LHCb Computing Report
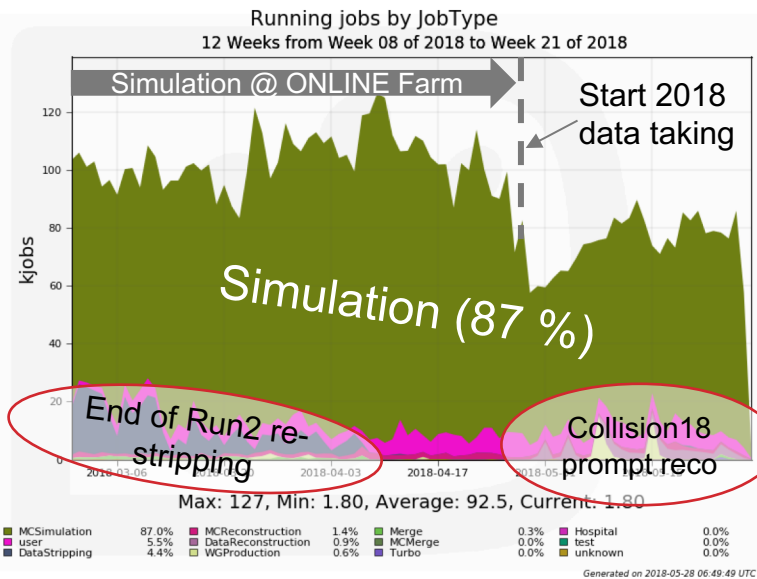
Stefan Roiser

LHCC/WLCG Referees

29 May 2018

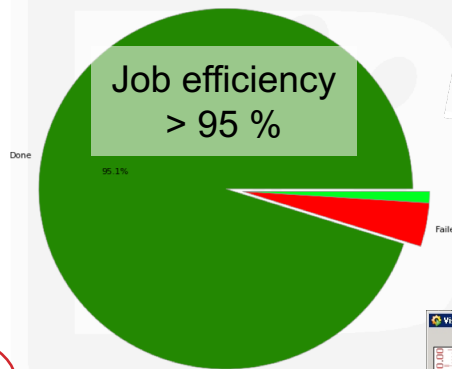# Operations

Running jobs by JobType
12 Weeks from Week 08 of 2018 to Week 21 of 2018

Simulation @ ONLINE Farm

Start 2018 data taking

Simulation (87 %)

End of Run2 re-stripping

Collision18 prompt reco

Max: 127, Min: 1.80, Average: 92.5, Current: 1.80

|							
■ MCSimulation	87.0%	■ MCReconstruction	1.4%	■ Merge	0.3%	■ Hospital	0.0%
■ user	5.5%	■ DataReconstruction	0.9%	■ MCMerge	0.0%	■ test	0.0%
■ DataStripping	4.4%	■ WGProduction	0.6%	■ Turbo	0.0%	■ unknown	0.0%

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- Usage dominated by Simulation
- Run 2 restriping finished
- Collision18 reconstruction running
  - Start of remaining workflows imminent

CPU days used by FinalMajorStatus
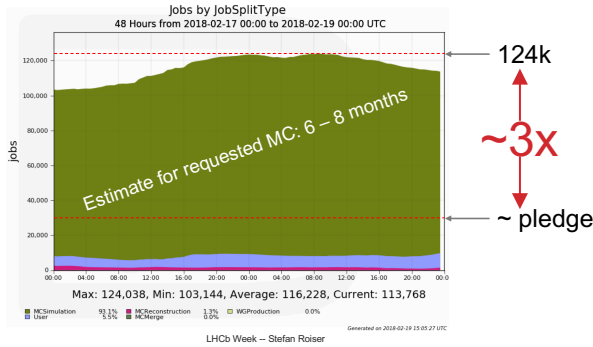12 Weeks from Week 08 of 2018 to Week 21 of 2018

Job efficiency > 95 %

95.1%

Done

Failed

■ Done   7740649.5
■ Failed   318874.2
■ Completed   82385.9
■ Rescheduled   72.3

Job CPU efficiency by JobType
12 Weeks from Week 08 of 2018 to Week 21 of 2018

CPU/Wall time ~ 99 %
(for 99 % workflow time use)

- Usage of Online farm during YETS for Simulation
  - Short period of parallel usage with Trigger during ramp

Online farm usage

Trigger

Simulation
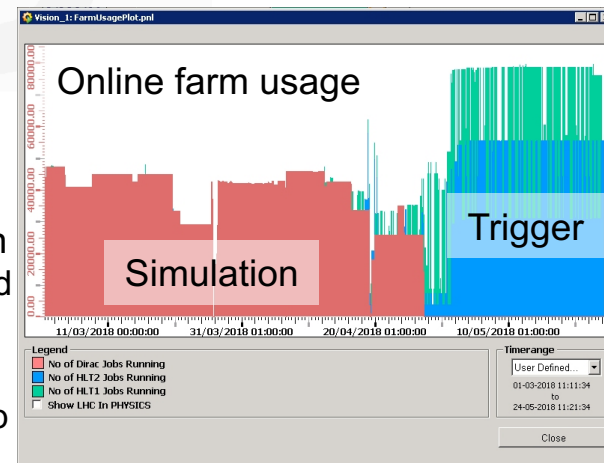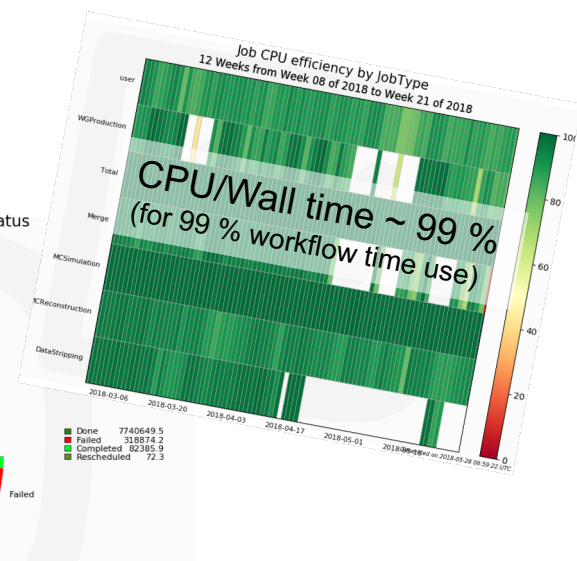
Monte Carlo Production Status

All Events in Queue by Simulation Type

New Peak Number of Running Jobs Reached

~3x

Also working on increase of distributed computing resources (HPC, BOINC, …

Evolution of the MC Queue Length

- Length of queue to produce MC stays problematic
 - Current estimate to empty the queue at ~ 6 months
- Monitoring of MC requests put in place. Aiming to push for more usage of recently introduced fast monte carlo simulation types

Run 3 Software & Computing TDR

- Preview of the document has been given to referees in April
- Final version of document uploaded to CDS
  - https://cds.cern.ch/record/2310827
- Describes engineering choices taken for application software engineering and distributed computing
- Asking for approval by LHCC in Q3/2018 together with the computing model document
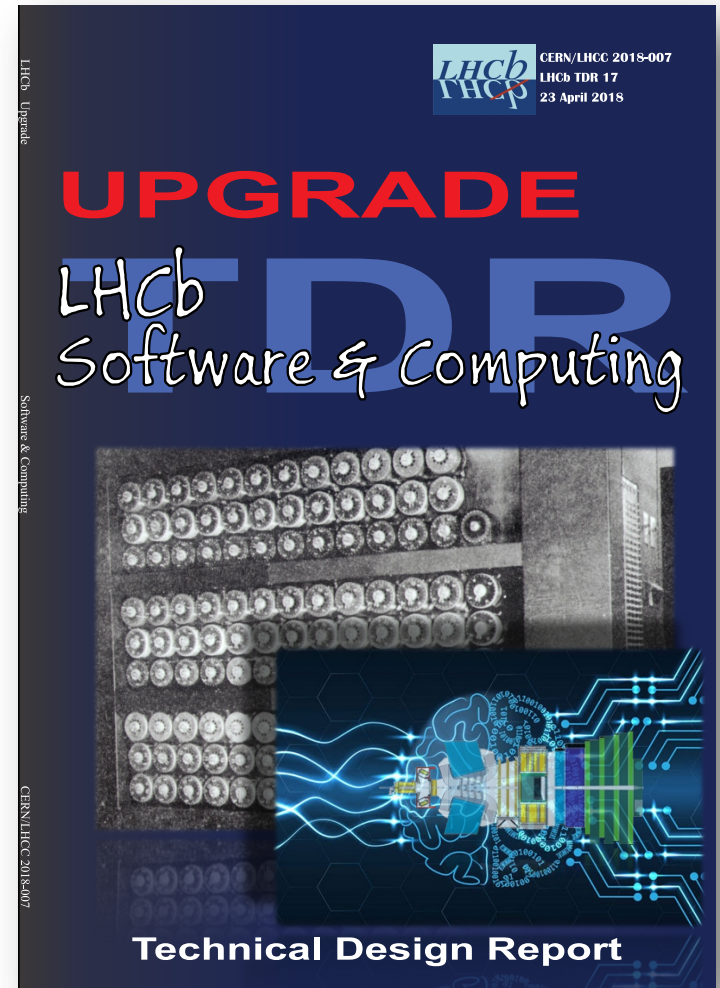
Run 3 Computing Model

- First numbers for distributed computing resource requests available
- 10 GB/s output trigger bandwidth allows full exploitation of the upgrade physics program
- Resource optimizations taken into account
  - Reduction of Run 1 & Run 2 data and monte carlo to 1 disk replica at most
  - All Turbo data reduces needs to almost no offline data processing
  - Monte carlo microDST used for vast majority of data
  - Exploiting full potential of fast monte carlo with several production types
- In addition working on different additional resource optimization measures

Run 3 Computing Model

	CPU			Disk			Tape		
	kHS06	FCB	AYG	PB	FCB	AYG	PB	FCB	AYG
Baseline scenario by end of Run3 (2023)	2.931	2.7	2.0	356	3.5	1.6	398	2.2	1.4
Baseline scenario by end of LS3 (2025)	3.823	2.4	1.7	375	2.6	1.2	408	1.6	1.2

- Baseline scenario numbers with 10GB/s HLT output rate, ~ 5 Mio s LHC collisions / year, ~ 2 disk replicas
  - 2nd and 3rd columns are factor of "constant budget" (FCB) and average yearly growth (AYG)
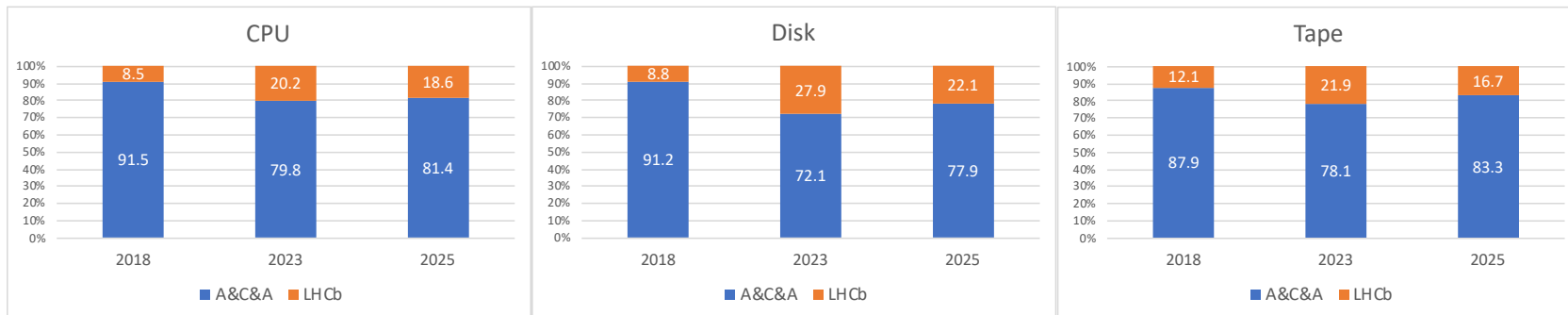
- Fraction of LHCb resources on WLCG move from 10 % in 2018 → peak of 28 % for Disk in 2021 → ~ 16 to 22 % by end of LS 3

Summary

- Continued very good usage of distributed computing resources
  - CPU/Wall time efficiency close to maximum, > 95 % job success rate

- Length of queue for production of monte carlo samples worrying
  - Monitoring of queue length and requests put in place
  - Aiming at higher usage of recently introduced fast monte carlo and expanding distributed computing resources further above pledge level

- Run 3 upgrade activities continuing on schedule
  - Software and Computing TDR describing the engineering has been submitted to the LHCC
  - First numbers for upgrade distributed computing resource needs available

Backup

Run 3 Computing Model Details