Grid computing

Some of today's large-scale scientific activities — modelling climate change, Earth observation, studying the human genome and particle physics experiments — involve handling millions of bytes of data vary rapidly. Such activities would not be possible without a new type of computing. It is not possible for one single institution to store and analyse all these data, so scientists share computer storage and processing power around the world at hundreds of different locations. This is called grid computing. Much of it is based on vast numbers of PCs linked to process data in parallel with other tasks. In the past, individual supercomputers might have been used but these could only deal with single, although very large, tasks.

CERN

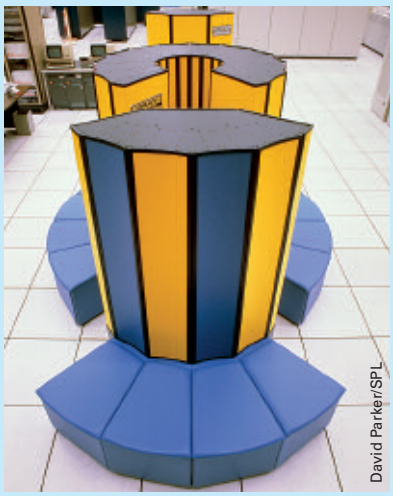
CERN's Large Hadron Collider (LHC) goes live this year (see pages 1–3 and page 11). It will produce 15 petabytes (1 petabyte = 10^{15} bytes) of data a year — equivalent to a stack of CDs 20 km tall. Data from the LHC will be analysed by more than 100 000 PCs in 100 institutions linked up in a worldwide grid.

Useful websites

- To find out more about the LHC computing grid go to: http://lcg.web.cern.ch/LCG/overview.html
- The website for GridPP is at: www.gridpp.ac.uk

The computer hall at CERN with 2000 PCs per floor

CRAY supercomputers have been replaced by grid computing

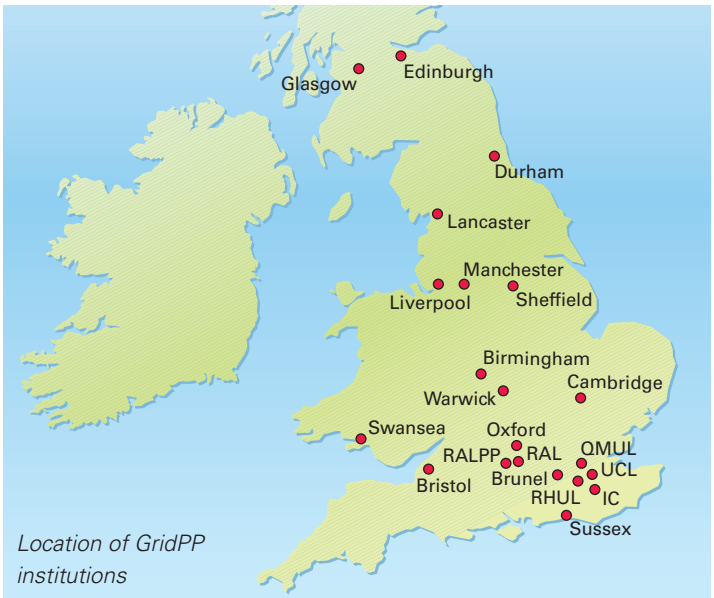


GridPP

GridPP is the UK computing grid for handling particle physics data. It is also part of the global grid for handling LHC data. It involves collaboration between around 100 researchers in 20 UK universities, at research centres and at CERN. It currently utilises more than 2000 computers at 16 locations. This will rise to 10 000 computers later this year. It allows scientists to access data and processing power seamlessly, wherever they are.

GridPP has also been responsible for the middleware, which allows the software being used by the scientists to talk to the grid's hardware, distributing computing jobs efficiently around the network. Only authorised users can access the grid.

GridPP is a 6-year project, and is funded by the Particle Physics and Astronomy Research Council as part of its e-science programme.



Location of GridPP institutions