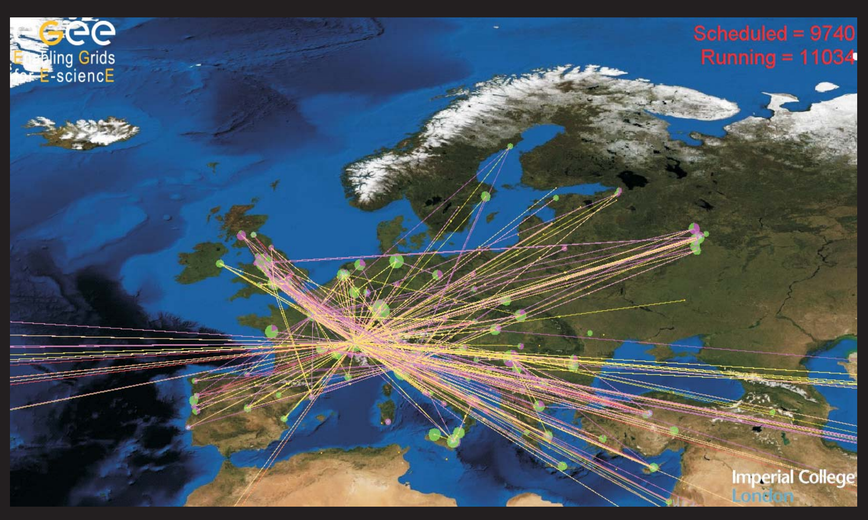
High Energy Physics the Data Deluge and e-Science

A Sea Of Data

The experiments being performed at the Large Hadron Collider in Geneva will collect an unprecedented amount of data; expressed in number of bits, a micromole is an appropriate unit; about ten petabytes each year. For the last eight years, the LHC community has been working on a software and hardware infrastructure to deal with this amount of data. This system is called "the Grid". Nikhef and SARA have been working on this Grid system since its beginning.

> http://www.nikhef.nl/grid



> http://www.eu-egee.org/

BiG Grid

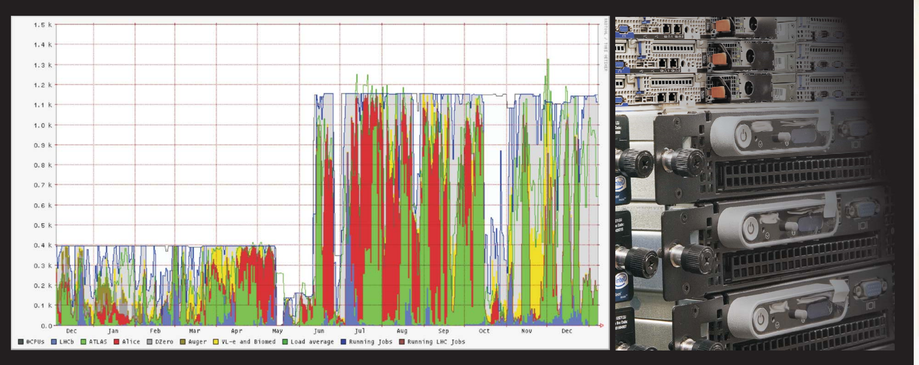
Nikhef, together with the Netherlands Computing Foundation (NCF) and the Netherlands Bio Informatics Center (NBIC), are executing a 28 M€ project BiG Grid, which will provide an e-Science infrastructure in the Netherlands, as well as assist Dutch scientists in getting the maximum benefit from it. A wide range of groups supported the project proposal, from psycholinguistics through medical imaging to low-frequency radio astronomy. The project is actively seeking new user groups, as one of the BiG Grid missions is to promote and encourage the achievement of scientific results through e-Science.

> http://www.biggrid.nl/

LHC Tier-1

Early Dutch involvement in LHC grid computing, together with the BiG Grid project, has enabled the construction of a "Tier-1" facility for LHC computing in the Netherlands. These Tier-1 facilities are at the "petascale" and play a key role in the storage and analysis of the LHC data. The Dutch facility, operated jointly by SARA and Nikhef, will support the ATLAS, LHCb, and ALICE experiments.

> http://cern.ch/LCG/public/



> Communities sharing clusters at Nikhef

E-Science

High-energy physics has an unprecedented scale; the computing pattern however is a common one: *e-Science*. "e-Science is used to describe computationally intensive science that is carried out in highly distributed network environments, or science that uses immense data sets that require grid computing; the term sometimes includes technologies that enable distributed collaboration" (Wikipedia). Do you recognize the pattern?

Grid Security

Security is an important aspect in a shared computing infrastructure. Researchers don't want their preliminary results to be leaked, medical imagers need to ensure that patient details are not exposed to the outside world. Grid security software components produced at Nikhef are used in grid projects all over the world, and our security staff are recognized world leaders in this area.

BiG Grid the dutch e-science grid · vl-e virtual laboratory for e-science · LCG · gLite Lightweight Middleware for Grid Computing · eGee Enabling Grids for E-sciencE · NIKHEF · sara