

**WLCG**

Worldwide LHC Computing Grid

# Multicore job accounting

Antonio Pérez-Calero Yzquierdo  
PIC-CIEMAT

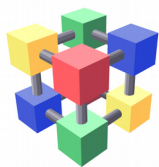
Pre-GDB meeting, 04/12/2016

**Ciemat**

Centro de Investigaciones  
Energéticas, Medioambientales  
y Tecnológicas

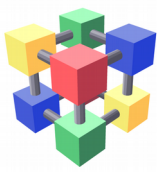


**PIC**  
port d'informació  
científica



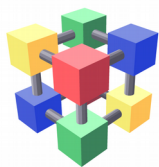
# Introduction

- Basically presenting here the summary of information collected during last WLCG Operations Coordination meeting (April 7<sup>th</sup>) together with other considerations regarding accounting of multicore jobs.
- Several CPU usage information sources:
  - Accounting portal(s)
  - Accounting reports
  - Site own accounting, monitoring history, etc
  - Experiment monitors, dashboard history, etc
- **Need for a complete and reliable source**



# Multicore accounting basics

- Elements that are needed for proper job accounting:
  - CPU time
  - Walltime
  - Number of cores
- The only "new" element is number of cores
  - So far always = 1
- $N_{\text{cores}}$  used
  - Calculate correct efficiencies:  $\text{CPU}/(\text{Wall} * N_{\text{cores}})$
  - Classify jobs
- **Need to be collected and reported for every job**

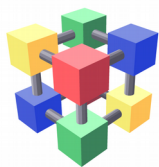


# EGI Accounting Portal(s)

The EGI accounting portal is currently available as

- Current **production portal**: <http://accounting.egi.eu>
  - recently updated from the up-to-now development portal to make it suitable for multicore: use `N_cores` to **classify jobs**, show **scaled walltime** and calculate **CPU efficiencies**
  - linked from <http://wlcg.web.cern.ch/collaboration/reporting/accounting>
- The **development portal**: <http://accounting-devel.egi.eu>
- The **new development portal**: <https://accounting-devel-next.egi.cesga.es/>
  - Some concerns: new format confusing? not yet ready for multicore?
    - **Comments sent to developers by Alessandra (\*)**
  - Ready by end of April?
- **Coexisting portal versions = increased confusion**
  - **Alessandra report on discrepancies** later in the agenda

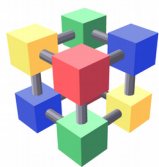
(\*) <https://rt.egi.eu/rt/Ticket/Display.html?id=10875&results=8e3a964f1d3def64d8bd502d39f79c17>



# EGI Accounting Portal(s)

- Current situation for **multicore jobs use by LHC VOs**:
  - **ATLAS** running multicore, T1s + T2s
  - **CMS** running multicore, T1s and recently major T2s
  - **LHCb** multicore in development
  - **ALICE**, no multicore
- **Situation of sites/CE reporting multicore for CMS and ATLAS to the accounting portal**
  - **T1s: Ready**
  - **T2s (\*): Ready**
    - except a few T2s still showing Number of processors = 0 in the portal (Ukraine, Estonia, DESY)
    - Should check as more CMS T2s are moved to multicore

(\*) query: [http://accounting.egi.eu/tier2.php?query=sum\\_normelap\\_nprocessors&startYear=2016&startMonth=3&endYear=2016&endMonth=3&yrange=SubmitHost&xrange=NUMBER+PROCESSORS&groupVO=custom&listVO\[\]=atlas&listVO\[\]=cms&chart=GRBAR&scale=LIN&localJobs=onlygridjobs](http://accounting.egi.eu/tier2.php?query=sum_normelap_nprocessors&startYear=2016&startMonth=3&endYear=2016&endMonth=3&yrange=SubmitHost&xrange=NUMBER+PROCESSORS&groupVO=custom&listVO[]=atlas&listVO[]=cms&chart=GRBAR&scale=LIN&localJobs=onlygridjobs)



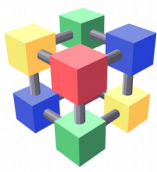
# Accounting reports

- Monthly accounting reports also available

<https://espace.cern.ch/WLCG-document-repository/Accounting/Tier-1/>

<https://espace.cern.ch/WLCG-document-repository/Accounting/Tier-2/>

- Coherent source of information with respect to the portals?
  - Sites (T1s) manually edit the information submitted for the reports



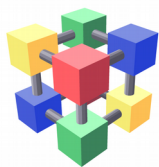
WLCG

Worldwide LHC Computing Grid

# Accounting reports and multicore

- Accounting issues in general and in relation to multicore discussed at length during and after the Lisbon workshop
- Presentation by J. Flix (\*) to MB recommended the use of walltime, instead of CPU time, in accounting reports
  - In particular, in the comparison to pledges
  - VOs and sites tend to agree
- CPU efficiencies not any more to be considered as *a priori* values, but measured
  - Multicore processing introduces additional corrections to CPU efficiencies: empty/partially-used/draining pilots, high memory payloads used within multicore pilots, etc.
- Also, discussion on **accounting on locked resources**, as the result of current evolution towards more complex requests (cores and memory).
- An **accounting TF** has been recommended

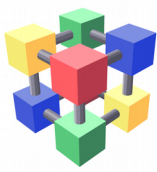
(\*)[https://indico.cern.ch/event/459359/contribution/4/attachments/1229392/1801384/20160216\\_Accounting\\_Tier1s.pdf](https://indico.cern.ch/event/459359/contribution/4/attachments/1229392/1801384/20160216_Accounting_Tier1s.pdf)



# Summary of VO reports

- Full report links to last WLCG Ops Coord. meeting in backup
- **ALICE:**
  - Accounting portal not used
  - Accounting reports used:
    - T2 reports should be moved from CPU to walltime
    - T2 federation not providing per site view
- **ATLAS, CMS and LHCb:**
  - Accounting portals used for CRSG reports
    - But not easy: numbers not directly trusted, but compared to each VO dashboard numbers.
    - Multicore accounting from the portals also complicated: correct for T1s, but not in per country view?
    - Proposals also to add simple  $\text{walltime} * N_{\text{cores}}$  metric (i.e. not normalized)
    - Q: What are cloud view? And computation monetary costs?
  - Accounting reports not used



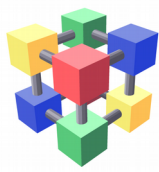


**WLCG**

Worldwide LHC Computing Grid

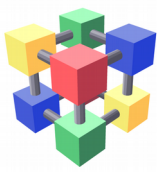
# Conclusions

- Multicore accounting needs `N_cores` to be provided as part of the information reported per job to classify jobs, scale walltime use and calculate efficiencies.
- **LHC VOs currently running multicore are CMS and ATLAS, LHCb in development, ALICE not using them (yet).**
- **For them, sites reporting to the accounting portals is basically solved:**
  - T1s are OK
  - T2s are OK, except a few CEs
- The **EGI accounting portal** currently in production, based on the previous devel portal, **provides multicore accounting** information
  - but is it trusted by VOs? Both CMS and ATLAS contrast the values with their own sources
- A **new reformatted accounting portal** is being developed, should be released soon
  - However still in development, should provide full functionality for multicore accounting
- **Accounting reports** are not used by either ATLAS, CMS or LHCb. But used by ALICE
  - Still also some comments on improvements
- Is it a new Task Force dedicated to accounting going to be needed?



**WLCG**  
Worldwide LHC Computing Grid

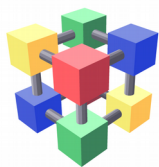
- Backup slides



# Collecting accounting data

- It is each **site's task to verify that this information is being collected and reported**
- This is performed at the level of **CEs by the APEL parser** (EMI3 package for EGI sites)
  - Other sites, other procedures for reporting (\*)
- Sites using APEL should
  - use the **latest version of the parser**
  - **enable multicore accounting on all CEs and batch system node**
    - in parser.cfg, set the value parallel=true (false by default)

(\*) See slides by J. Gordon, [https://indico.cern.ch/event/357785/contribution/9/attachments/712132/977609/Gordon-MB-Accounting\\_For\\_Multicore\\_Jobsv3.pdf](https://indico.cern.ch/event/357785/contribution/9/attachments/712132/977609/Gordon-MB-Accounting_For_Multicore_Jobsv3.pdf)



**WLCG**  
Worldwide LHC Computing Grid

# Full reports from LHC VOs

- **ALICE:**

[https://indico.cern.ch/event/514077/contribution/10/1/attachments/1254542/1851417/ALICE\\_accounting\\_feedback.pdf](https://indico.cern.ch/event/514077/contribution/10/1/attachments/1254542/1851417/ALICE_accounting_feedback.pdf)

- **ATLAS:**

[https://indico.cern.ch/event/514077/contribution/10/2/attachments/1254623/1851554/2016\\_April\\_ATLAS-and-Accounting.pdf](https://indico.cern.ch/event/514077/contribution/10/2/attachments/1254623/1851554/2016_April_ATLAS-and-Accounting.pdf)

- **CMS:**

<https://indico.cern.ch/event/514077/contribution/10/3/attachments/1254550/1851428/CMSInputOpsCoordAccountingReview.pdf>

- **LHCb:**

<https://indico.cern.ch/event/514077/contribution/10/4/attachments/1254565/1851595/20160407-WLCGOpsCoord-LHCbAccounting.pdf>