Applications Area Report
August 2012 – October 2012

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ROOT

The ROOT team is working very hard in getting ROOT 6 out by the end of the year. This will include the work on the new C++ interpreter based on the LLVM compiler technology. Finally, there will be no more C++ idiosyncrasies in the interpreter. The ROOT team is committed to ensure that all tutorial and tests will be running with this new interpreter. This release will not be used by the LHC experiments since it will still be missing some of the required components for the I/O subsystem.

ROOT 5.34 has now a native cocoa back-end on the Mac instead of using the X11 windowing system that has been using up to now for this platform. A new Latex interpreter to produce high quality plots for publication has also been added. Finally, there has been a lot of progress the set of Javascripts that would allow any user to browse ROOT files from any web client and server. A publisher has contacted the ROOT team interested in this development in order to provide access to the data (mainly histograms) associated to published HEP papers using a web browser.

Persistency Framework

No new releases of the Persistency Framework projects have been built in Q3 2012. The last software versions built in Q2 2012 (for LCGCMT_63) have been re-released using new configurations (LCGCMT_64 and LCGCMT_64a) providing a few external software upgrades (e.g. frontier_client) for ATLAS and LHCb. The port of the CORAL and COOL code base to gcc47 with c++11 support has been completed, except for the removal of language constructs that are deprecated in c++11. Work is also ongoing on the preparation of new major releases with API changes in both packages, to be picked up by the experiments during the LS1 shutdown in 2013.

A new Oracle client (11.2.0.3.0) has been installed on AFS in view of its use by the LHC experiments in the upcoming releases of CORAL. The main motivation for the upgrade is a critical fix for the security vulnerability CVE-2012-3137 in the Oracle logon protocol. It has also been verified that the new software includes fixes for SELinux and AMD/multicore related bugs previously affecting the unpatched 11.2.0.1.0 Oracle client. It was found, however, that the 11.2.0.3.0 client is still affected by the redefinition of Kerberos and GSSAPI symbols, a bug which was observed in the past to cause issues due to clashes with the same symbols from the system libraries. A Service Request is open with Oracle about this problem and continues to be followed up.

The CORAL server and MySQL server for the CORAL and COOL nightly tests, previously hosted on old hardware that had to be retired, have been moved to a new fully quattorized SLC5 virtual machine in the CERN computer centre.

Simulation

The development activities are focused on the preparation for the 2012 public release of Geant4, release 9.6. Part of the development for release 9.6 and already included in the Beta release of last June is a series of improvements in the EM physics builders used in HEP applications. This includes the adoption of the Wentzel multiple-scattering model

for electrons (only at energies above 100 MeV) and for all other particles (spanning all energies). This enables the improved treatment of large angle scattering at high energies. 9.6-Beta also includes changes in the configuration to use the relativistic e+/e-pair production model at energies above 80 GeV (to correct deviation of cross-section found in existing model in this limit); fixes and improvements in the angular generators for Bremsstrahlung and photoelectric.

The performance improvement in the Livermore Rayleigh scattering model now allows its use also in HEP applications, if needed.

In preparation for release 9.6, all production physics-lists have been or will be migrated to use the new Bertini/FTFP stopping models for stopping particles, lepto-nuclear and electro-nuclear interactions, in place of CHIPS models. The cross-sections of electro-nuclear, gamma-nuclear and quasi-elastic, which have been extracted from CHIPS will be used. For electromagnetics, the configuration of EM builders will be revised as well.

Opt1 (for homogeneous calorimeters) is refined to coincide with the options chosen together with CMS; Opt2 (tuned for vertex reconstruction) is targeted to address the needs and parallel fully the choices of LHCb (configured with multiple scattering with higher precision of displacement for high energy particles and less reduced precision for showers in calorimeters); a new choice, Opt4, further refines the precision choice (Opt3) in order to give the best combined standard/low-energy models.

Following the annual Geant4 Collaboration Meeting has been held in Chartres (France) on September 10-14th, plans have been established for Geant4 Release 10 in 2013, in which multi-threading will be incorporated in the base Geant4 source code. It will be possible to choose at installation time between the multi-thread capable version and the sequential version. The beta, development release for this is scheduled for June 2013.

The GRID validation suite (Simplified-Calorimeter) has been greatly improved in terms of automation and integration with CERNVM. The lack of long-term support of the underlying Diane tool still remains an open problem.

A more strict cooperation between the SFT/SPI project and GENSER has been defined. Planning to introduce changes in GENSER mainly on the technical side (to adopt the build system used by SPI) for a better integration with the SPI external software distribution.

SPI

One new patch release LCG 64a was prepared in August. It contains updates mainly to the used Python packages. In addition, another HEPSOFT 0.6 release was created. Concerning supported platforms, externals are now provided for the latest gcc 4.7 cycle and it is foreseen to become the default production platform next year. In addition a clang 3.1 based nightly build has been added. The migration of LCG configurations to MacOS X Mountain Lion is ongoing. It will probably be finished by the next quarter.

On infrastructure, the SPI project assisted the Geant4 collaboration in setting up a new nightly build infrastructure based on Electric Commander and CDash.

The preparations for migrating project data from LCG Savannah to the CERN Jira service are progressing. A dedicated importer plugin has been developed, and exact migration plans will be discussed with the LHC experiments at the start of the long shutdown in 2013.