

# LHCb Computing Report

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LHCC Referees Meeting

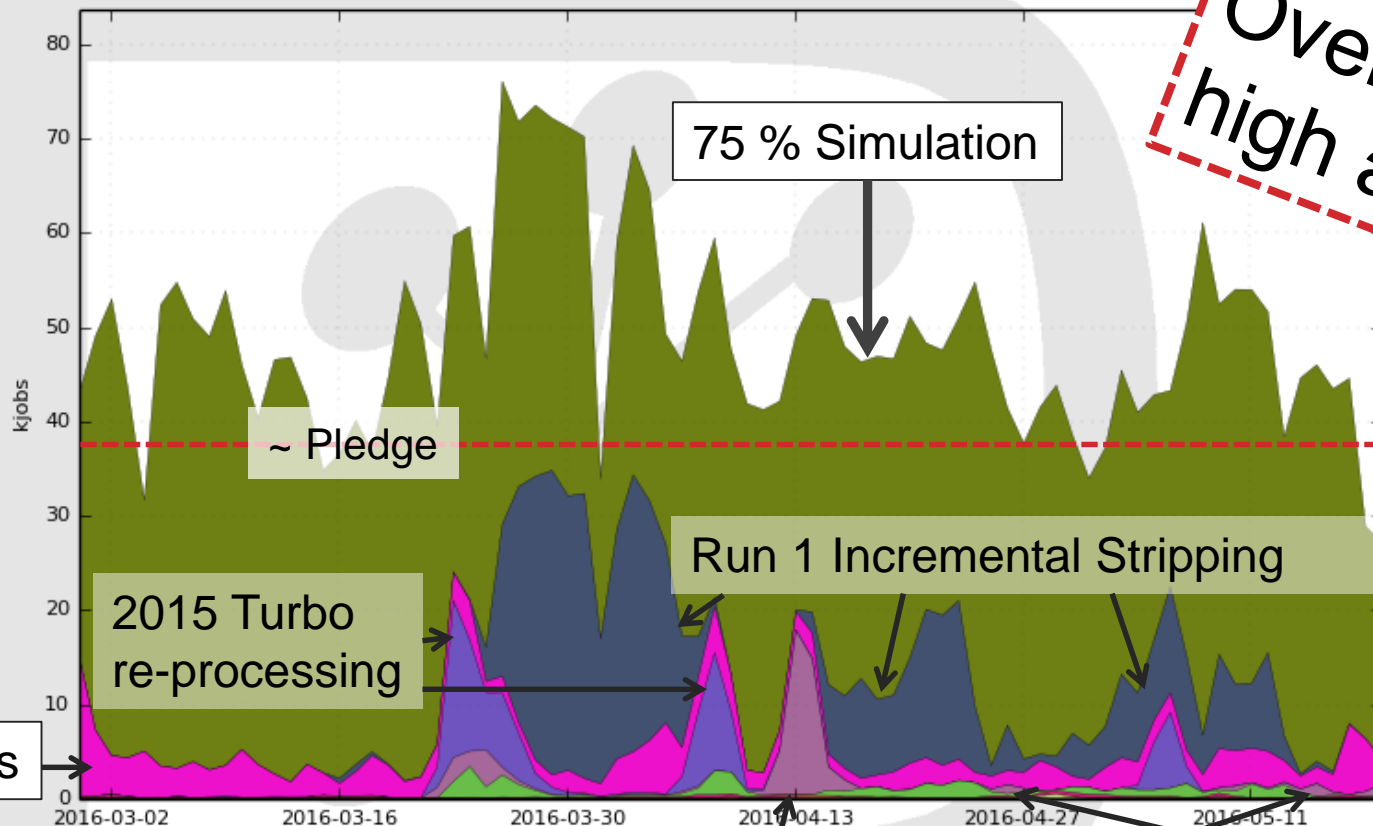
24 May 2016



# Main Computing Activities by Type

Running jobs by JobType

11 Weeks from Week 09 of 2016 to Week 20 of 2016



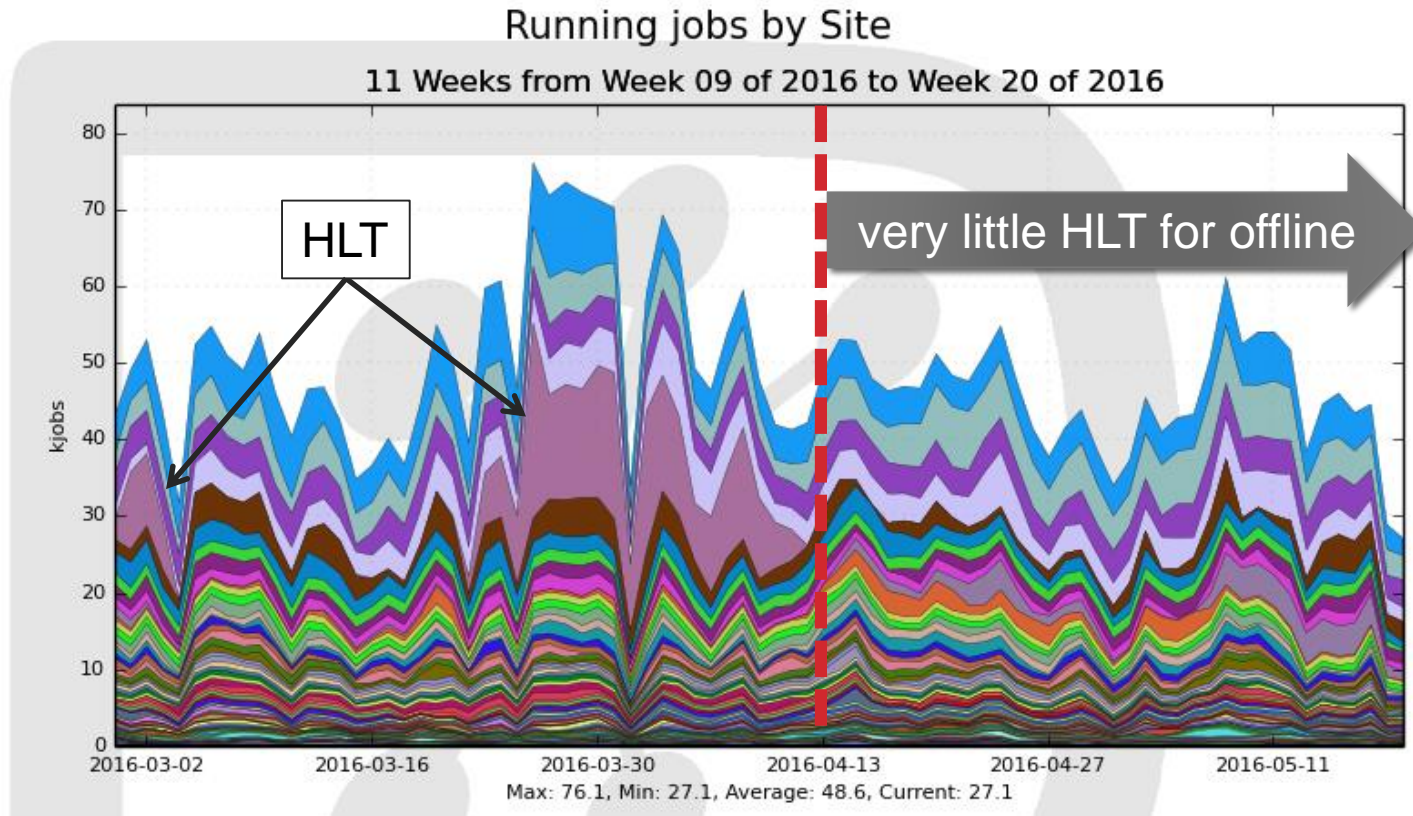
Overall, very high activity

User jobs

MCSimulation	75.1%	2015 Lead reconstruction	1.1%	WGPProduction	0.0%
DataStripping	13.2%				
user	6.0%				
Merge					
test	0.0%				

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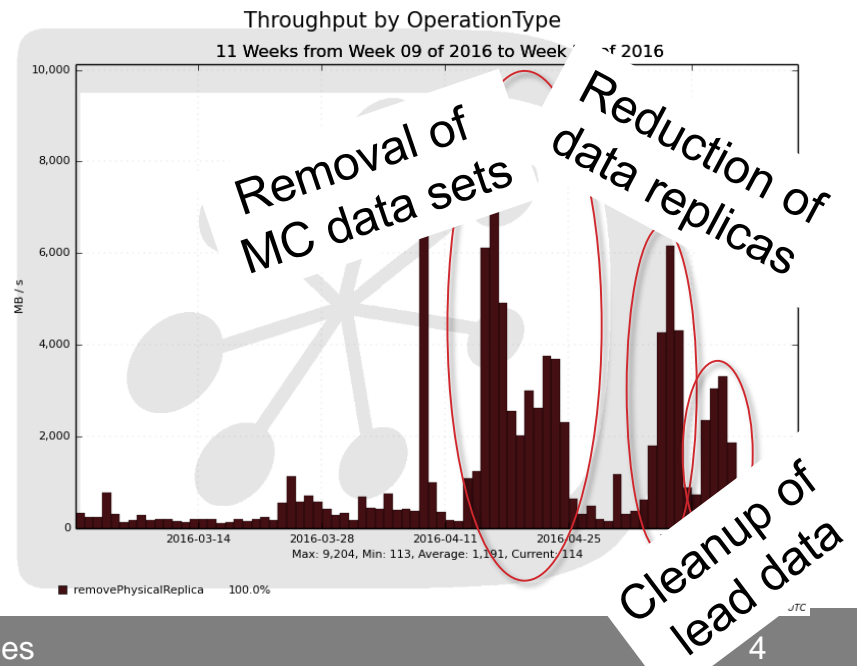
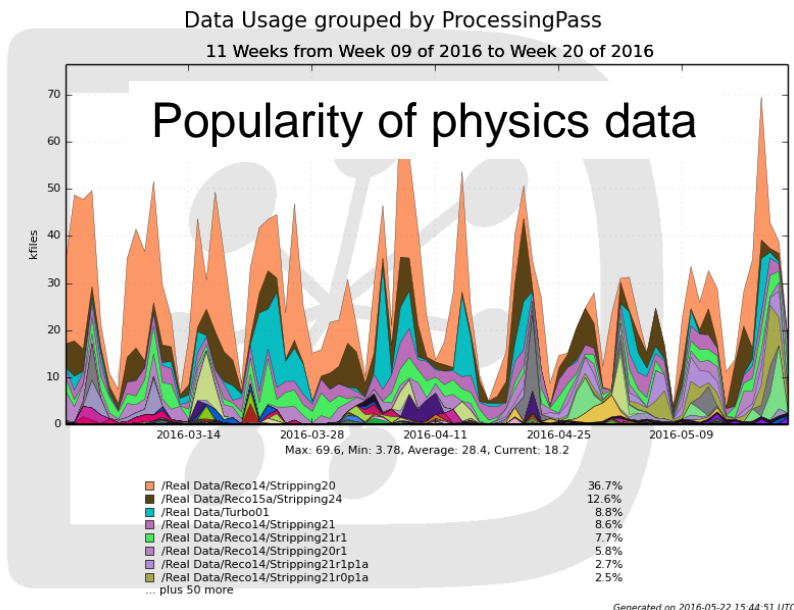
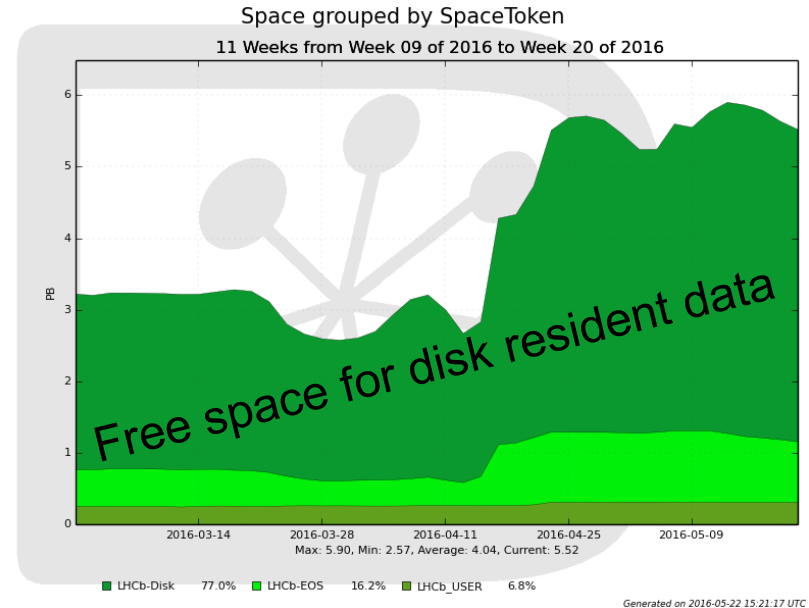
# Main Computing Activities by Sites



- HLT farm contributed until mid April to distributed computing
  - Up to 20 % of CPU power provided
- Only little contribution from HLT for offline processing until end of year stop
  - Because of deferred triggering HLT busy during interfill-gaps and into technical stops

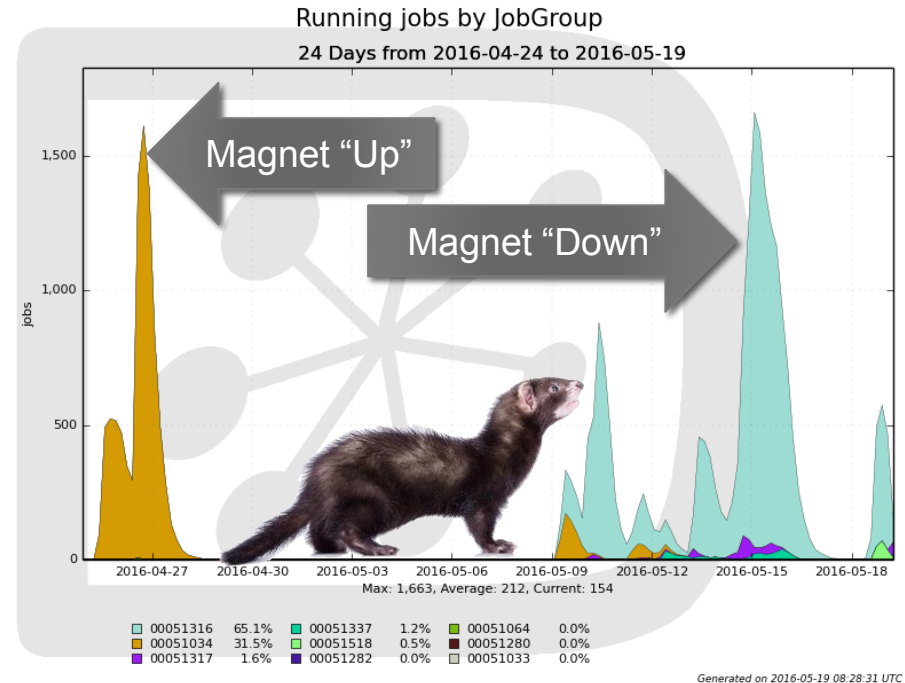
# Data Management

- 2016 pledges coming in
  - Visible in jump in free disk space
- Disk optimization done in “manual mode” by experts
  - Steered by data popularity
  - ... and bookkeeping of datasets



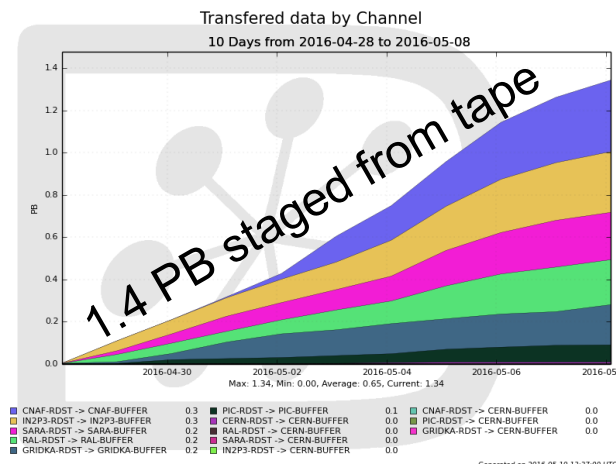
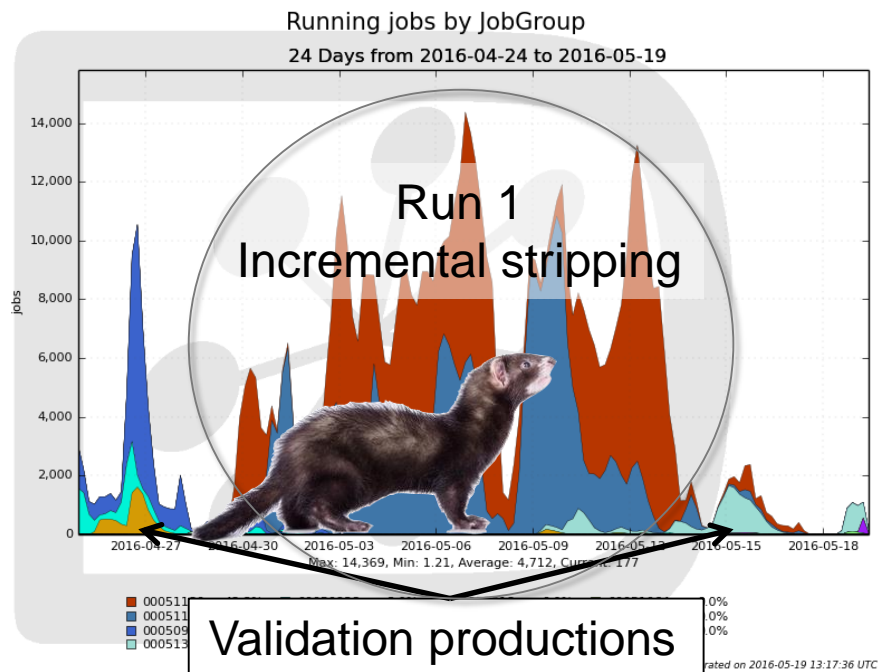
# 2016 data taking validation

- Plan: during LHC ramp up period take data to
  - Validate the online and offline workflows
  - Test new features, e.g. provide reco info with the Turbo stream
  - Accumulate enough data for a 2016 detector alignment
- With the final 2016 detector calibration
  - Move to physics production
- Last week, enough data available for detector alignment
  - Final calibrations provided, switch to data processing production imminent



# More activities on the grid

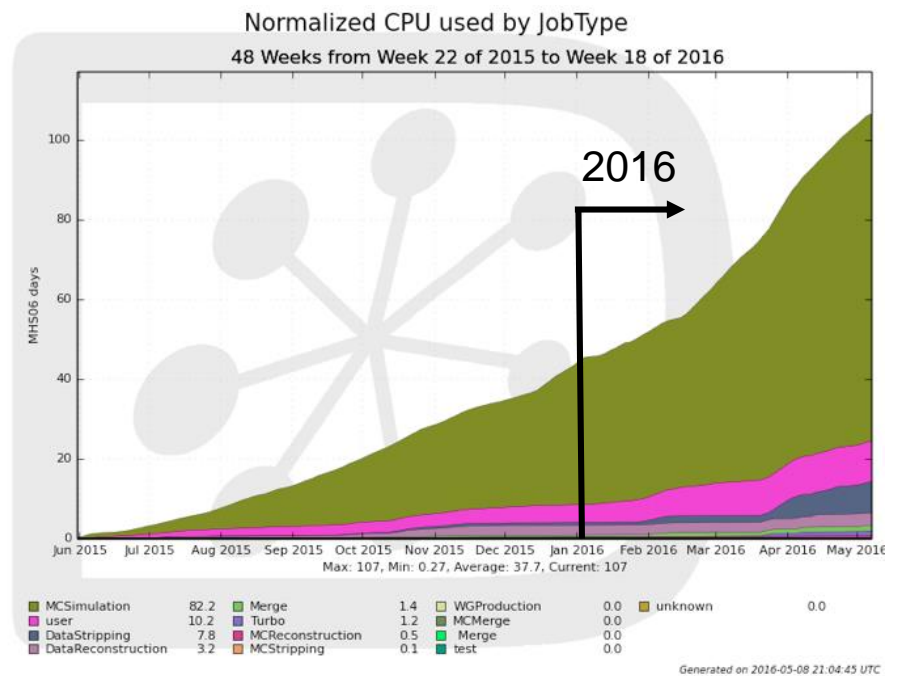
- Time of the “marten” incident used to stage in remaining 2012 data for Run 1 incremental stripping campaign
  - Used tape storages for 1.4 PB staged from tape in 10 days
  - Then data processed in parallel with the remaining validations
- Run 1 incremental stripping campaign now finished





# Simulation

- Ongoing productions for Run1 with current simulation framework “Sim08”
- New simulation productions “Sim09” to start imminently for 2015 data, early samples for 2016 and for Run1 new analysis
  - New generators and Geant4 9.6.p02
  - Carried out extensive validation campaign
  - New MC microDST format with roughly 1/10<sup>th</sup> of space footprint
- Exploring a variety of options for faster simulations for Run3
  - from fully parameterized options to code optimization



# Software & Infrastructure

- Software infrastructure currently moving to CERN/gitlab & Cmake
  - In parallel supporting “old” infrastructure on CMT & svn for transition period
  - + needed modifications for software development, runtime environment and testing infrastructure
- 2016 data taking applications built with gcc 4.8 + gcc 4.9
- New branches for all repositories created with gcc 4.9 only
  - To be used 2017 onwards
  - Allows C++14 constructs in code
  - Build infrastructure solely based on CMake



# Upgrade work towards Run 3

- “Roadmap” document presented to collaboration in March, provides
  - a work plan to be followed
  - the related effort of the different areas
  - decisions to be taken
- ... to write a TDR by Q4/17
- Also presented yesterday in “LHCC in-depth review”



LHCb-INT-2016-016  
March 31, 2016

## Upgrade Software and Computing TDR: a roadmap

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### Abstract

The LHCb experiment will be upgraded for Run 3. The detector will be readout at 40 MHz, with major implications on the software-only trigger and offline computing. This document presents a roadmap of the workplan to be followed, the related efforts, and the decisions to be taken, in order to release the Technical Design Report for Software and Computing by the end of 2017. An analysis of the consequences in case the goals will not be met is also given.

LHCb-INT-2016-016  
31/03/2016

# 2 main areas of the upgrade work

**“Revolution”**

Activity	Persons	Percentage	Required FTE	Available FTE
Framework and Scheduling	3	1	3	3
Event Model	2	0.5	1	1
Non-Event data	2	0.5	1	0.4
Hardware and Dataflow	10	0.4	4	< 4
Integration	1	0.2	0.2	0

**Task force established**

Data processing and analysis	1	1 + 9	1.4	0.05
Externals (DIRAC)	3	0.33	1	0.2
Simulation	8	0.33	3.6	2
Collaborative Work	7	0.33	1.4	0.4
Project Management	1	0.2	0.2	0.2

**“Evolution”**

**Adiabatic integration into current environment**



# 2 main areas of the upgrade work

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Task force established

- Very tight schedule for “revolutionary part”
  - Aim to provide “demonstrators” by Q1/17
  - Will guide the decisions towards the TDR and the upgrade work
- Need expert programmers. They are willing to contribute but at the same time are also busy with Run 2 operations
  - Looking for additional personpower for tasks during limited period

# Summary

- Personpower is a concern for LHCb computing upgrade
  - Experts needed for tasks occupied with Run 2 operations
- Constant high usage of distributed computing resources in reference period at or above pledges
- 2016 data validated for offline processing successfully
  - Data processing productions to start imminently
  - “Gaps” in LHC delivered data used successful for other activities
- Several changes in Run 2 software infrastructure
  - Move to gitlab, CMake, gcc 4.9
- Next major version of the Simulation framework validated
  - Further increase in simulation processing expected

# Backup

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# Executive Summary

- Very high usage of distributed computing resources during reference period
- 2016 detector aligned, data processing start imminently
- New version of the simulation framework validated
  - To be used for new Run1 analysis, 2015 and 2016 data sets
- Upgrade work towards Run 3 split into two main parts
  - “Revolution” on framework, scheduling, event model tackled with taskforce – personpower is a concern in this area
  - “Evolution” on simulation, distributed computing, computing model – can be tested already within Run 2 operations

