

LHCb handling of CNAF incident

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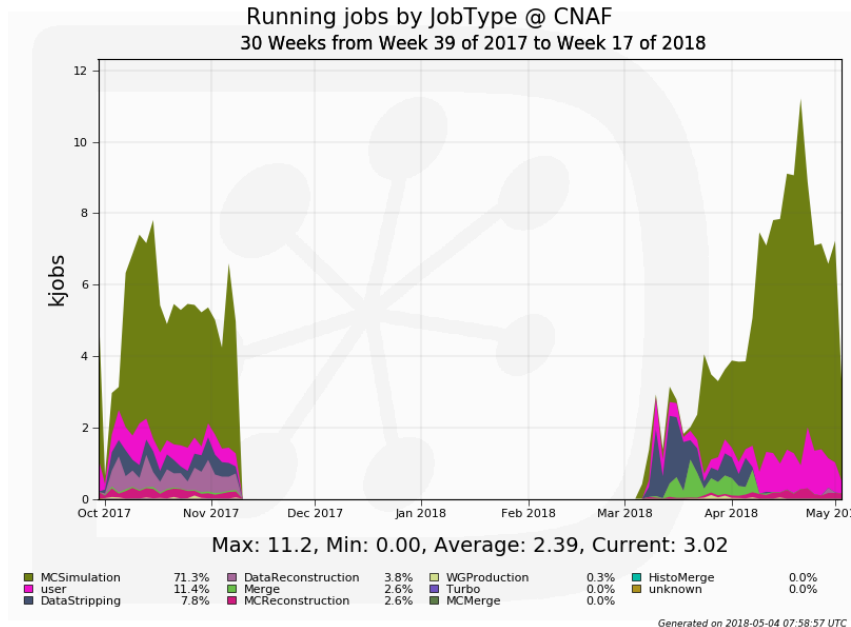
GDB

9 May '18



Overall Status

- CNAF site is the second biggest T1 resource of LHCb
- Non-redundant LHCb resources
 - Tape
 - Reconstruction output files
 - Archive data
 - Disk
 - Intermediate files of monte carlo and data processing workflows
 - Potentially user analysis output data

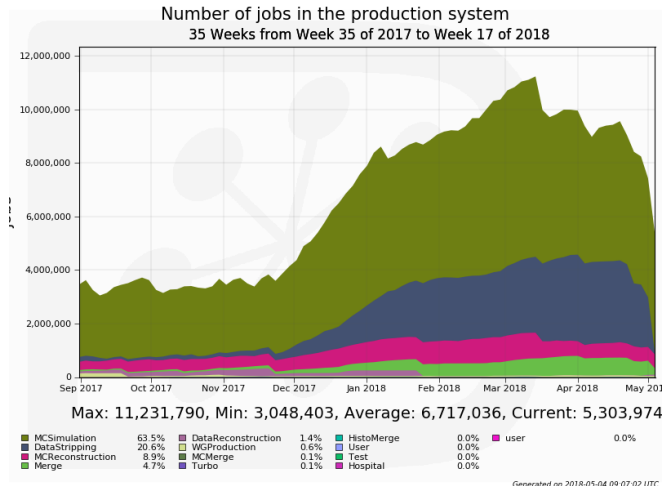
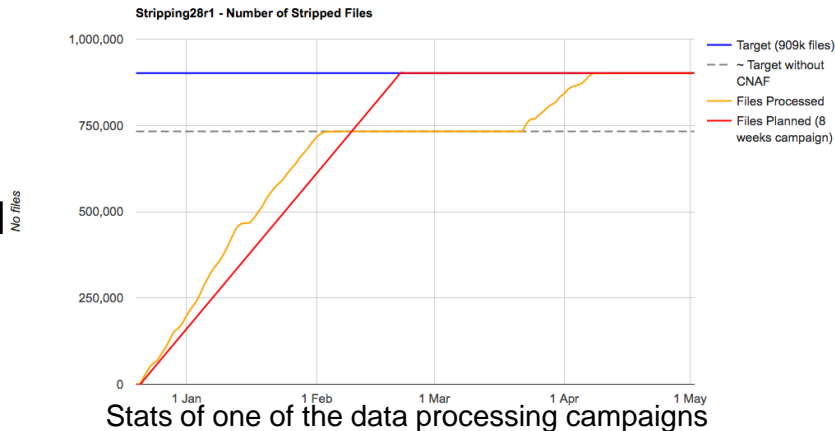


	% of T1s	% of WLCG
CPU	19 %	10 %
Disk	23 %	13 %
Tape	25 %	14 %

2018 WLCG LHCb pledges provided by CNAF

Effect on productions

- Data re-stripping of Run 2 data
 - ~ 20 % of data could not be processed until site was recovered
- Monte carlo simulation
 - Intermediate files could not be accessed
- → Many productions need to be kept open until site came back
- → Production system had to deal with multiple of jobs than usual
 - Production archiving was pending
 - Now closing of productions has started → system recovering



Job entries in the production system database

Data management handling

- Tape
 - 27 “wet” cartridges
 - 12 cartridges with archive data: all recovered
 - 10 cartridges with raw data: second replica created on other site
 - 5 cartridges with reco output data: all recovered but
 - Lost 877 files from 2012 and 47 files from 2017
- Disk
 - Vertical RAID system avoided data loss
 - Access after site became operational was slightly delayed because of (planned) migration to new disk infrastructure

Person power cost

- Difficult to calculate
 - Meetings with CNAF representatives and technical personnel to judge the impact the prepare a plan for the duration of the outage
 - Additional load on the production and data management teams to handle operations during the outage
 - Additional load on the grid operations teams and site contacts during the period of the outage

Lessons learnt

- Gathering files via “tape families” on tape cartridges saved a lot of operational effort
 - Only one “wet cartridge” affected for the re-stripping campaign
- Communication is crucial and was very well done by CNAF!!!!
 - Several meetings and personal interaction on technical levels
 - Suggestion to streamline the discussions, e.g. via a “taskforce”
- LHCb computing infrastructure mostly resilient to outage of a big site
 - Delay in data processing campaigns by 2 – 3 months due to computing model and resource constraints

Lessons learnt

- Gathering files via “tape families” on tape cartridges saved a lot of operational effort
 - Only one “wet cartridge” affected for the re-strictions
- Communication is crucial and a big help from the CNAF team by CNAF!!!!
 - Several meetings and discussions on technical levels
 - Suggestion for future discussions, e.g. via a “taskforce”
- Existing infrastructure mostly resilient to outage of a big data center
 - Delay in data processing campaigns by 2 – 3 months due to computing model and resource constraints

Congratulations to the CNAF team for the professional handling of the incident which kept the impact and data loss at the possible minimum.