

## Computing and data



# WLCG WORLDWIDE LHC COMPUTING GRID

Providing the computing resources to process, simulate and analyse LHC data

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- **Scientific leader:** Laurent Duflot (IJCLab) \*
- **Laboratories involved:** CC-IN2P3 (Lyon), CPPM (Marseille), IJCLab (Orsay), IPHC (Strasbourg), IP2I (Lyon), LAPP (Annecy), LLR (Palaiseau), LPC (Clermont-Ferrand), LPNHE (Paris), LPSC (Grenoble), Subatech (Nantes)
- **Nature:** distributed computing and storage infrastructure
- **Status:** project in operation, coordinated by CERN
- **Website:** <https://wlcg.web.cern.ch/>

### SCIENTIFIC OBJECTIVES

WLCG, the Large Hadron Collider (CERN) Global Computing Grid, is a distributed computing infrastructure that allows more than 12 000 physicists around the world to access data from the LHC detectors in near-real time. It provides seamless and secure access to all the computing resources (computation and storage) needed to process, simulate and analyse LHC data.

### RESOURCES DEPLOYED

- The LHC experiments generate 15 Petabytes of data per year, the equivalent of 20 million CDs, processed by WLCG.
- The LHC computing grid comprises 170 computing centres in more than 40 countries linked together by a powerful internet network.
- The sites are divided into levels: the CERN computing centre (level 0) collects the raw data produced by the detectors, stores it, carries out initial processing and redistributes it to the level 1 sites. The level 1 sites are made up of 11 computing centres, known as "nerve centre", which are available 24 hours a day. These carry out the maintenance and reprocessing of the data and, together with the level 2 and 3 centres, the simulations and analyses that produce the physics results.

**100** Petabytes/year of data processed after filtering

**20** years of operation

**42** participating countries

**100** million euros per year (2.5 for France)

**6** main contributors: CERN, Germany, France, Italy, UK, USA

### IN2P3 CONTRIBUTIONS

- A level 1 centre, the IN2P3-CC, equipped with 4 700 processors and 145 million Go.
- Eight level 2 (Ile de France, Clermont-Ferrand, Grenoble, Lyon, Nantes, Annecy, Strasbourg, Marseille) and level 3 (Lyon) sites participate in the computing grid.
- Participation in the organisation and smooth running of data processing within experimental collaborations.
- Supporting R&D to prepare the computing resources for the next phases of LHC data collection.

### OTHER FRENCH LABORATORIES INVOLVED

Irfu (CEA Saclay)

**1994**

CERN Council approves construction of the LHC

**2001**

European Datagrid (EDG) project for a prototype computing infrastructure

**2003**

First data recorded and transferred

**2004**

European EGEE project to establish a global computing grid infrastructure for science

**2005**

The WLCG computing grid comes into play with 100 centres in 31 countries

**2009**

Start-up of the LHC

**2010-2020**

Computing and disk storage resources are increased by a factor of 5 and tape storage by a factor of 10