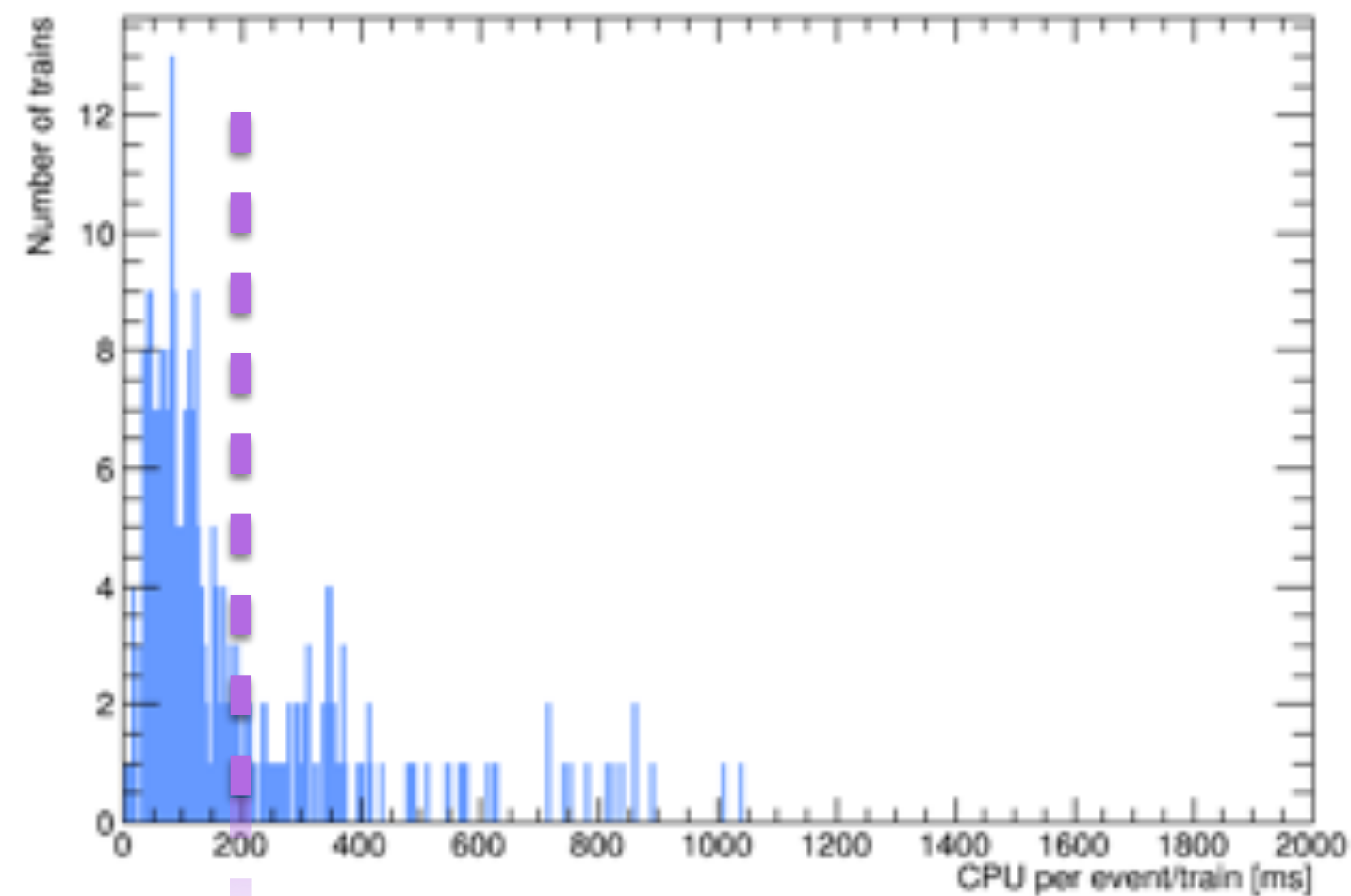
<https://twiki.cern.ch/twiki/bin/view/AtlasPublic/Summer2015-13TeV>



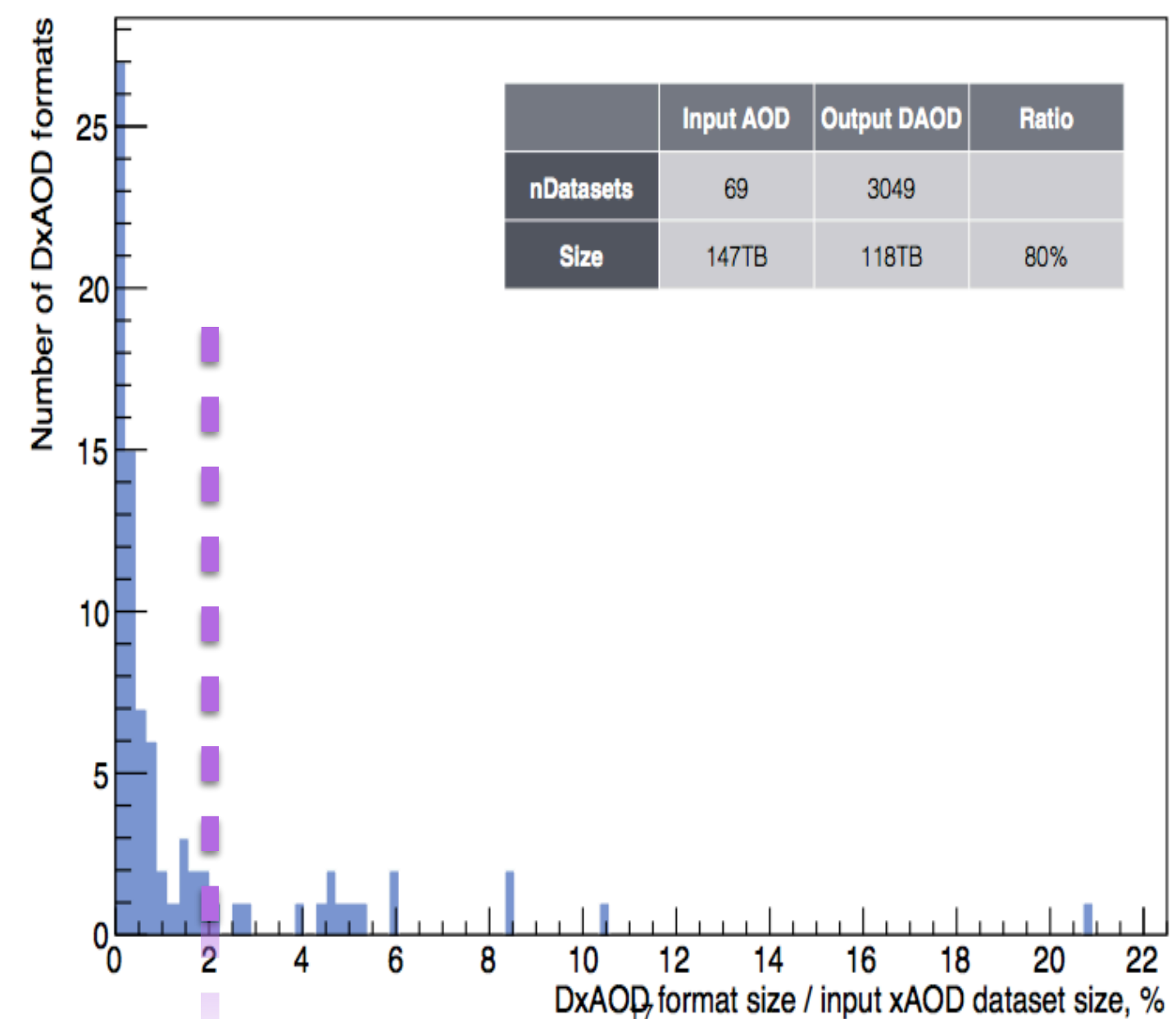
Train #	Data stream	Carriages
1	physics	EGAM1,EGAM2,EGAM3,EGAM4
2	physics	EXOT0,EXOT1,EXOT5,EXOT6,EXOT7
3	physics	EXOT2
4	physics	EXOT3,JETM1,JETM8,JETM9
5	physics	EXOT4,EXOT7,EXOT11,EXOT12
6	physics	EXOT16
7	physics	FTAG1,FTAG2,FTAG3,FTAG4
8	physics	HIGG1D1,HIGG1D2,HIGG2D1,HIGG2D2
9	physics	HIGG2D4,HIGG5D1,HIGG5D2,HIGG5D3
10	physics	HIGG4D1,HIGG4D2,HIGG4D3,HIGG4D4
11	physics	JETM2,JETM3,JETM4,JETM6,JETM7
12	ZeroBias	JETM5
13	physics	MUON0,MUON1,MUON2,MUON3,MUON4
14	physics	STDM2,STDM3,STDM4,STDM5
15	physics	SUSY1,SUSY4,SUSY5,SUSY9,SUSY10
16	physics	SUSY2,SUSY3,SUSY6,SUSY7,SUSY8
17	physics	TAUP1,TAUP3
18	physics	TCAL1
19	physics	TOPQ1, TOPQ2, TOPQ3, TOPQ4

Derivation framework benchmarks

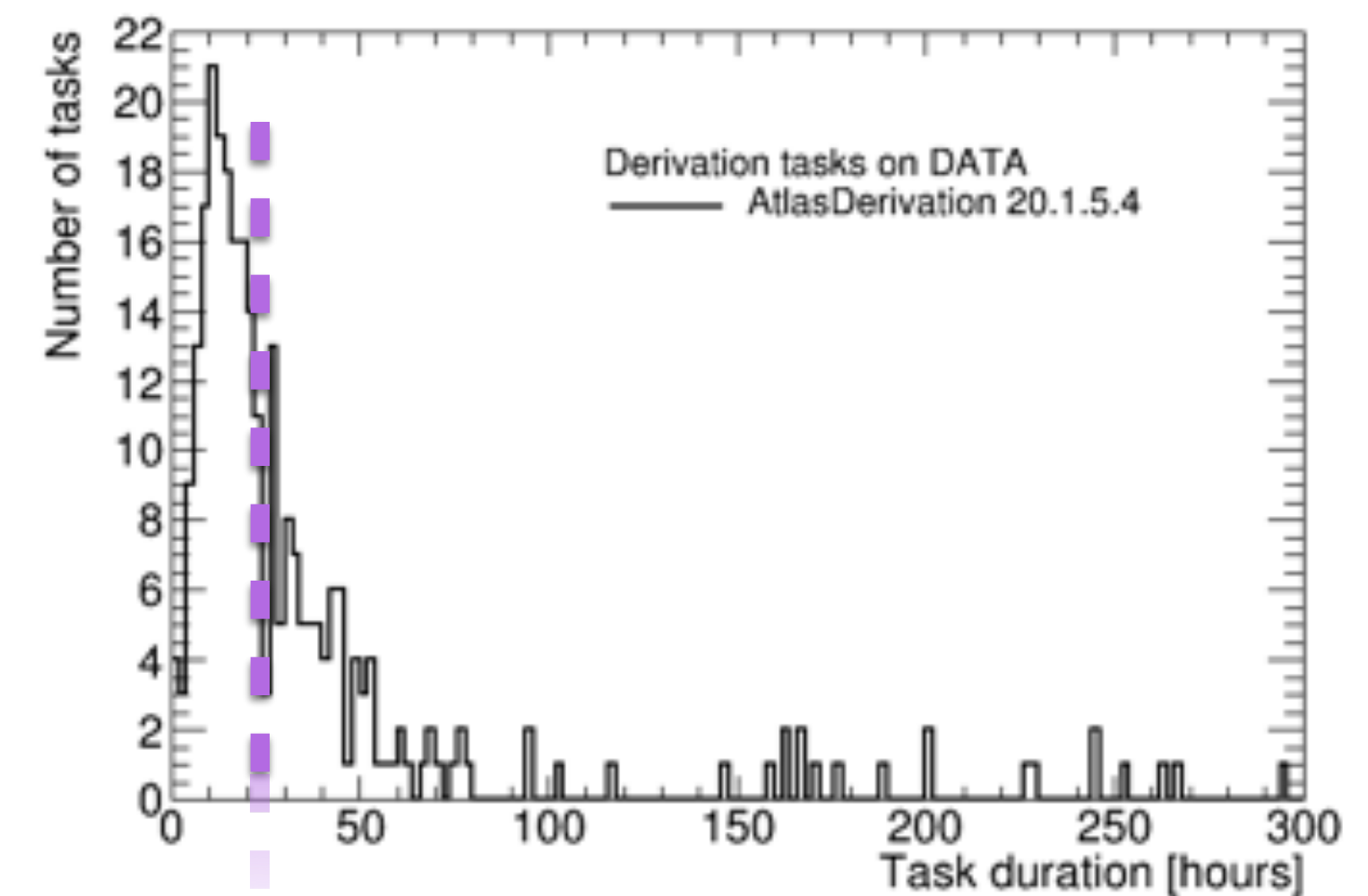
New component of computing model in Run 2



<CPU> consumption
within allocation



<Size> within budget



Available within 24h after
submission

2017 resources requests

Update 2017 LHC parameters

- ▶ Updated 2017 LHC parameters common to the 4 LHC experiments
- ▶ With prescribed $\langle\mu\rangle$ values, but likely values will be larger in future

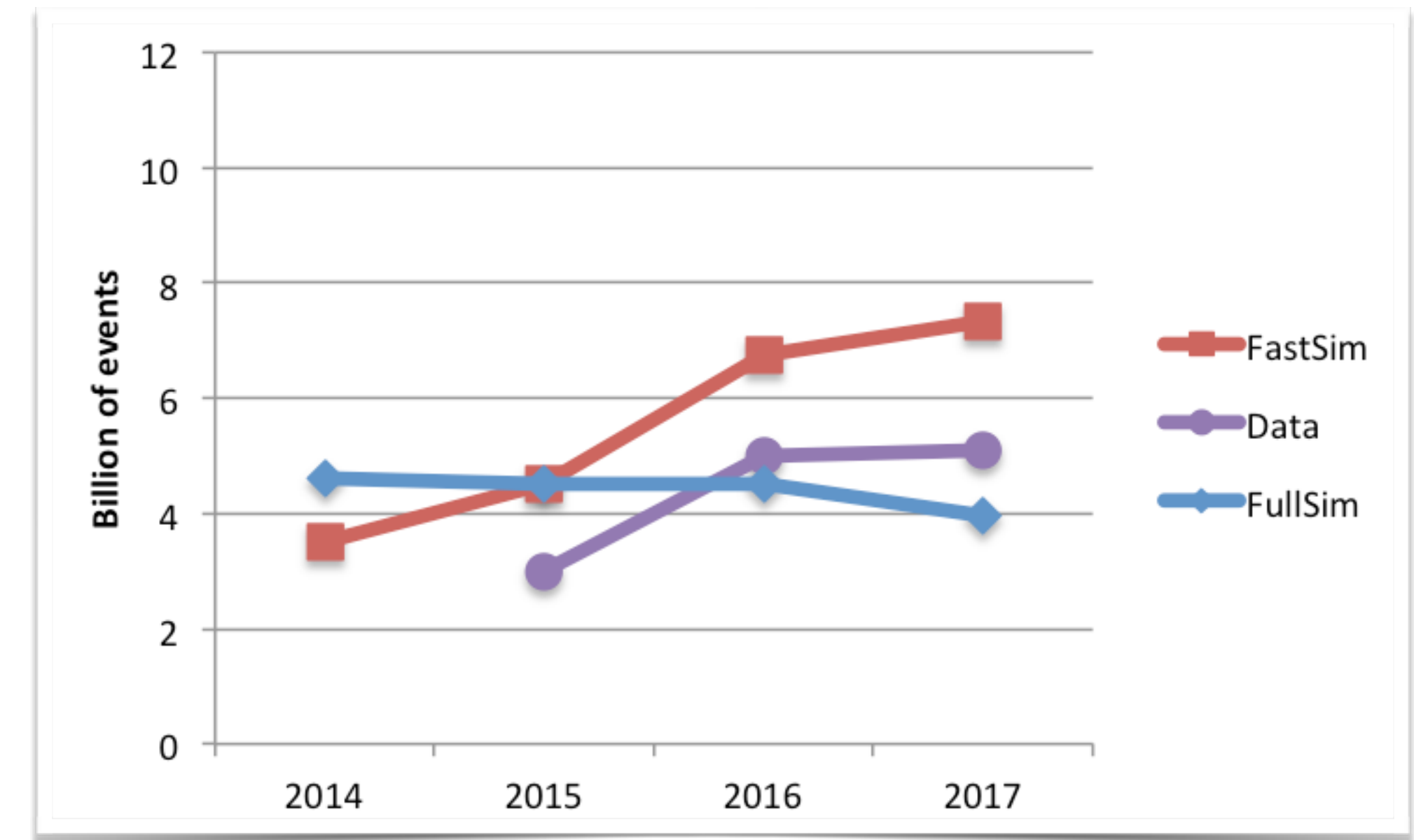
LHC (pp) data taking parameters

		2015	2016	2017
$\langle\mu\rangle$		25	30	35
Rate	[Hz]	1000	1000	1000
Time	[MSeconds]	3.0	5.0	5.1
Real data	B Events	3.0	5.0	5.1

Input parameters to model

ATLAS simulation statistics - pp collisions

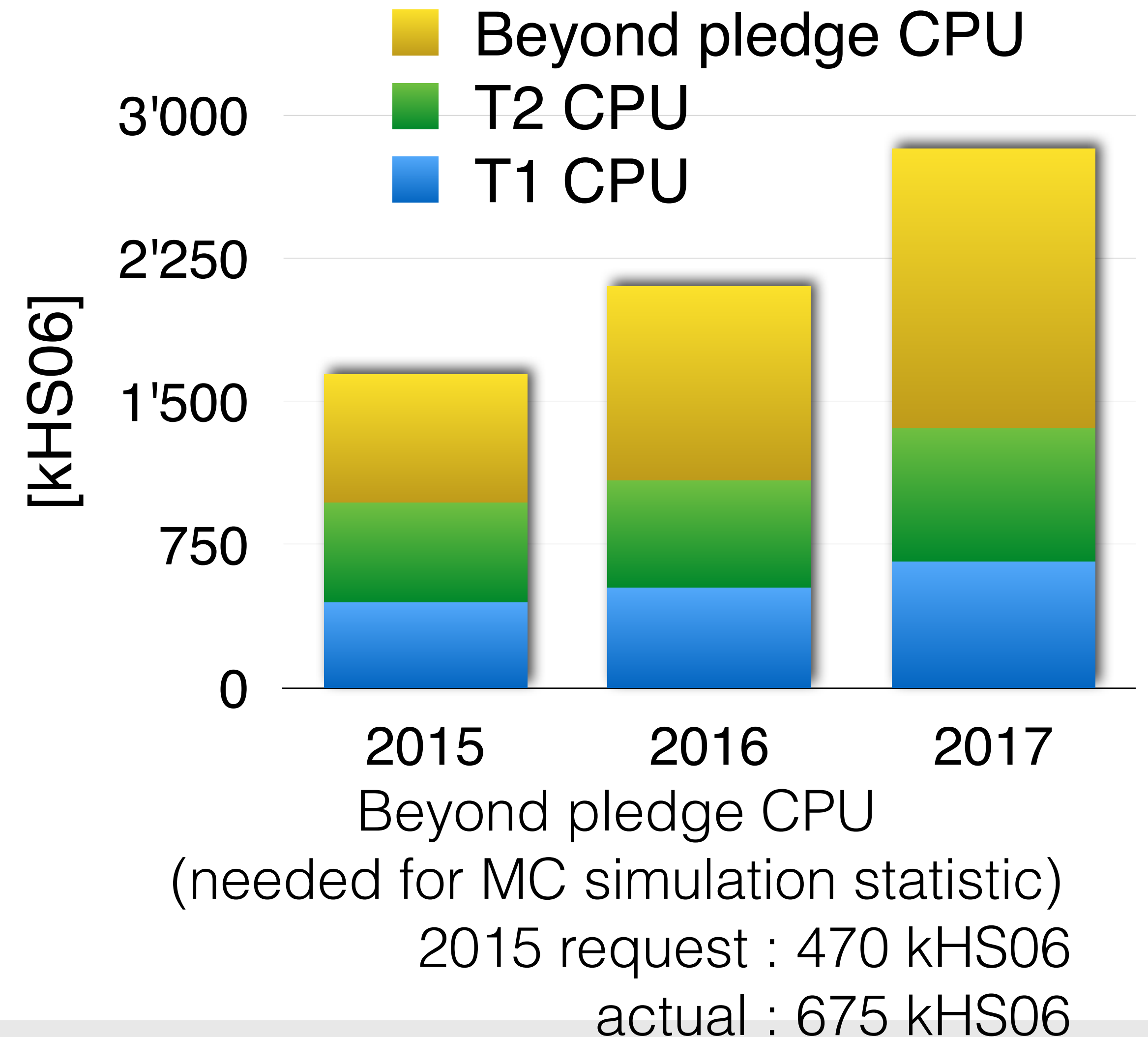
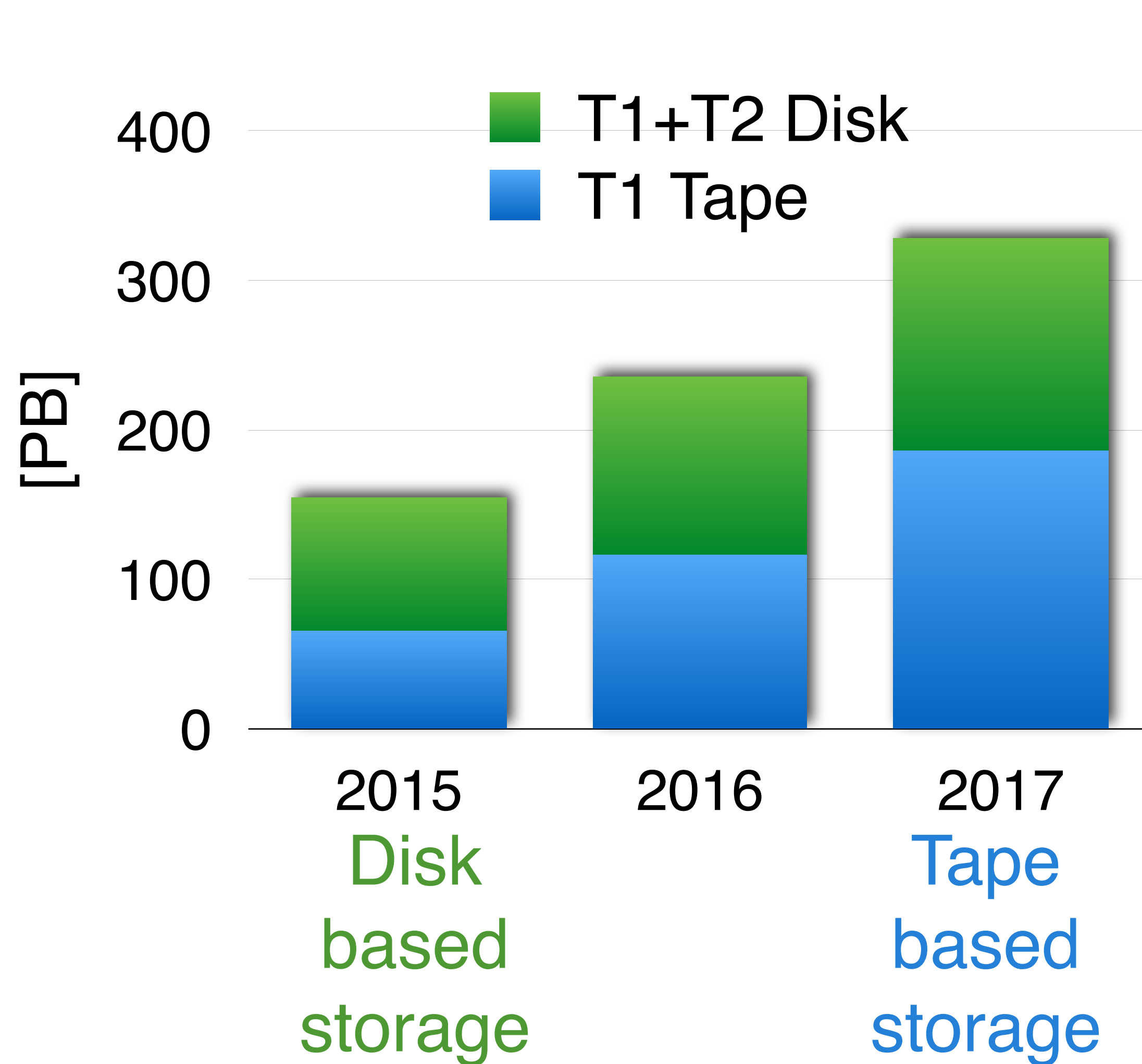
		2015	2016	2017
Full Simulation	B Events	4.5	4.5	4.0
Fast Simulation	B Events	4.5	6.8	7.4
	% FullSim	50%	40%	35%
	MC/Data	3.0	2.3	2.2



Computing needs for upgrade studies not included in model
TDRs need MC samples to be produced in 2016 and 2017
2017 request will be reevaluated for March 2016 RRB

Heavy Ions : 10% pp resources

Storage and CPU evolution



ATLAS upgrades

- ▶ Computing needs for upgrade studies not included in model
- ▶ Today upgrade studies ~5% of resources (Upgrade Phase-2 scoping document)
- ▶ TDRs require MC samples to be produced in 2016 and 2017, some uncertainties about :
 - Exact statistics, type of simulation (fastsim vs fullsim),...
 - Software performances
- ▶ 2017 requests will be reevaluated for March 2016 RRB to include needs for upgrade studies

Software upgrade

- ▶ Demonstrators and code preparation of new framework are well underway
 - Prototype by end 2017
- ▶ Regular core software development meetings
- ▶ Gaudi collaboration has been re-established (LHCb, PH-SFT and FCC)
- ▶ Workshop in November (LBNL)

Summary

- ▶ 2015 data have been processed, distributed and analysed without major issue
- ▶ New analysis model is working
- ▶ 2017 resource requests have been reevaluated in light of updated LHC running parameters
- ▶ Software upgrade for Run 3 and beyond is on track
- ▶ Sizeable computing resources will be needed for TDRs for ATLAS upgrades