Types of Grid service

Work is in progress to create Grid services at the levels of individual campuses, both nationally for the UK and internationally. Each level is likely to be based on components contributed by the levels below it. This section therefore gives a brief overview of the characteristics of each type of service and the agreements that are needed to build them into a consistent whole.

Campus Grids are normally intended primarily as a service for members of organisations where they are located; it is usual for users to have to obtain permission to use the Campus Grid rather than the service automatically being open to everyone in the organisation. Users may authenticate to a Campus Grid using their existing login credentials or using special credentials for the Campus Grid. The aim of most Campus Grids is to make better use of the computing resources that the organisation already owns, though it should not be thought that the additional capacity comes for free as there will be an increased cost – at least in electricity and air conditioning – when computers are active rather than idle. Campus Grids may use any mixture of spare processing cycles on computers bought for other purposes, such as classroom workstations, and dedicated computing hardware, such as a High Performance Compute cluster. Spare cycle grids are usually constrained to run the operating system required for the systems' primary use, so Grid users may have to adapt their jobs to a new working environment. It is also important to ensure that the background use of these systems for Grid processing does not unduly affect their primary purpose. A number of Campus Grids have been created and many of these are moving from experimental to service status.

The UK National Grid Service (NGS) was created to provide computer and data services to researchers in the UK. The aim is to provide a national service, more powerful than is commonly available on a single campus, to let researchers run jobs that are too large for their local campus resources to complete in the available time. The NGS is currently available for scientific and academic research projects, which may be subject to peer review. Users are authenticated using digital certificates from the UK Grid Certification Agency or other recognised certification agencies. The first four nodes on the NGS were funded as dedicated services at four locations with good connections to JANET. These nodes have been used to define standard services and interfaces. The NGS is now working with partner organisations who undertake to provide those same services and interfaces, with service levels chosen by each partner, to allow their Campus Grids to be accessed, managed and monitored as part of the centrally managed NGS.

A number of international efforts are in progress to allow researchers to collaborate using computers and data from different countries. Possibly the most advanced, in terms of providing a Grid service, is the EGEE (Enabling Grids for EsciencE) project. This requires that all computers run the same package of software and requires their managers to commit to providing defined levels of service. Researchers submit batch jobs for processing somewhere on the EGEE pool. This pool includes national grid services (which may themselves contain campus grid services) as well as services provided by national and international computing and data centres. Once available resources are identified, the jobs run on them and results

are returned to the user. EGEE has the same goal as the UK NGS, to make large computing resources available for relatively short periods of time, but also focuses on the need to support collaborations by making large data sets available over a wide area.