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**Introduction**

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**BOINC, how does it work?**

The Berkeley Open Infrastructure for Network Computing (BOINC) allows scientists to harness computing power from thousands of volunteer PCs for their scientific computing projects.

The clients connect to a central BOINC server via the web and download jobs from there. When the computations on the volunteer PC are finished, the resulting output files are uploaded to the BOINC server and the results reported. The user gets BOINC Credit for his work.

**Virtualisation with BOINC**

Use of virtualisation technology with BOINC frees the scientists from the constraints of porting their software to different architectures of volunteer PCs.

The BOINC client downloads a BOINC – CernVM wrapper from the BOINC project server.

CernVM runs under the Hypervisor of the Volunteer PC, and downloads tasks from the project via the Co-Pilot job management framework.

This scheme is suitable for all kinds of simulation or analysis with small data sets pr. job.

Any physics software that can run under CernVM can benefit from volunteer computing power under BOINC.

See also Artem Harutyunyan’s presentation on CernVM Co-Pilot and the talk on CernVMinS by Jakob Blumer.

**BOINC projects**

At CERN, there are currently 2 BOINC projects, both within the LHC@home platform:

* Sixtrack, is a classic BOINC project with executables for Linux and Windows. The forums and outreach are handled by the Sixtrack team in BE Department and at EPFL.

* Test4Theory, a VM based BOINC project running Monte Carlo event generators like ALPGEN, HERVIG++ and PYTHIA. All the programs are running under CernVM on hypervisors on the volunteer PCs. The site contains an active outreach part and notably links to scientific work of the scientists involved in the project. (http://mcplots.cern.ch)

**Outlook for a BOINC service**

**Shared front-end LHC@home portal**

Distribution of different types of jobs to the volunteer cloud would all go via CernVM, no need for dedicated BOINC executables.

Jobs from different projects can be dispatched to volunteers via a rotating job scheme.

Depending of processing needs from the service customers, there would be jobs from the Theory group, LHC accelerator studies, or from Alice, Atlas, CMS, LHCb etc.

**Summary**

Use of Virtualisation Technology with Volunteer Computing overcomes the principal obstacle for using volunteer PCs as a computing resource in High Energy Physics. The current project-based approach to Volunteer Computing at CERN will gradually evolve towards a general service, where the Volunteer Cloud can be considered as a computing resource. The outreach aspect of Volunteer Computing has a lot of potential, and we should not neglect this communication channel.

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