GridPP

Working with other e-Scientists and industry

GridPP is developing a UK computing Grid for particle physics, but many of the people and institutions involved in GridPP are also working with other disciplines, sharing their expertise and building knowledge of Grid applications, middleware and infrastructure. This leaflet details just a few selected examples from a variety of UK-wide activities.

• Brunel – distributed electrical power generation and GRIDCC

Peter Hobson and colleagues at Brunel University have been working for GridPP on monitoring particle physics application software over the Grid, using R-GMA middleware. This has led them to collaborate with colleagues at Brunel who are experts in the area of distributed electrical power generation. Researchers there are interested in the increasing shift away from a small number of large generators to a very large number of small generators (e.g. renewables such as wind turbines). Current bespoke systems use a private WAN, which will not scale to increasingly large distributions.

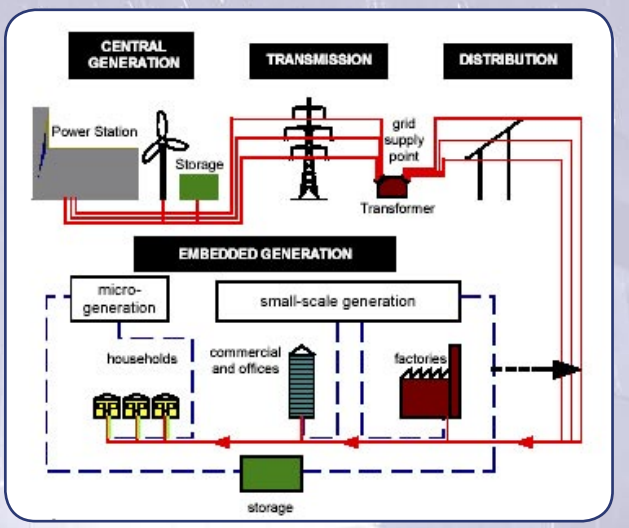
Brunel, along with Imperial College and other institutes across Europe, has formed a new EU funded collaboration - "GRIDCC" (Grid-enabled Remote Instruments with Distributed Control and Computation). One goal of GRIDCC is to provide a real-time aspect to Grid computing, with an emphasis on applications that need remote control and monitoring. It will work on applications with a significant social impact (control of a network of power grid generators, meteorology, geo-hazards monitoring, analysis of neuro-physiological data), engineering impact (distributed telecommunications measurements) and scientific impact (control and monitoring of a high energy physics experiment, far remote operation of an accelerator facility). The three-year GRIDCC project started on 1 September 2004, and will benefit from strong links with GridPP, both at Brunel and Imperial.

• Glasgow – a shared computing infrastructure

In Glasgow, a shared computing infrastructure for particle physics, bioinformatics, and other applications has been set up in collaboration with IBM, as part of ScotGrid and eDIKT (e-Science Data, Information and Knowledge Transformation), and funded by the Scottish Higher Education Funding Council. The system recently celebrated its second anniversary of deployment. Two years on, the total CPU usage is more than 1 million CPU hours, representing a landmark in terms of regional deployment of a shared infrastructure.

• Oxford – complexity research

The Complex Agent-Based Dynamic Networks (CABDyN) research cluster brings together researchers from a wide range of disciplines, from biology to management science, sociology, economics, engineering, and physics. The cluster studies how the behaviour and dynamics of radically different networked systems such as slime moulds, ant colonies, high-tech innovation clusters, and the Internet can be better understood using a shared set of frameworks and methods. Oxford's GridPP researchers have been active participants in workshops designed to explore those commonalities, and are interested in how such understanding might apply to designed networks such as the Grid.



Distributed power generation, one of the areas in the GRIDCC project. Source Parliamentary Office of Science and Technology

PPARC GridPP UK Computing for Particle Physics

• Manchester – GridSite

Andrew McNab at the University of Manchester has developed GridSite, to bridge the gap between the web and the Grid. It allows users to identify themselves to websites using an X.509 certificate, so that members of a virtual organization can be can be granted rights to edit and upload web pages, images and binary files. Although it was built initially for the GridPP website, GridSite is open source and available for any website to use – current sites include the Grid Operations Centre and Grid Ireland. It has even been installed on a Grid-enabled Sony Playstation 2. JISC have also granted funding to extend GridSite for use by the wider UK academic community.

• Bristol – data distribution and curation

The GridPP-funded e-science group at the University of Bristol have been working on handling large amounts of data using the Storage Resource Broker (SRB) Grid middleware from San Diego Supercomputing Centre. Researchers at Bristol and Rutherford Laboratory have successfully demonstrated SRB's capabilities during a recent 75TB data challenge. Other groups within the University are now taking advantage of the expertise in SRB to manage and distribute data for other disciplines. Facilitated mainly by the work of a PPARC-funded e-science student, proposed applications include management of geographical information system data for a worldwide mapping project, and curation of large amounts of archived raw data in a development of the e-print server concept. Bristol is a leading member of the Worldwide Universities Network, and will be taking a major role in deploying and supporting SRB across computing systems at WUN institutes around the globe.

• Networking

A number of GridPP researchers, such as Pete Clarke at UCL/Edinburgh and Robin Tasker at CCLRC, Daresbury Laboratory, are involved in the computer science network research community worldwide, playing important roles in projects such as UKLight, MB-NG, and EGEE (see below). They are also working with the UK core e-Science programme and the Global Grid Forum, and with interdisciplinary projects such as Very Long Baseline Interferometry for radio astronomy and developing the Teragyroid project with the UK and US high performance computing community.

• EGEE

Many members of the GridPP collaboration are heavily involved in the EGEE project (Enabling Grids for E-science in Europe). EGEE is a two-year EU-funded project that started in April 2004. It aims to support the European Research Area, by bringing together Grids from different disciplines and different regions into a European Grid infrastructure that is available to scientists 24 hours a day. With partners in 27 countries and funding of over 30 million Euros, the project is among the largest of its kind. GridPP member are involved both in the management of the project and its day-to-day research. As an example, Frank Harris, a GridPP-funded physicist based at CERN, is deputy leader of the overall applications group, involving collaboration with biomedicine, earth sciences, computer science, and industry.

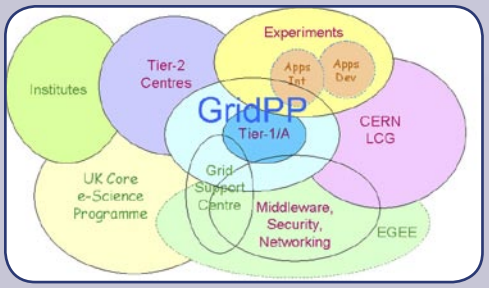
GridPP at the EGEE launch conference

As well as involvement in specific projects and joint use of computer hardware, GridPP researchers are on the boards of many e-Science Centres, including Birmingham, Cambridge and the National e-Science Centre, working towards wider UK e-Science goals. GridPP is also involved in the UK core e-Science programme, working with the Grid Support Centre, the e-Science Certificate Authority and the National Grid Service.

• Working with Industry

Dell

Oxford and Dell-UK have embarked on a collaboration to involve Dell more closely in leading Grid applications and to help build up the Dell-UK research programme. A CASE student is spending the summer of 2004 in the company's High Performance Computing development teams in Texas, where she is learning the commercial environment while she shows them the ins and outs of research computing.



Some of the projects with which GridPP works

HP Labs

The SouthGrid consortium has recently launched a new two-year joint development project in collaboration with HP Labs, Bristol. HP is a major player in Grid development and standardisation, and the first industrial partner in the CERN LCG project. A researcher at the University of Bristol, to be funded jointly by HP and GridPP, will work to attach SouthGrid hardware resources, including those of HP Labs, to the UK particle physics Grid. SouthGrid will demonstrate the capabilities of its distributed computing system by directly contributing to particle physics experimental data challenges. HP is also a leading vendor of 64-bit computing platforms, and will provide valuable assistance to GridPP and LCG in the porting of both physics applications and Grid middleware in order to take full advantage of increasingly cost-effective 64-bit processors. It is hoped that this project will form the basis of a wider future collaboration between HP Labs and GridPP, bringing benefits to both partners.

GridPP is also working with wider industry contacts including IBM and BT, sharing experiences and discussing current Grid development and deployment issues.

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