Computing and data

Global multi-site infrastructure

WLCG WORLDWIDE LHC COMPUTING GRID

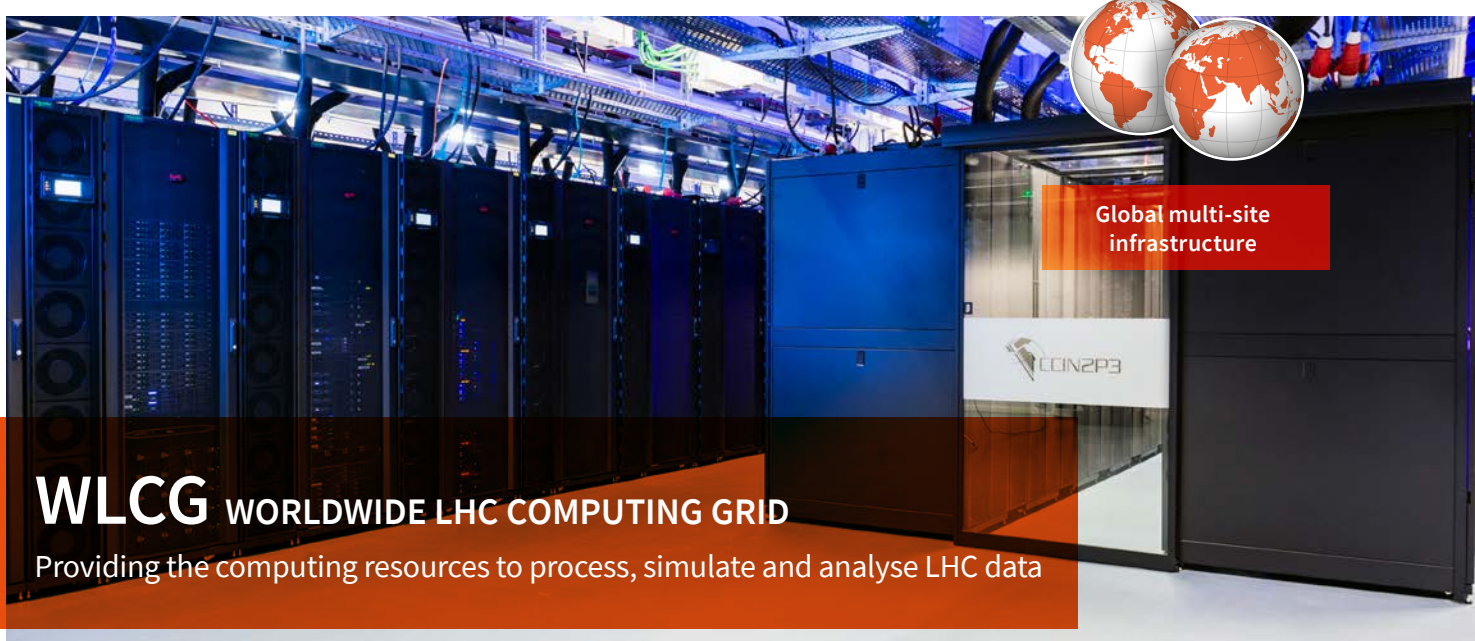Providing the computing resources to process, simulate and analyse LHC data

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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/

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

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.

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