Applications Area Report
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In the last quarter AA has prepared 8 different releases of the common software stack for LHC experiments. The changes within these releases include major upgrades of the AA developed projects (ROOT, POOL, COOL, CORAL, RELAX) and at least one upgrade of 26 "external packages" (i.e. software developed outside AA). Currently 14 different software platforms are being supported and recently the complete software stack was ported to the latest Mac OSX 10.6 on 32 and 64 bit architectures. Python continues being one of the cornerstones of AA and LHC software with an ever-increasing number of modules. This huge success of the language required a new deployment method to be implemented for the currently 23 supported Python modules.

ROOT

In view of the coming production release 5.28 in December an overall campaign of code correction and consolidation in response to the reports generated by the Coverity static code analysis tool has taken place. This great tool is able to report very special cases that may happen with a very small probability. We have been actively working in fixing the vast majority of reports, in particular the ones flagged as "high impact".

Finalized the support for member-wise streaming of collections and made it the default, the files using the new format are between 2% and 10% smaller and can be read 12% to 30% faster. Investigation of the feasibility of a new C++ interpreter based on the industry standard C++ compiler Clang is on going and show good promises. Significant increase in the number of new groups setting up PROOF-based analysis farms, mostly from ATLAS and CMS. This also increased the request for user support. The RooStats package has been greatly improved taking into account the new requirements from the LHC data analyses. For example it has been used in a prototype analysis for combining Higgs results of ATLAS and CMS.

Persistency Framework

Three new releases of the Persistency Framework projects have been prepared motivated by fixes to problems reported by experiments. One important issue in Oracle database services was also analyzed and solved. The cause has been an incompatibility between various versions the gssapi library used by Oracle, Globus and Xerces.

Server-side process crashes triggered by COOL applications were observed on the ATLAS and LHCb databases, after the Oracle security updates were applied in June. The team prepared a COOL-based stress test suite that was successful in reproducing the issue on a test database and this has also been used to validate the lastest patch proposed by Oracle.

Simulation

New Beta release of Geant4, 9.4-beta, was announced as scheduled on June 25th. Among the developments included are a new revised Bertini cascade hadronic model, new physics-lists configurations utilizing improved modeling for anti-baryons and hyperons (using the CHIPS hadronic model instead of parameterised LEP/HEP models). Improvements in memory management for issues also reported by performance monitoring teams in ATLAS and CMS, and a new trapezoid shape, G4GenericTrap,

requested by ALICE. Additionally two patch-releases, 9.2.p04 and 9.3.p02, were recently distributed, including also fixes for few issues affecting the releases currently in use by the LHC experiments.

Good progress has been made in understanding the effects of models transition on energy resolution in Geant4. The simulation quality of new physics configurations combining the Fritiof model and the Bertini intra-nuclear cascade, has improved considerably, with rather positive feedback from validation studies made by ATLAS and CMS.

The regression testing suite for MonteCarlo Generators has been renewed to be now based on distributions and using tools like Rivet and the HepMC-analysis tool. Good progress has been also achieved in the realization of a new web interface for the tuning and validation of Generators against the latest available public data from the experiments.