LHCb Status

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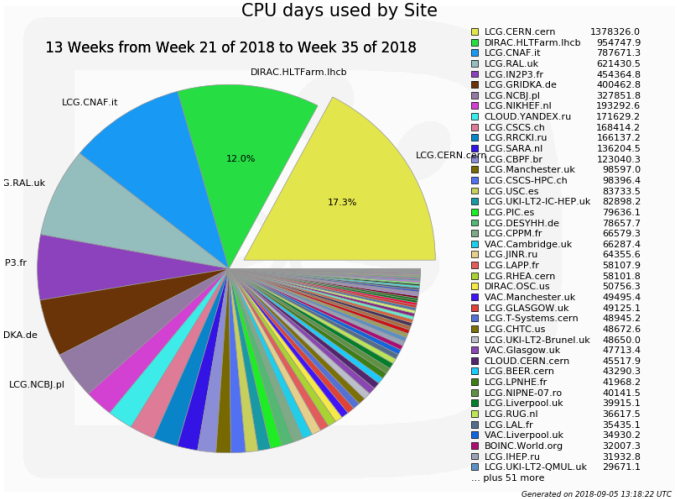
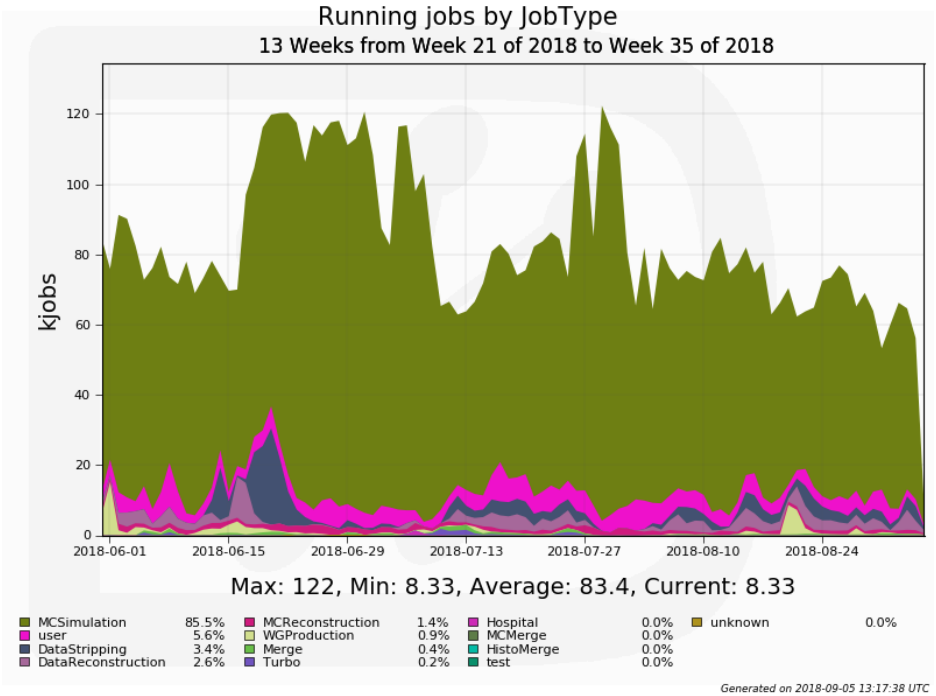
LHCC / WLCG Referees Meeting

11 Sept 2018

Operations

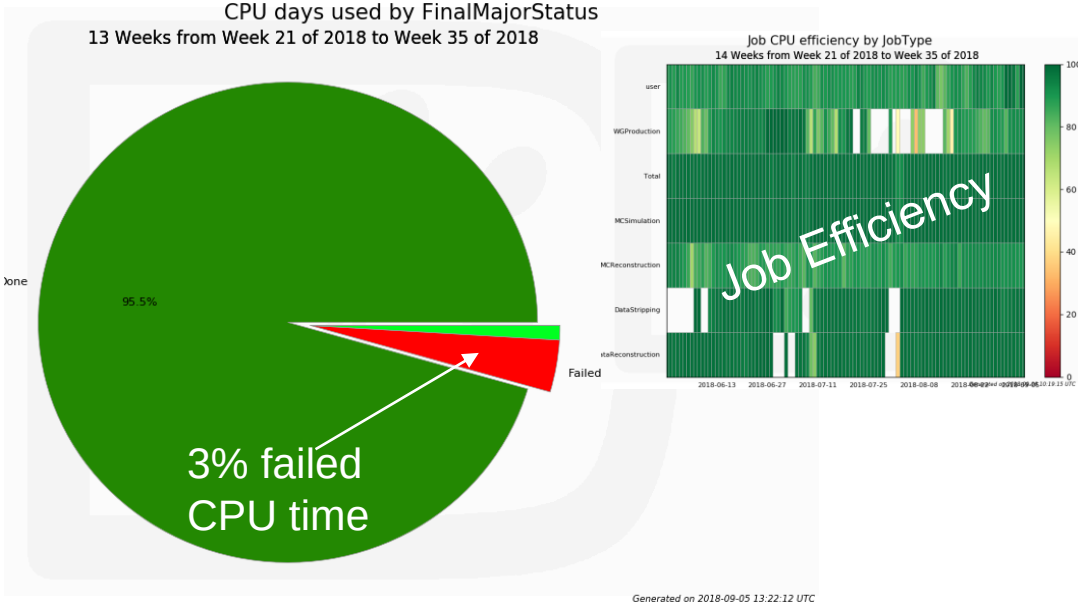




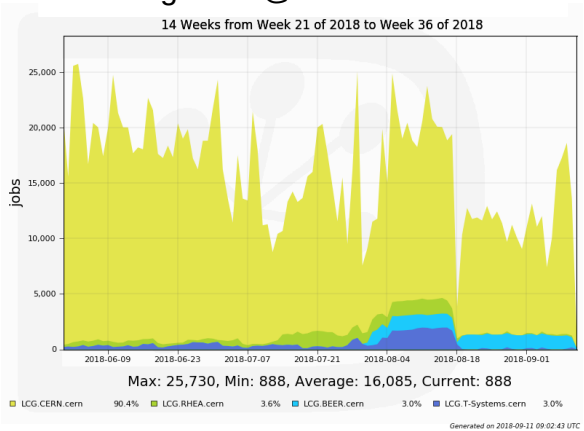
- CPU usage continues well above pledge levels
  - Usage continues being dominated by Monte Carlo production
  - 2nd highest consumer now user analysis jobs
  - Online farm second biggest CPU contributor, used in parallel & TS & MD

Operations (ctd)

- Job success rate (97 %) and CPU efficiency continue at high levels



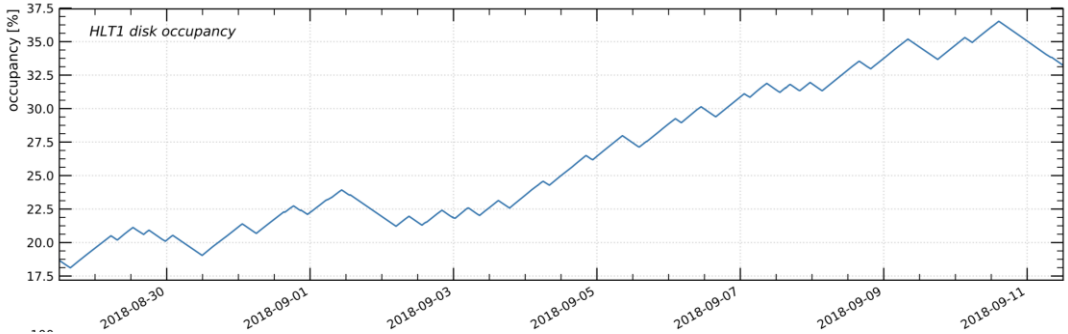
Running Jobs @ CERN resources



- Using additional CERN resources on cloud and CPU on disk servers

End of Run 2 pp & HI run & LS 2

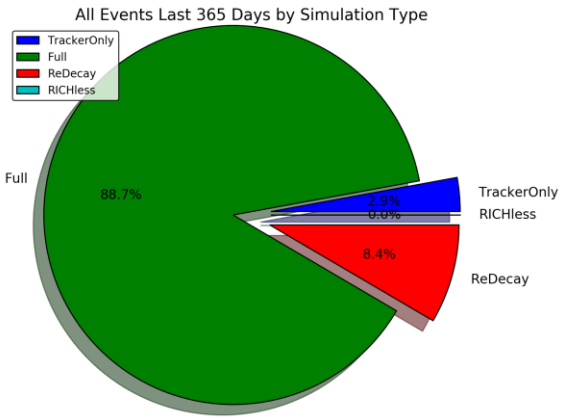
- During MD and TS, HLT continues to process buffered data

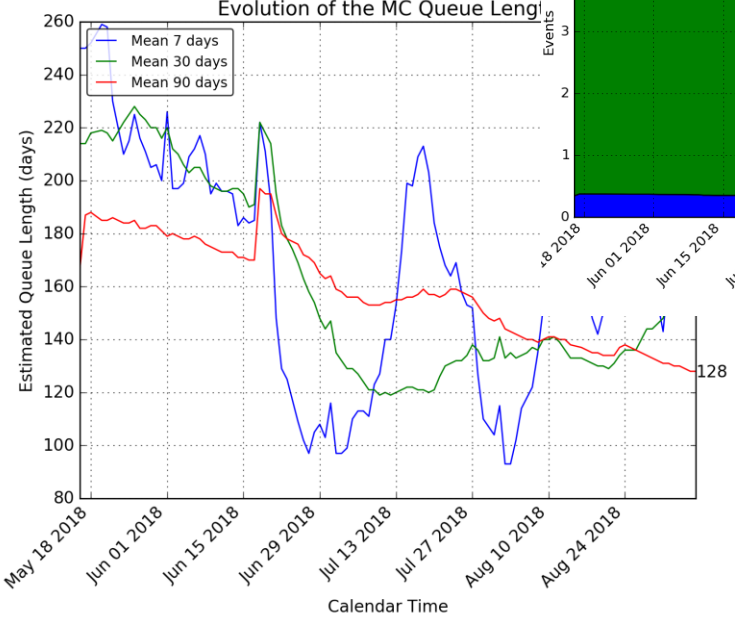


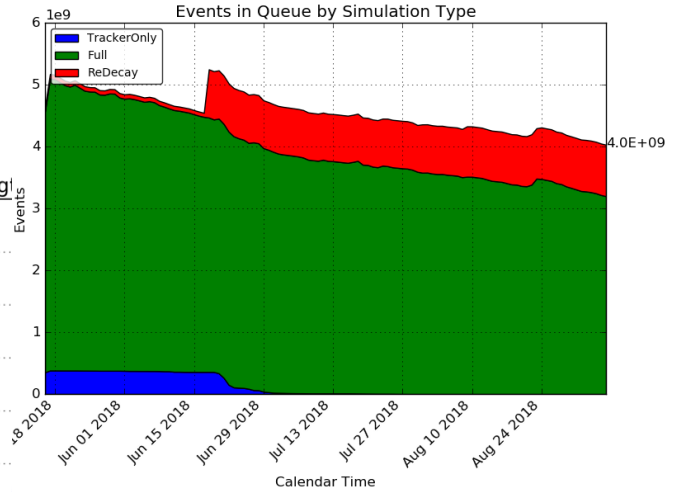
- LHCb participating in HI run and to common infrastructure testing

- Run 2 legacy re-stripping campaign foreseen for 2019

Simulation Queue



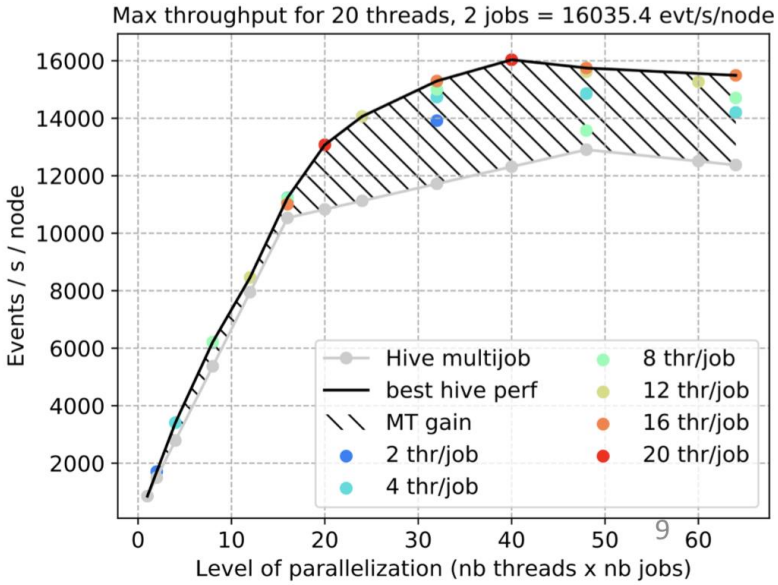




- Queue of events to simulate is going down
  - Expect new wave of requests with next simulation version releases

Upgrade Software

- New scheduler of algorithms for core framework integrated
  - Enables easier benchmarking with trigger sequences
- Constant evolution of trigger (HLT1) event throughput
  - Latest measurements at 16k events / s / node
  - Achieved via continuous improvement of algorithm logic and code optimisations
  - Work ongoing …



Run 3 Computing Resources – Baseline Scenario

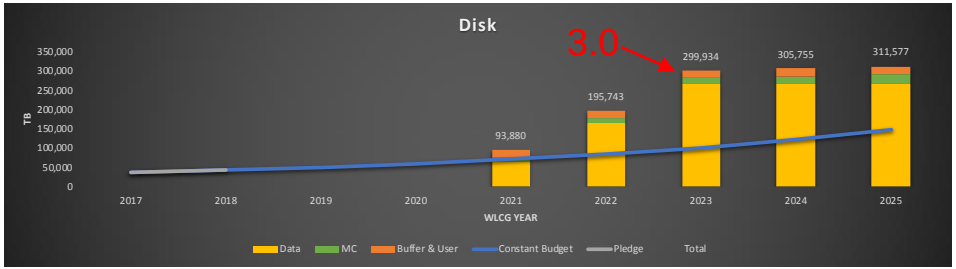
- Baseline model updated
  - Assuming a “2021 commissioning year”
  - 10 GB/s HLT output bandwidth, all analysis data on disk
- Storage, especially disk, keeps on being a tight resource

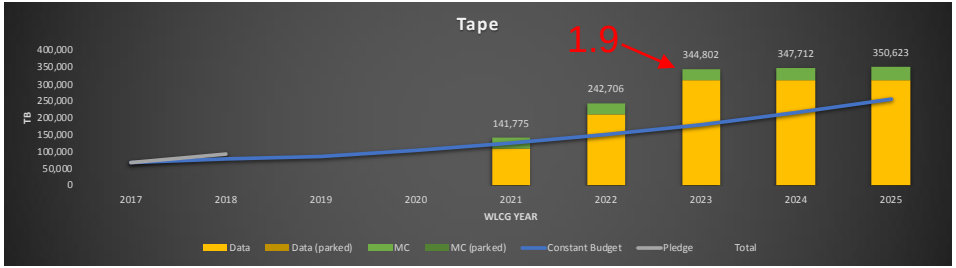
	CPU			Disk			Tape		
	kHS06	FCB	AYG	PB	FCB	AYG	PB	FCB	AYG
Baseline scenario by end of Run3 (2023)	2.797	2.5	2.0	300	3.0	1.8	345	1.9	1.6
Baseline scenario by end of LS3 (2025)	3.676	2.3	1.3	312	2.1	1.4	351	1.4	1.3

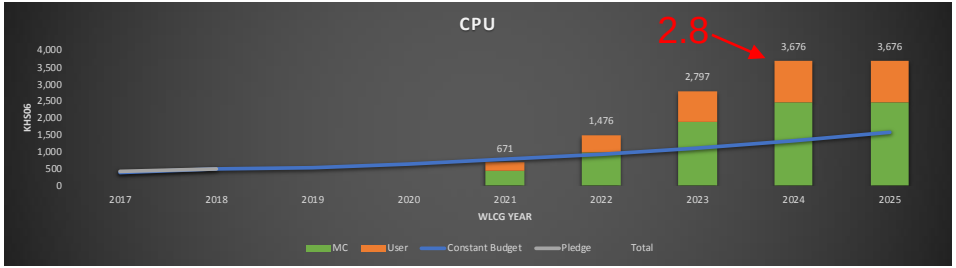
- 2nd and 3rd columns are factor of “constant budget” (FCB) and average yearly growth (AYG)

Baseline Scenario (ctd)

- 10 GB/s HLT output bandwidth
  - including ~ 2 disk replicas
- Storage usage driven by detector data
  - Most of MC data will move to m(icro)DST format
  - Further disk optimizations possible
- CPU dominated by MC Simulation work
  - Shared between full / fast and parametric simulation



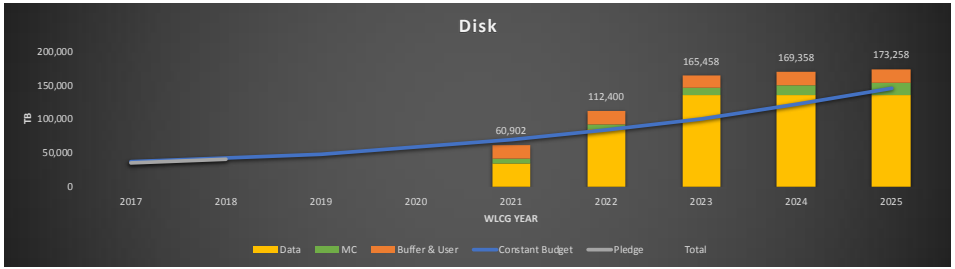


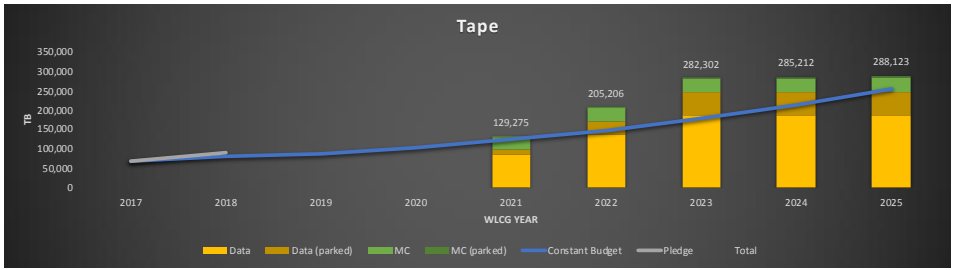


Run 3 Computing Resources – Alternatives

For example:

- Reduction in disk requirements of 33 %
- Reduced HLT output bandwidth of 7.5 GB/s
- Compared to “constant budget” for disk & tape
  - Reach max factor of 1.6
  - End of LS3 → 20 and 10 % above





Detailed presentation in LHCb/LHCC session

Summary

- Run 2 Operations continues smoothly at high usage and efficiency
- Data re-stripping campaigns foreseen for LS 2
- Run 3 software engineering, performance continues to improve
- Run 3 computing model being finalized and TDR document to be submitted soon