Applications Area Report
Nov 2011 – Jan 2012

February 2012

Pere Mato

ROOT

ROOT version 5.32/00 was released on Nov 29, 2011. In includes many improvements in basically all packages (see the release notes for more details). Among the changes it includes a new version of RooFit 3.50 that has undergone a substantial amount of core engineering to improve computational efficiency and improve algorithmic likelihood optimizations. The expected increases in execution speed range from roughly 20% (for problems that were already implemented in a close-to optimal form) to more than 2000% for certain type of problems. The release of ROOT version 5.34 is scheduled for May 29, 2012.

Persistency Framework

Validation of COOL performance on Oracle 11g servers has been completed, confirming that COOL queries exhibit good performance and scalability on 11.2.0.3 for all COOL use cases. The poor performance previously observed on 11.2.0.2 servers is finally confirmed to be due to an Oracle bug, absent in 11.2.0.1 and fixed in 11.2.0.3.

Releases of all PF projects have been prepared for ATLAS and LHCb in Q4 2011 for the five new LCG configurations. Changes to the PF code bases (such as important fixes in CORAL and COOL for the upgrade to Oracle 11g servers), were included in several of these configurations. LCG_62 is the first release that does not include POOL (as discussed below); it also includes the first production build with the gcc46 compiler on SLC5, a preliminary step to the release of the software using this compiler on SLC6.

POOL support has been clarified with LHCb and ATLAS. LHCb has already stopped using POOL, while ATLAS will continue to use it and need support for as long as the 2012 production version of the ATLAS software, based on the LCG61 series, is actively used. ATLAS will no longer need support for POOL for their releases based on LCG62.

Other activities in this quarter included user support to CMS, about their observation of ORA-25408 errors in the online Oracle cluster, and several discussions with the ATLAS TDAQ team to discuss the requirements and possible implementation of a monitoring infrastructure for the CoralServerProxy instances deployed in the ATLAS HLT system.

Simulation

The new Geant4 release 9.5 was announced as scheduled on December 2nd; the validation has been carried out on the GRID, making use for the first time of both WLCG and Japanese (KEK) resources, as well as LXBATCH. A technical report on the validation of release 9.5 is available as LCG note (CERN-LCGAPP-2011-04).

The new release includes many new features and fixes. In addition to those mentioned in the previous quarterly report, it should be mentioned: a new model for Bremsstrahlung, based on the tabulated cross-sections published by S.M. Seltzer and M.J. Berger and providing better agreement with the low energy Livermore and Penelope models below 10 MeV and the standard relativistic model at 1 GeV, now used by default at energies below 1 GeV. The Fritiof (FTF) model has been extended to treat

interaction of antinucleons with matter. The Binary cascade model has been revised to improve the excitation energy for re-scattering. The physics-lists interface has been revised, allowing a considerable reduction in the number of reference physics-lists, but enabling more options for electromagnetic and ion physics including a new interface to DPMJET-II.5. A new base-material approach is now implemented, allowing reuse of the physics table build for one material by a group of similar materials with different densities. A new geometrical shape, a tube with possible cuts in +-Z, has been defined, completing the set of geometrical primitives foreseen in the GDML schema. The installation system in the new release is now based on CMake and is fully featured.

Among the fixes there is a correction to field propagation and navigation for resolving a long-standing issue of charged tracks stuck on boundaries reported by ATLAS. This fix, along with others collected, has been also included in a patch release 9.4.p03 released last December as well, and provided to the LHC experiments for their 2012 simulation production.

The first prototype of the multi-threaded Geant4 (Geant4-MT) based on release 9.4.p01 has been announced early November, now downloadable from the Geant4 web site and available for Alpha-testers.

Enhancements have been made to MCPLOTS, now including a new feature allowing filtering the displayed graphs according to the selected Rivet analysis.

The Simplified-Calorimeter application for physics validation has been moved to the SVN repository; it now includes also the necessary scripts to allow production of data on distributed resources (including the GRID); the code can be used as an example demonstrating how to extend a simulation application to run on the GRID.

A new note (CERN-LCGAPP-2011-03) describing validation of meson-induced target diffraction has been prepared.

SPI

The LCG 62 configuration, aimed at the 2012 data taking, was delivered in December. It is based on ROOT 5.32 and contains a major upgrade in Boost. It is as well the first LCG configuration being released for gcc46. After having resolved the licensing situation with Intel, which was reported last time, the LCG 62 configuration has been released for the Intel Compiler Collection as well.

Concerning future versions and platforms, the project now provides integration builds for gcc46 on Scientific Linux and another special branch aimed at the migration to Python 3.0. Activities to provide a Clang based build started recently.

The effort on reducing the Savannah issues backlog is finished. Remaining issues has been included in the standard upgrade planning. In February a security incident was reported, which allowed anonymous users to upload unauthorized content. Together with the CERN Computing Security the missing security features could be added and deployed the same day. Preparations for JIRA as a potential Savannah successor continue, and CERN IT hired a new person to work on a prototype infrastructure. Access for test users is expected for early February.