

Applications Area Report

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We have seen in the last quarter a small reorganization in the activities of the PH-SFT group to respond to the review recommendations and to define the new priorities for 2011 and 2012. The group will continue to support for the LHC experiments as its main priority. At the same time, improve synergy between activities of the group, start supporting new approved experiments and continue to prepare for the future by investigating new software technologies. This new organization comes with changes in roles and responsibilities: John Harvey is the new group leader, Pere Mato will continue to run the AF and steer the baseline and consolidation tasks, Fons Rademakers leads the ROOT project, Gabriele Cosmo leads the simulation project and Benedikt Hegner leads the SPI project.

ROOT

The production release 5.28 at the end of the year went smoothly without any major problems. Large effort has been made to consolidate the existing code and improve its quality by using the coverity tool, better testing infrastructure and additional tests for the GUI subsystem using the event recorder. For the I/O subsystem, major progress has been made to further optimize the reading part of the streaming engine. The new interpreter prototype based on clag/LLVM is clearly progressing: already in this early stage it can replace certain parts of ROOT's current interpreter CINT. Additional improvements have been made in the core mathematical libraries such as an updated interface for numerical integration, minimization and distribution sampling. New algorithms like genetic minimization or kernel density estimation have been added, as well as various bug fixes and improvements have been applied also in Roofit/Roostats packages. Started to investigate (and prototype) new GUI technologies based on OpenGL (in particular OpenGL ES) on different platforms.

For PROOF a lot of work on supporting ALICE during the HI run. Introduction of the ProofBench suite that allows benchmarking and understanding PROOF performance at any cluster.

Persistency Framework

New releases of the PF projects have been prepared for the two new configurations LCG_59b (for ATLAS, based on ROOT 5.26) and LCG_60 (for LHCb, based on ROOT 5.28), using the same code base for both (COOL 2.8.8, CORAL 2.3.14 and POOL 2.9.11). The new releases include several bug fixes and enhancements in all three packages, mainly in CORAL (including a major restructuring of the test infrastructure to extend its coverage, as well as the implementation of a workaround for a bug causing endless connection retrieval loops after a network glitch), but also in POOL (support for the latest I/O optimizations in ROOT and enhancements in the collections packages) and COOL (bug fixes for NaN handling).

Simulation

The new public release of Geant4, release 9.4, was made in December as scheduled. Among the features included, contributed by SFT, to mention: improvements in the Fritiof/FTF hadronic model (better selection of final states at low energies and tuning of the parameters of its Reggeon cascade); a revised choice of modeling in FTFP_BERT to use improved modeling of hyperons and anti-nucleons (adopting the CHIPS model in place of LEP); a new geometrical solid, G4GenericTrap (following an ALICE request); the first implementation of a new build/installation environment based on CMake. Validation tests of the new release have been carried on the GRID, showing excellent stability. The new release has been chosen by both ATLAS and CMS to base their 2011 simulation production on.

The Geant4 source code repository has been successfully migrated from CVS to SVN IT services; a new tags selector system integrated with Drupal has been put in place, replacing the old Bonsai system.

On physics validation, the investigation on the effects of hadronic models transition on the energy resolution has been completed; it has revealed that both resolution and the normalized width do not show the problem, and in particular, the FTFP_BERT physics-list is very smooth. "Shower momenta" are now routinely checked with the Simplified-Calorimeter test suite. The results are now available through a web-based application.

The new web service on MC Generators tuning and validation is now publicly available at mcplots.cern.ch. Further extensions and improvements are now planned. Most MC Generator packages have now been ported to MacOSX, and old ones can be added on demand.

SPI

The SPI project has been focusing on consolidation of infrastructure and services. All the web services have been successfully migrated to newer hosts in the CERN computing center, and in turn integrated into the central service monitoring provided by CERN IT. The AA project websites are still being moved to the central Drupal services of PH/SFT, and an effort to systematically update the documentation of the SPI infrastructure has been started.

There have been two further releases in the "LCG 59" cycle and the first release of the "LCG 60" cycle. The most important change in the "LCG 60" cycle is the move to ROOT 5.28.00 and Boost 1.44. Various other externals were updated as well. This release series is the first one to fully support the Intel icc compiler on Linux. At the same time VC7 was replaced by VC9 on the Windows platform. The Scientific Linux 4 support has now officially been discontinued.

The usage of JIRA as an issue tracker for the internal work of the Applications Area was evaluated. Its usage should increase the transparency of tasks and priorities for discussions in the Architects Forum. The evaluation was very successful and the tool is about to be used in production now.

A new prototype project is the usage of CMake as a common build tool for the Applications Area projects, being a potential replacement for CMT and manually managed Makefiles. First attempts have been promising and the next milestone will be to provide the externals of the LCG configuration in form of a CMake environment.