

Laboratório
Nacional de
Computação
Científica

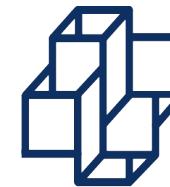
PreGDB on HPC Utilization

<https://indico.cern.ch/event/651338/>

HPCs at LHCb



PreGDB on HPC Utilization HPC at LHCb



Laboratório
Nacional de
Computação
Científica

Federico Stagni – 10th LHCb Comp Workshop
(<https://indico.cern.ch/event/561982/>)



~easy integration when

- WNs have inbound/outbound connectivity
- LHCb CVMFS mounted on the WNs
- SLC6 “compatible”
- At least 2GB/core
- x86

This is the case for OSC and CSCS

When some of the requirements above are not met, we can try to go around them, but this requires dedicated work (and anyway it may not be possible, case by case)



PreGDB on HPC Utilization HPC at LHCb

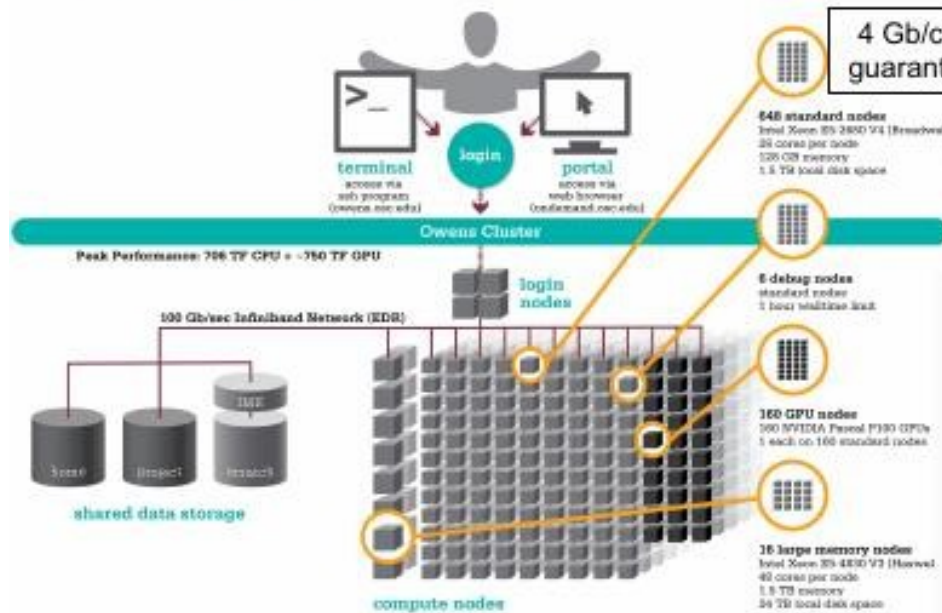


Laboratório Nacional de Computação Científica

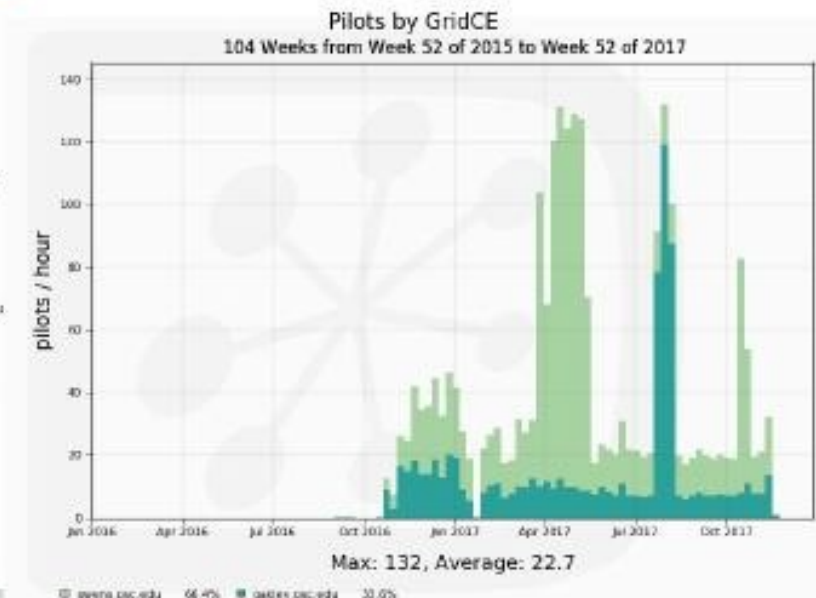
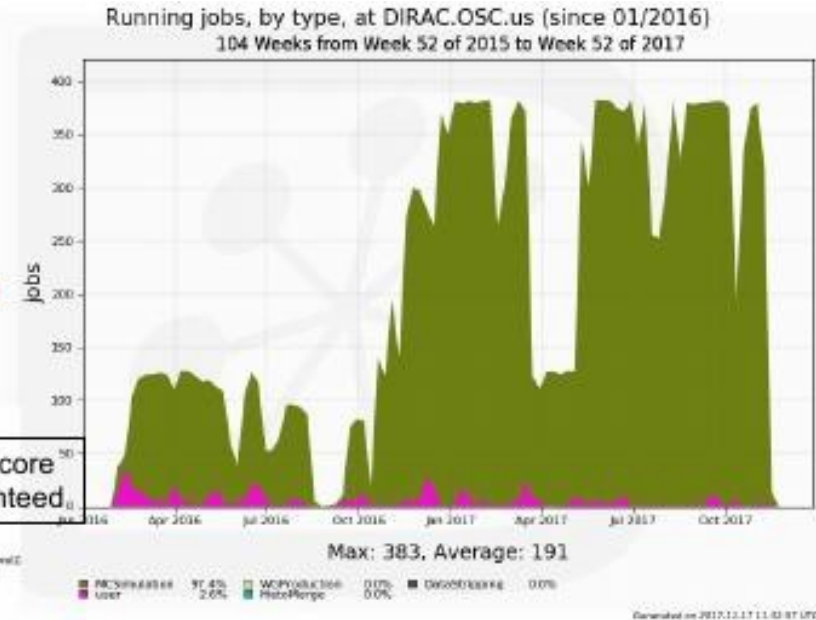
Federico Stagni – 10th LHCb Comp Workshop
(<https://indico.cern.ch/event/561982/>)

DIRAC.OSC.us

osc.edu



~easy setup!





PreGDB on HPC Utilization HPC at LHCb



Laboratório
Nacional de
Computação
Científica

Federico Stagni – 10th LHCb Comp Workshop
(<https://indico.cern.ch/event/561982/>)

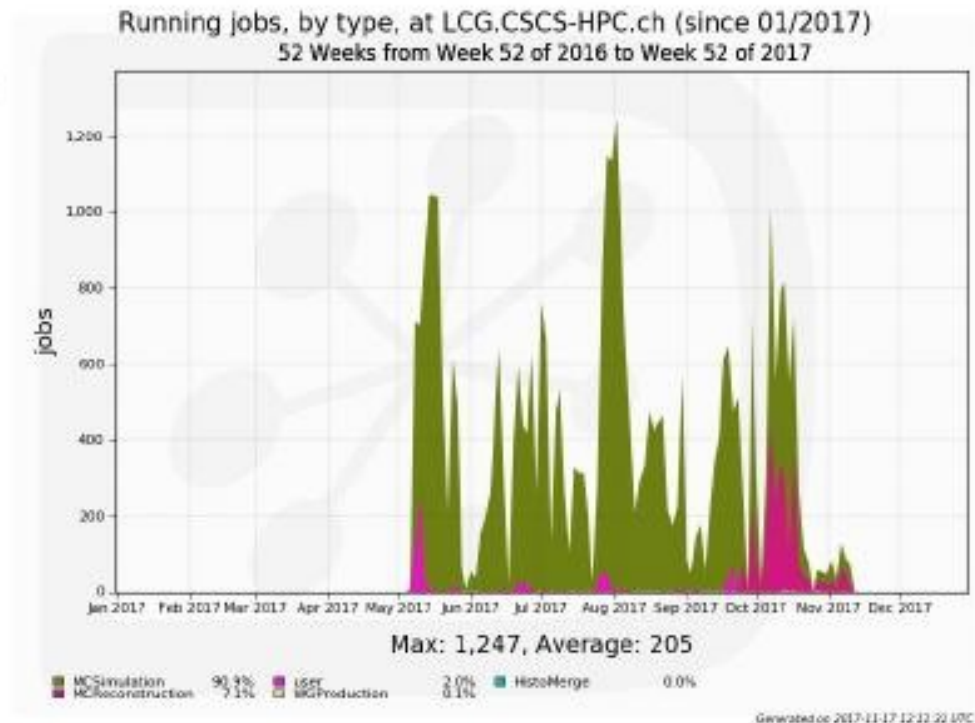


LCG.CSCS-HPC.ch

cscs.ch

swiss national supercomputing centre
(3rd in top500 list)

a LCG site, for us (ARC CE + slurm)
... so this was “transparent” for us





PreGDB on HPC Utilization

HPC at LHCb: SDumont



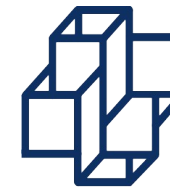
- Santos Dumont (SDumont)
- Origin: French ATOS/BULL
- Located in Petrópolis/Rio de Janeiro – Brazil
- LHCb project for LHCb use, accepted: 2017





PreGDB on HPC Utilization

HPC at LHCb: SDumont



Laboratório
Nacional de
Computação
Científica

The machine:

It has 1.1 Petaflops/s installed capacity. The architecture is hybrid.

Today SDumont has 18.144 CPUs on 756 nodes (24 core/node):

- . 504 nodes (thin node) each node with:
 - .. 2 X CPU **Intel Xeon** E5-2695v2 Ivy Bridge, 2,4GHZ
 - .. 24 core each. Total of 12.096 core.
 - .. 64GB DDR3 RAM



PreGDB on HPC Utilization

HPC at LHCb: SDumont



Laboratório
Nacional de
Computação
Científica

The machine (cont):

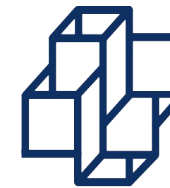
- . 198 nodes (thin nodes) with **GPUs** K40, each one has:
 - .. 2 x CPU Intel Xeon E5-2695v2 Ivy Bridge, 2,4GHZ
 - .. 24 core (12 per CPU), in total 4.752 core
 - .. 64GB DDR3 RAM
 - .. 2 x Nvidia K40 (GPU)

- . 54 nodes (thin node) with **Xeon Phi**, each one has:
 - .. 2 x CPU Intel Xeon E5-2695v2 Ivy Bridge, 2,4GHZ
 - .. 24 core (12 per CPU), total of 1.296 core
 - .. 64GB DDR3 RAM
 - .. 2 x Xeon PHI 7120 (dispositivo MIC)



PreGDB on HPC Utilization

HPC at LHCb: SDumont



Laboratório
Nacional de
Computação
Científica

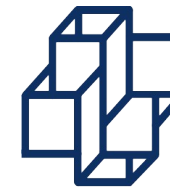
The machine (cont):

- . 1 MESCA2 node with shared memory (fat node) with:
 - .. 16 x CPU **Intel Ivy**, 2,4GHZ
 - .. 240 core (15/CPU)
 - .. 6TB RAM
- . All 756 nodes are linked through Infiniband FDR
- . File system LUSTRE with 1.7PB total and a secondary system with 640TB
- . Scheduling System:SLURM



PreGDB on HPC Utilization

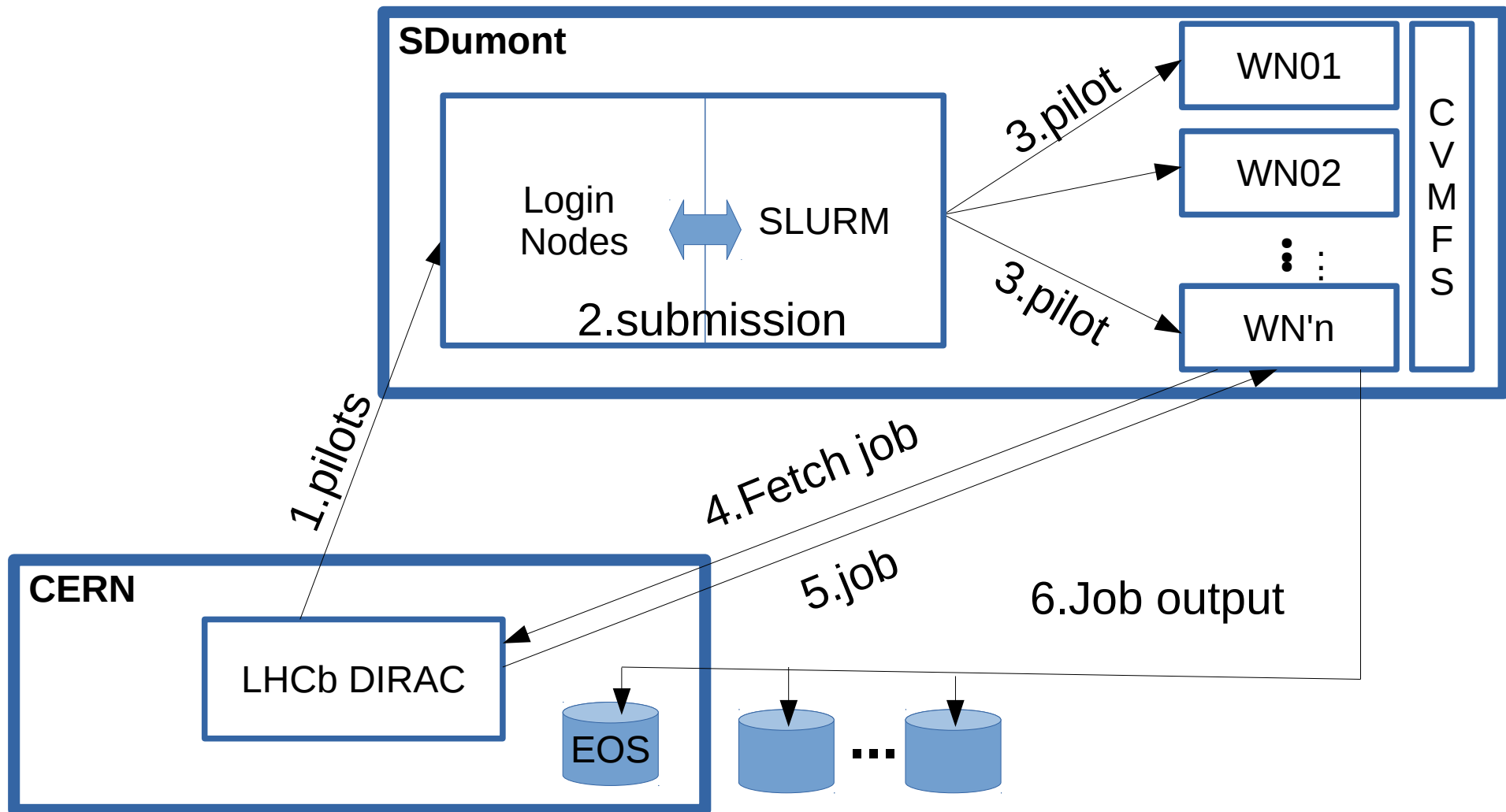
HPC at LHCb: SDumont



Laboratório
Nacional de
Computação
Científica

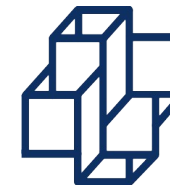


The LHCb – DIRAC model: Ideal





PreGDB on HPC Utilization HPC at LHCb: SDumont

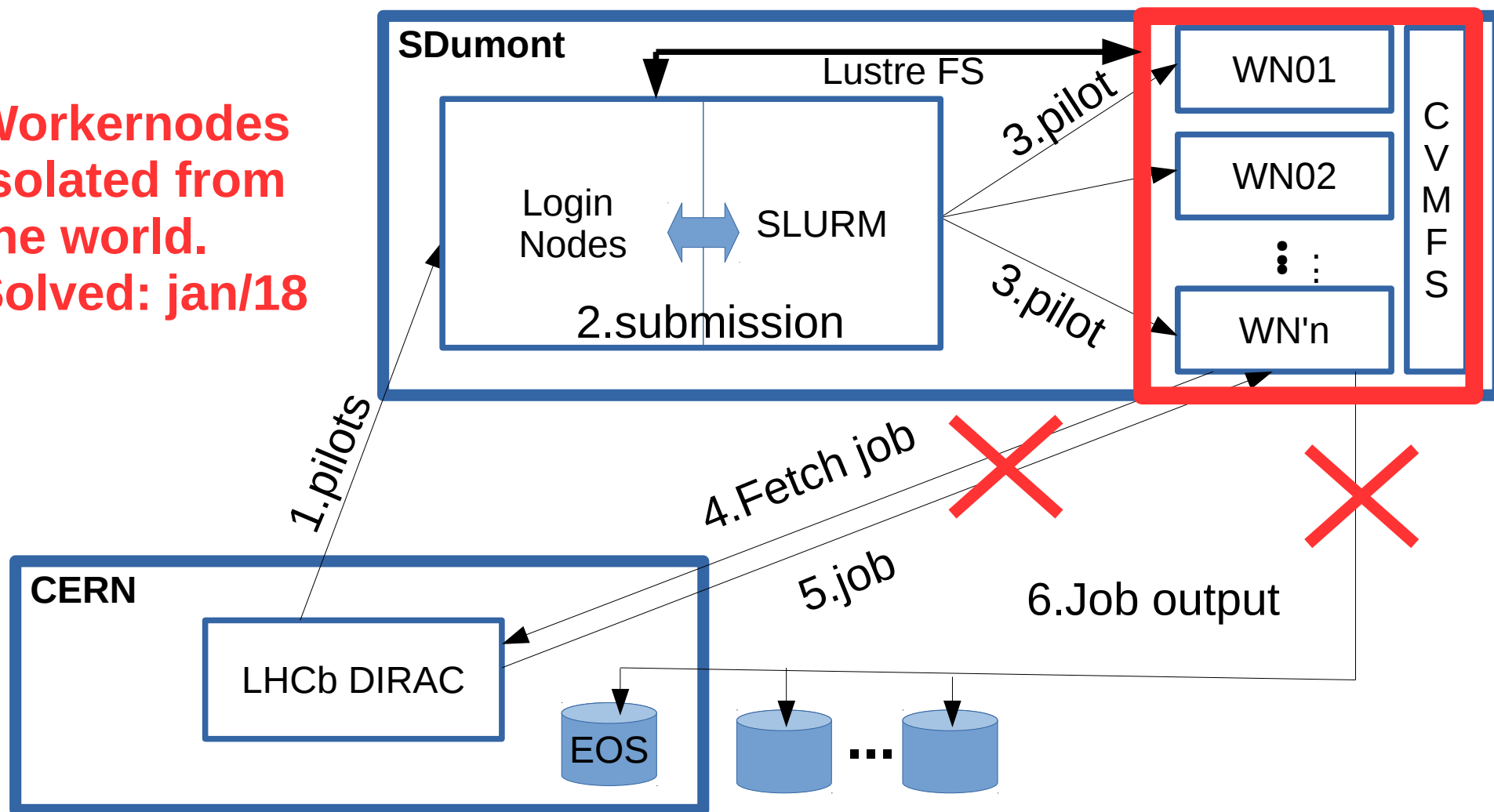


Laboratório
Nacional de
Computação
Científica



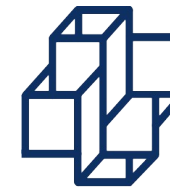
The LHCb – DIRAC model: 1st issue

**Workernodes
isolated from
the world.
Solved: jan/18**





PreGDB on HPC Utilization HPC at LHCb: SDumont

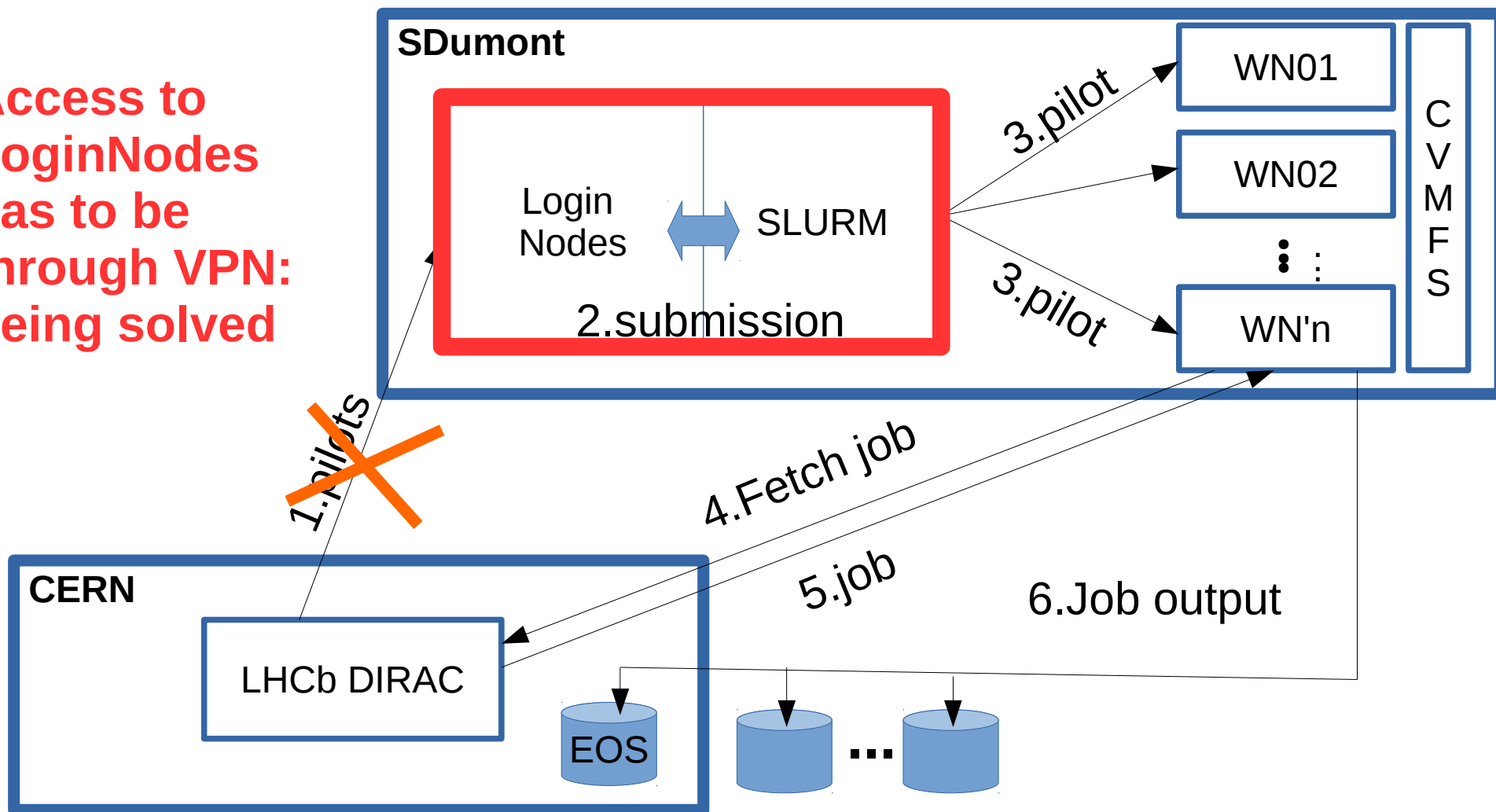


Laboratório Nacional de Computação Científica



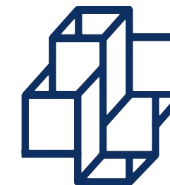
The LHCb – DIRAC model: 2nd issue

Access to LoginNodes has to be through VPN: being solved





PreGDB on HPC Utilization HPC at LHCb: SDumont

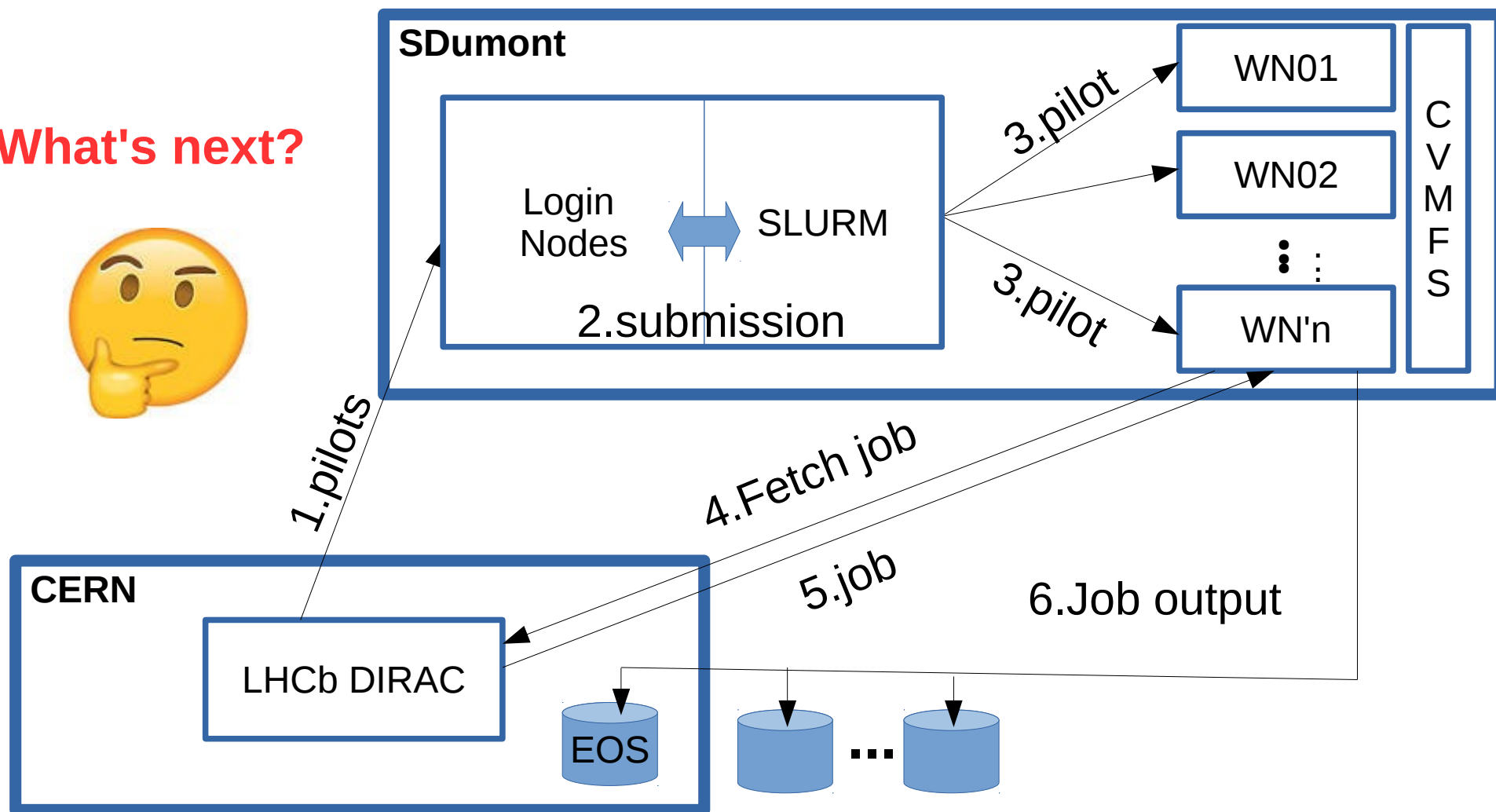


Laboratório
Nacional de
Computação
Científica



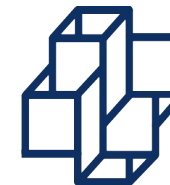
The LHCb – DIRAC model: Nth. issue

What's next?





PreGDB on HPC Utilization HPC at LHCb



Laboratório
Nacional de
Computação
Científica



THANK YOU!



**Questions?
Suggestions?
Experiences?**

renato.santana@cern.ch