

| QUARTERLY STATUS REPORT | | | | |
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| Project Name | | | Date | |
| Applications Area | | | 3.10..2008 | |
| Report Period | | | Author Name | |
| 2008Q3 (Jun-Sept) | | | Pere Mato | |
| Milestones for the Quarter | | | Status | Comments |
| SPI | | | | |
| SPI-13 | 31.12.07 30.04.08 30.09.08 | Provide an integrated web-based information system about LCG software. This includes information about software dependencies, build information, LCG configurations, then nightly build system, etc. | Done | The system has been put into production (see http://lcgsoft.cern.ch) |
| SPI-15 | 31.03.08 30.09.08 | Integrate the Geant4 build and test procedure with the LCG AA nightly build system, this will require some adaptation as Geant4 uses different procedures for software check out using tag collectors. | Done | The nightly build system has been adapted to the needs for Geant4 builds. As a proof of concept first test suites are being executed with in the LCG/AA nightlies. Any further work to make the test suite complete will be done by a newly joined Technical student of the Geant4 collaboration (with help of SPI if needed). |
| SPI-16 | 30.06.08 31.12.08 | Deployment of a web content management system, after a quick survey, needed for the restructuring of the SPI web to provide a coherent and complete source of information of all services for users and maintainers. | In progress . Rescheduled. | Investigations about the amount and distribution of pages are in progress. After analyzing those results we will have a clearer picture about the distribution of SPI pages over web servers, content types, etc. which will ease the decision on a new web content management system to be implemented to server as many of the different types of pages as possible. |
| SPI-17 | 30.06.08 | Development of a tool to bootstrapping LCG-AA software infrastructure. This tool should download the essential ingredients to be able to install the rest of the LCG-AA software stack. | Done | The tool "bootstrapLCG" will download and deploy the necessary bootstrapping ingredients of LCG software (i.e. LCGCMT configuration, python, cmt) and setup a proper environment. The tool was developed and tested all LCG/AA platforms. |
| SPI-18 | 30.09.08 31.03.09 | Migration of the current SPI web contents to the newly deployed content management system. This will require the manual inspection and possibly correction, re-writing of the pages. | In progress . Rescheduled. | This milestone depends on SPI-16 which is currently in progress. |
| ROOT | | | | |
| ROOT-19 | 30.06.08 31.12.08 | Implementation of the complex data schema evolution in ROOT | In progress . Rescheduled | The schema evolution will be available in version 5.22 in December, most of it already released with 5.21/04. |
| ROOT-20 | 30.06.08 | Improvements of the ROOT test suite as part of the nightly build system to improve the robustness of the system in general. | Done | Done but of course new tests are regularly added. |
| ROOT-21 | 30.06.08 | Development of the Event Display library (first version). | Done | The Event Display Library (EVE) now used by several event displays, in particular AliEve for Alice and FireWorks for CMS. This area requires continuous developments. |
| POOL | | | | |
| POOL-11 | 30.04.07 31.08.07 | Complete the porting of the POOL data regression tests into the nightly build system | Done | The work has been completed. |
| POOL-13 | 30.06.08 31.12.08 | CORAL server development. COOL read-only tests for selected basic use cases pass | In progress . Rescheduled. | Development is taking longer than expected. The first official release (read-only) is expected by December. |
| POOL-14 | 15.08.08 31.04.09 | CORAL server development. All CORAL integration tests (including write test) pass. This will also require some extension of the current CORAL tests suite to achieve full coverage. | In progress . Rescheduled. | The functionality (update and security) of CORAL sever is expected by end April 2009. |
| POOL-15 | 30.09.08 | CORAL Server scalability and stress tests pass. | No progress . On hold. | Waiting for POOL-13 and POOL-14 |
| COOL | | | | |

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| COOL-9b | 31.12.06 31.03.07 30.06.07 30.09.07 31.12.07 31.03.08 30.09.08 | Deployment of COOL database services at Tier0 (separate instances for online and offline) and Tier1 for LHCb with Streams replication. | Done | For LHCb: a test service setup was prepared with two-step Streams replication between CERN online (private LHCb test single-instance server at the pit), CERN offline (IT-PSS 'integration' RAC) and three 'phase-1' Tier1 sites (Gridka/FZK, IN2P3, RAL) by Q4 2006. One 'phase-1' (CNAF) and one 'phase-2' (Nikhef/SARA) Tier1 sites joined in Q1 2007. The last 'phase-2' site (PIC) joined in Q2 2007. The production 'LHCb-offline' RAC server replaced the 'integration' RAC in the T0 setup for LHCb in Q2 2007. The production T0 setup was finally completed in Q3 2008, with the move to the production 'LHCb-online' RAC server, installed and managed by LHCb at the pit. The delay is due entirely to LHCb. |
| COOL-25 | 30.09.08 | Implement a 'partial' tag locking mechanism. | Done | Partial' tag locking is meant to prevent the removal but allow the addition of new IOVs or HVS nodes to partially locked tags. The generic API for partial tag locking, and its implementation for the additions of new HVS tags, have been completed in COOL 2.3.0 (January 2008). The functionality to allow also the addition of IOVs to partially locked tags has been completed and is ready to be released in the upcoming COOL 2.6.0 (November 2008). |
| COOL-26 | 30.09.08 30.12.08 | Support for the gcc4 compiler. | In progress Rescheduled. | The port of the COOL code and configuration to support gcc4.1 has been completed in COOL 2.3.0 (January 2008). This is not an officially supported platform yet - it is expected that only gcc4.3 will be supported in the LCG AA. The port of the COOL code to gcc4.3 (stricter than gcc4.1) has started in October 2008 and is almost completed. It also depends on the completion of the CORAL port (POOL-19). |
| COOL-28 | 30.09.08 31.12.08 | Support for the 'CORAL server' backend. | In progress Rescheduled. | Support for 'coral://' URLs was first prototyped in COOL 2.4.0 (February 2008), allowing simple tests against early prototypes of the CORAL server and the definition of additional constraints on its development for its integration into COOL. The COOL read-only tests are now routinely used to validate the CORAL server implementation (POOL-13). Full support in COOL depends on the release of the CORAL server (POOL-16). |
| COOL-29 | 30.09.08 31.12.08 | Expose transaction management in the user API. | In progress Rescheduled. | Prototypes of the API and implementation are ready to be internally reviewed for inclusion in one of the upcoming COOL releases. |
| COOL-30 | 30.09.08 31.12.08 | Allow session sharing in the user API. | Not started. | Depends on COOL-29. Waiting for review of API of COOL-29 transactions. Instead: COOLxx (pyalod queries), resurrected, will be in COOL260. |
| SIMU | | | | |
| SIMU-10 | 30.06.07 31.12.07 31.12.08 | Application of corrections of test-beam data, for validation of stand-alone simulation, to the LHC calorimeter test-beams (VD703) | | No progress. Experiments are still working to complete their test-beam analyses. |
| SIMU-20 | 30.11.07 | Review, redesign and debugging of the FLUGG tool (SF711) | | Partially done. An important bug fix was recently provided, enabling to use FLUGG with the latest version of Geant4. A general code review has not been done due to lack of manpower. |
| SIMU-21 | 15.12.07 31.12.08 | Thin-target validations of Geant4 forward physics (G4712) | | Work is suspended, due to lack of manpower in physics validation. Problems exist with acceptance corrections in the published HELIOS data. Awaiting man-power (a fellowship) in order to continue this work. Postponed to December 2008. |
| SIMU-25 | 30.03.08 | 4th simple benchmark for Geant4 and Fluka: diffraction of nuclei (VD801) | | After first Geant4 results, also some preliminary Fluka results have been compared with data. After discussions with Fluka experts, it has been agreed that the data needs further investigation since the original analysis was based on some old, wrong assumptions. Furthermore, proton-proton data is considered important for a more complete investigation of the diffraction, therefore requiring additional analysis. The activity has been postponed, pending the assignment of new manpower. |

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| SIMU-27 | 30.04.08 | Status report on comparisons with shower shapes and relevant physics modeling (G4802) | | With the addition of quasi-elastic scattering and the use of the Geant4 QGSP_BERT physics-list, starting with version 8.3, the hadronic shower shape descriptions are now much improved, resolving the issue for the LHC experiments. A short note summarizing this progress is pending and under preparation. |
| SIMU-29 | 30.09.08 | Fluka extension to the ATLAS HEC test-beam analysis (VD804) | | The ATLAS HEC test-beam analysis is one of the main calorimeter validation tests for the hadronic physics of Geant4. The aim of this milestone is to extend this analysis to Fluka using Flugg, and the experience gained in the similar Fluka extension of the ATLAS TileCal test-beam (see Milestone VD524). |
| SIMU-31 | 01.06.08 31.12.08 | Extend Rivet validation to new C++ generators (GS808) | | Some work has started in December with Sherpa, but it is not yet concluded due to problems with Sherpa which were fixed after the GENSER integrator left. The work should resume and be concluded by December 2008. |
| SIMU-32 | 15.09.08 | First version of System Integration Testing of Geant4 running on SPI-nightly platform (G4811) | | Level-2 milestone. Provide migrated test suite for integration in the SPI-nightly facility. |
| SIMU-34 | 30.06.08 | New release of HepMC (2.04) including new handling of units (GS815) | | 2nd level milestone, the new release will include optional handling of units and other minor features |

Summary Of Progress

No major releases of the Application Area software was released during last quarter. Experiments were getting ready for beam and didn't require any major change. On the other hand we have made substantial progress on porting the software stack (externals, and AA developed code) to other platforms such as gcc 4.3 and VC9. These ports are needed for next year production releases.

No new releases were produced for any of the Persistency Framework projects since the LCG_55 release in June 2008. Several new functionalities and performance optimizations have been prepared for COOL and are ready to be released in the upcoming COOL 2.6.0 (November 2008). Significant progress was made also in the port of COOL to gcc4.3 and VC9. Progress was made in the development of the initial read-only implementation of the CORAL server, but a few functional and performance issues still need to be addressed before the software can be released. The addition of secure authentication and write functionalities have been postponed and rescheduled as separate milestones to be completed in 2009. A few enhancements of the POOL collections package have been prepared and will be released in Q4 2008.

On the CINT/Reflex merge, a version that passes all ROOT tests and that is comparable in speed with the old CINT is on schedule for ROOT's December release. ROOT can be built already now with the new and the old CINT in parallel. Still to come: speed improvements for Reflex and several bug fixes for the core of CINT7.

We released the first step in the implementation of the infrastructure for the new Data Model Evolution Scheme. The current capabilities are: assign values to transient data members, rename classes, rename data members. change the shape of the data structures or convert one class structure to another, change the meaning of data members, ability to access the TBuffer directly when needed, ensure that the objects in collections are handled in the same way as the ones stored separately; all of those are supported in object-wise, member-wise and split modes. The following features and issues should be addressed in the next release: make things operational also in bare ROOT mode; ability to transform data before writing; support for changing the class type of nested object in a split branch; support for access to onfile version of nested objects from within the parent rule.

Graphical User Interface development was mainly focused on event displays (Alice and CMS), implementing a few new widgets and extending several existing ones. An event recorder prototype has been successfully implemented and integrated in ROOT. Focus has been given on improvements of the robustness and performance of the GUI.

A new version of the ROOT mathematical libraries has been release with improvements in the fitting and minimization. New common classes are now used for fitting all ROOT data objects, such as histograms and graphs, and various minimization algorithms can be used as independent plug-in's. The GUI fit editor has been as well improved by adding the support for multi-dimensional histograms and graphs. The documentation has been also improved and in particular, for RooFit a new version of the user guide has been released and many example tutorials added to the distributions.

Redesign of the TGraph family classes to separate the data handling from the graphics. Improvement of test suite to make it the more accurate as possible in early bugs tracking. As part of the general effort to improve ROOT documentation and tutorials the documentation of all graphics classes has being redesigned and completed.

Finally, for what concerns PROOF, In addition to consolidation and debugging activities, the main developments during this quarter have been (i) the delivery of a new version of the XROOTD plugin, supporting automatic reconnections in the case of xrootd restarts; (ii) the implementation of a dynamic mechanism for "per-query" scheduling, where the master asks the scheduler the list of workers to start just before start processing the query; and (iii) the support for memory consumption monitoring on all the workers as a function of the processing step.

For the simulation project during the 3rd quarter of 2008, two major achievements were made in Geant4: a preview release 9.2-Beta, released to public in July, and a new patch to release 9.1 (9.1.p03), released last September. Most of the fixes introduced in 9.1.p03 are also part of 9.2-Beta, plus some more, including a fix in the field propagation causing a rare crash in ATLAS (about 2 per million events). Most fixes are the result of feedback received from LHC experiments and have been made promptly available to aid experiments in their production phase. 9.1.p03 also contains corrections for two issues reported by the HARP-CDP group last March. ATLAS has reported great stability of their simulation based on 8.3.p02 (one failure every 500K events), and is now migrating to adopt release 9.1. 9.2.-Beta includes improvements in the FTF (Fritiof) hadronic model for pion incident interactions; alternative multiple-scattering models, and the first implementation of a GDML writer as part of the already existing Geant4 GDML plugin module. The final public release 9.2 is expected for December. Quite a lot of activity in the physics validation domain has been carried out to test and verify the new improved Fritiof model by V.Uzhinskiy, also using the HELIOS target diffraction benchmark. A new version of HepMC (2.04.00) was released last summer, adopting the new release process implying direct contertation with MC authors and developers in a dedicated forum; the release includes the announced changes in the handling of units, agreed with the experiments.

| Issues During the Quarter | | | | |
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| Milestones Changes and Actions | | | | |
| References and Hyperlinks | | | | |
| New and Next Quarter Milestones | | | Status | Comments |
| SPI-19 | 30.09.08 | Exploit the full potential of multicore build servers for LCG/AA nightly builds | New Done | The nightly build systems have been adapted to exploit the full potential of the multicore build servers used for LCG/AA s/w builds. This has been achieved by multithreading the builds on different levels (i.e. packages, compilation units) - decreasing the overall build time by a factor 3. |
| SPI-20 | 31.12.08 | Establish the software removal procedure | New | Over time the afs area of LCG/AA has been the container for many different versions of software packages. A proposal for cleanup of these has been sent out to the stakeholders of the LCG/AA software. If accepted some tools for the automatic cleanup need to be implemented. |
| SPI-21 | 31.12.08 | Review of the LCGCMT configuration database | New | LCGCMT is the basic software configuration database for CMT based projects in LHC. A review and adaptation to new needs of this database is needed. E.g. make it easier to do cross compilation of software. A proposal with changes has been sent out to the stakeholders, i.e. members of the architects forum which will be touched by these changes. |
| SPI-22 | 31.12.08 | Nightly builds with a "client server architecture" | New | In order to allow even more dynamic builds of the LCG/AA nightly builds a client-server architecture is envisaged. This will allow "build nodes" to connect to a client which will distribute the builds according to the capabilities of the client. |
| SPI-23 | 31.03.09 | Automatic external s/w stack rebuild | New | The LCG/AA software stack is permanently adapted to new compilers, operating systems, architectures. Every time such a change happens all the external software packages need to be recompiled. With the newly introduced "Builder" system this can be done easy on a package per package basis. A tool on top of this system should allow further automatization and ease the recompilation of all software packages in one go. |
| COOL-14 | 31.03.07 30.06.07 30.11.08 | Support for simple payload queries (lookup of IOVs by payload data). | Resumed. Ready to be released. | The implementation of payload queries will be based on the new record and field interfaces described in milestone COOL-7 and released in COOL 2.0.0 (January 2007). This milestone has been resumed after being removed in Q2 2007. The new API and its implementation are ready to be released in the upcoming COOL 2.6.0 (November 2008). |
| COOL-31 | 30.12.08 | Reimplement and optimize all SQL queries for IOV retrieval by time, reusing the same C++ methods for different SV and MV use cases. | Ready for release. | The SQL queries needed to handle the various COOL use cases (SV, MV tags, MV user tags, MV HEAD...) were originally defined in separate C++ methods, added over time. In order to allow the future maintenance of the software and further performance optimizations, these pieces of code need to be merged together. Some improvements in this direction were added in the COOL 2.3.1 release (February 2008): the same code is used for IOV retrieval from MV tags and MV user tags. This has allowed the simultaneous performance optimizations of IOV retrieval from MV tags, and IOV insertion with MV user tags. Additional improvements were then added in COOL 2.5.0 (June 2008) to reuse the same code also for some SV and MV 'head' queries. |
| COOL-32 | 30.11.08 | Implement the 'tag cloning' functionality. | New. Ready to be released | This functionality has been requested by LHCb. Its implementation is completed and ready to be released in the upcoming COOL 2.6.0 (November 2008). |
| COOL-33 | 30.11.08 | Avoid unnecessary COUNT(*) queries in IOV retrieval. | New. Ready to be released | This performance optimization has been requested by Atlas as a result of their distributed stress tests in Q3 2008. Its implementation is completed and ready to be released in the upcoming COOL 2.6.0 (November 2008). The size of IOV iterators is now computed only on demand, avoiding unnecessary COUNT(*) queries against the database server. |

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| COOL-34 | 31.12.08 | Support for MS VC9. | New. In progress. | A significant effort was spent during Q3 2008 on the port of the COOL code and configuration to support the Microsoft Visual Studio Express 2008 (VC9) compiler. In cooperation with the SPI and ROOT teams, this resulted on good progress also in fixing several issues with gccxml, ROOT and LCGCMT. COOL can now be built but several issues still exist at runtime during tests. Support for COOL on VC9 also depends on the completion of the CORAL port (POOL-21). |
| COOL-35 | 30.06.09 | Migration from CVS to SVN. | New. | |
| POOL-16 | 31.10.08 31.12.08 | First CORAL release with read-only CORAL server support, start of experiment validation | Rescheduled. | This milestone has been rescheduled and reduced in scope to functional tests of the read-only functionality. The releases of more complete CORAL server software with secure authentication and full write functionalities have been rescheduled as milestones POOL-17 and POOL-18. |
| POOL-17 | 31.10.08 28.02.09 | Release of CORAL Server with secure authentication. All functional tests pass. | Rescheduled. | This is a rescheduled milestone, previously expected for October 2008 as part of POOL-16. |
| POOL-18 | 31.10.08 30.04.09 | Release of CORAL Server with full write functionality (DML and DDL). All functional tests pass. | Rescheduled. | This is a rescheduled milestone previously expected for October 2008 as part of POOL-16. |
| POOL-19 | 31.12.08 | CORAL support for gcc4.3. | New. | |
| POOL-20 | 31.12.08 | POOL support for gcc4.3. | New. | |
| POOL-21 | 31.12.08 | CORAL support for MS VC9. | New. | |
| POOL-22 | 31.12.08 | POOL support for MS VC9. | New. | |
| SIMU-35 | 1.12.08 | Test of MCDB in CMS large productions | New | |
| ROOT-22 | 31.12.08 | Restructuring of the ROOT web site and documentation system. | New | We are planning to make a substantial reorganization of the ROOT web site (unchanged since many years) to reflect a more modern presentation style. The new site will include a brief description of the main ROOT functionalities and more guidance for newcomers. The class documentation system will be revisited to provide a more coherent description of the class, function parameters and side-effects. A first version of the web site is expected for June 30. |
| ROOT-23 | 31.12.08 | Implementation of PROOF optimized to run locally on multi-core platforms (PROOF-lite). | New | This version of PROOF, PROOF-lite, will not use the xrootd daemons, but start directly the master and workers. Communication will be via local mechanism, like Unix sockets and message queues. Also this version will be optimized the I/O by trying to use memory mapped I/O. Due date December 2008 |
| Comments and Additional Information | | | | |
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