Low energy BOINC

One of Sony CSL's contributions to IDGF-SP is to propose best practices to minimise the energy consumption of DGs. The output will be a series of guidelines on how to best deploy a desktop grid taking into account the energy consumption. These guidelines will be based in the results of the work done in WP5 and will be reported in the update of this document (deliverable D4.2.2).
The machines that participate in desktop grids and volunteer computing can be in one of many different scenarios. The most common are: private desktop grids, computing clusters, and volunteer participants. A single best practice for the energy consumption does not apply to all situations. A user running a laptop needs a different configuration than a computing cluster bought for this purpose. For a computing cluster it seems that, in terms of performance-per-watt, it is best to keep the machine running continuously at a 100% load.
However, a different scenario might apply when the cooling of the space is taken into account. Laptops and PCs generally compute when the user is absent, often during the night time. However, Sony CSL's preliminary results (see WP5) for the case of volunteer computing indicate that major energy gains can be obtained (in the order of 50% in terms of performance-per-watt) when the computation is performed while the user is working on the machine, and by keeping the machine in a low-power state. For this reason, Sony CSL developed a driver for Windows that helps to maintain the machine in this low-power state. The technical details will be given in deliverable D5.1.
The measurements that will be performed in WP5 (starting Q4 2013) will allow to improve our understanding of the energy/performance trade-off and will allow us to define a number of profiles, scenarios, and best practices that apply in the different situations. These best practices will give rise to a set of BOINC configurations and software modules that scientific organisations can promote when deploying a distributed computing project.

In order to support the above objectives, Sony CSL developed a BOINC application that measures various energy and performance characteristics on the machines that participate in desktop grids. Within the BOINC framework, the application is designed as a low-cpu-intensive application. This allows the application to run free from any scheduling constraints of the BOINC manager, provided the application does not hog the CPU. The sensor data that is obtained by the application is sent back to the server using trickle messages. The data is stored in the online database at OpenSensorData.net, so that the partners, participants, and other researchers can easily access and evaluate the results.