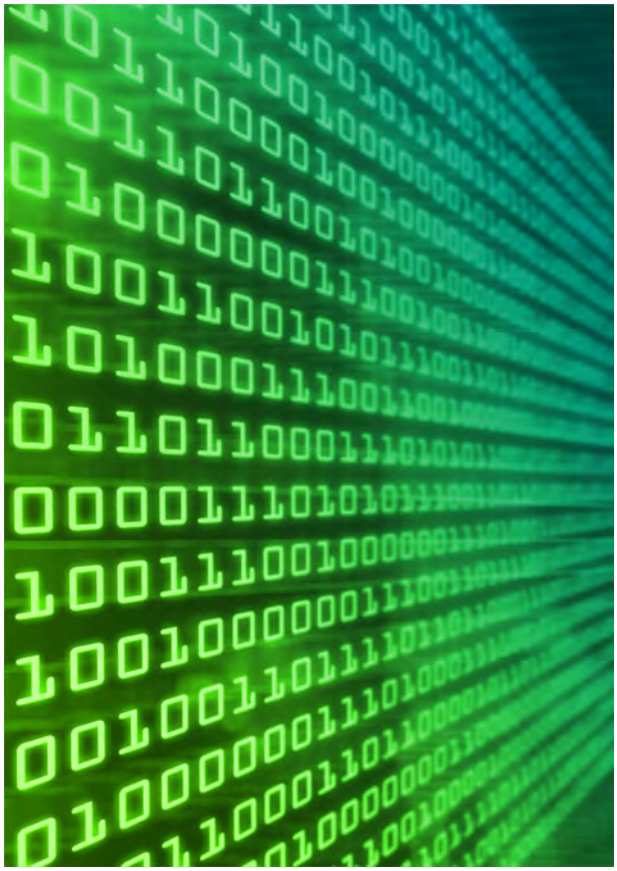
Scientific collaboration on a global scale



The Internet plays a vital role in science from researching ideas and conducting experiments to publishing papers.

Modern science facilities such as the synchrotrons, satellites, telescopes and lasers operated by STFC - generate enormous amounts of data. Researchers therefore need to process far more information than can be handled through existing World Wide Web servers.

Electronic or e-Science goes a significant stage further than the Web. It involves global collaborations where, through sharing computers, data storage and advanced software, individual scientists can access and exploit extremely large databases and computing resources.

Coping with the data deluge

Organising, searching, and extracting value from vast and diverse sources of data lies at the heart of today's global research challenges. Computers are essential tools for processing this extensive and disparate data. Leveraging recent developments in information technology, STFC e-Science provides sophisticated catalogues and data tools to exploit data from national and international facilities used by UK researchers across fields ranging from astronomy to medical research.

Producing faster, more effective research

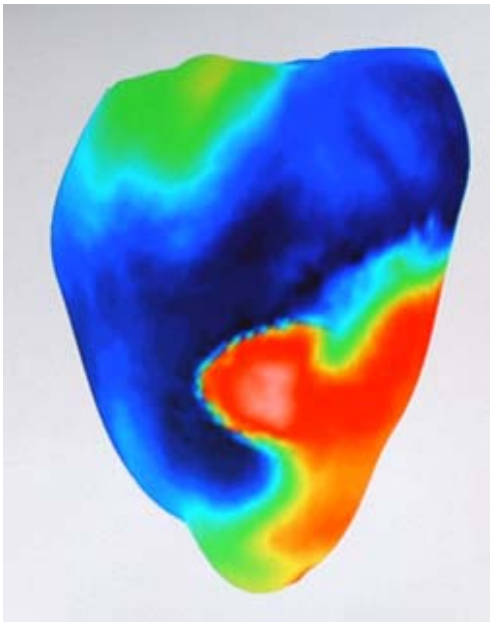
The University of Glasgow used computers throughout the UK through the National Grid Service for the NanoCMOS project to simulate transistors smaller than 30 nanometres. This is 1,000 times thinner than a human hair and 1.5 times smaller than the current size of individual components on today's computers. This enabled the future generation of chips to be designed with more processing power in a matter of a few weeks - something which would have taken 20 years on a single computer.

By sharing computers and data storage resources from different organisations, scientists can work on a single problem much more effectively – be it trying to find drugs to treat the H5N1 flu virus, digitising mammograms to help breast cancer treatment or modelling earthquakes to warn of potential disasters.

The UK's e-Science Grid

e-Science provides a powerful computing infrastructure to manage data for use in scientific simulations or analysing experiments. STFC Rutherford Appleton Laboratory's (RAL) scientific data centre, for example, has 25,000 processors and can store six petabytes - or six thousand, million, million bytes - of data. If stored on CDs, the number of discs would reach to the Moon and back.

The e-Science Centre located at RAL is part of the UK National Grid Service (NGS) and GridPP. The NGS links computers at 22 collaborating UK institutions. e-Science is vital for the UK's research community as it allows UK researchers to access data from major facilities around the world and take part in international collaborations to analyse it.



GridPP

GridPP is a computing grid for particle physics, funded by STFC, that is helping UK scientists analyse the data collected from the Large Hadron Collider (LHC) at CERN, Europe's particle physics laboratory in Switzerland. Combining the data processing resources across UK universities is essential to allow scientists to process the vast datasets from the LHC which will help us to penetrate further into the structure of matter and to understand what happened soon after the Big Bang.

GridPP ensures that UK scientists remain at the forefront of this important research by linking computers across the UK. As well as supporting the analysis of experimental data, Grid computing also allows scientists to simulate experiments before going into the laboratory, saving time and using valuable facilities more efficiently.

GridPP is the UK's contribution to the worldwide LHC computing grid (wLCG). Both the NGS and GridPP are linked to computers in 50 European countries and internationally through the European Grid Initiative (EGI).

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