

QUARTERLY STATUS REPORT				
Project Name			Date	
Applications Area			31.07.2007	
Report Period			Author Name	
2007Q2			Pere Mato	
Milestones for the Quarter			Status	Comments
SPI				
SPI-9	30.06.07	Set up an automated build system including running the tests and providing a web based view on the status of the builds/tests.	Achieved	The nightly build system has been setup for all LCG-AA supported platforms (Linux, MacOS, Windows).
SPI-10	31.03.07 30.06.07	Move the HyperNews service and the remaining web pages from lcgapp to new server hardware.	Achieved	The HyperNews service was move new IT manage hardware beginning of July. It improve the response and reduces the load on the machines. In addition a new instance for the LCG-AA has been setup. The lcgapp web server will not move and the few remaining pages will be deprecated.
SPI-11	30.06.07 30.09.07	Migrate all relevant scripts and procedures (external package building, project post-build, distribution kits, web page generators, etc.) in the SPI environment to use the configuration information from CMT.	In progress. Rescheduled.	Work is well advance and will be finish in the coming weeks.
ROOT				
ROOT-5	31.03.06 31.03.07 30.06.07	The Python interface to ROOT (PyROOT) adapted to directly use the new C++ reflection library (Reflex). This would avoid the intermediate software layers and additional dependencies of the current implementation, improving the overall design and maintainability.	Rescheduled indefinitely.	The only PyROOT developer (Wim Lavrijsen) is unable to allocation time for this.
ROOT-16	30.06.07 31.12.07	Cint 7.2 will use Reflex for storing all information regarding types (replace G__struct global array).	In progress, rescheduled to ROOT production release December 2007.	Reduction to 50% of original FTE at CERN. Need to determine and implement many missing, critical features in Reflex, e.g. delayed dictionary initialization, unloading, non-linear member look-up, real-use test suite. Porting fixes from current CINT to CINT7 is more time consuming than expected. Additional issues in CINT discovered while porting, e.g. scalars vs. 1-dim arrays. Status: functions, methods, variables, data members, and typedefs converted to Reflex; test suite not passing yet. Goal: the only remaining C structure G__struct for classes, enums, etc, will be converted until the December release. Reflex will have the necessary functionality. All ROOT tests will pass. By default ROOT will use the old CINT version; the new one can be activated by configure.
POOL				
POOL-8	31.03.07 30.09.07	Provide schema evolution for relational data according to a priority list of required use cases provided by the experiments.	In progress. Rescheduled.	The work on this milestone has started by collecting a list of required use cases between the persistency framework team and application experts from the CMS experiment. Further discussions are required until this list can be declared to be complete. We propose to reschedule this milestone to 30.9.07 to also involve new persistency framework developers.
POOL-10	31.03.07 31.05.07 30.11.07	POOL and CORAL independent from SEAL	In progress. Rescheduled.	The design work on this milestone has started but the schedule will likely be affected by the the development team replacements. We propose to reschedule this milestone to 30.11.07.
POOL-11	30.04.07 31.08.07	Complete the porting of the POOL data regression tests into the nightly build system	In progress. Rescheduled.	The work on this milestone is progressing well and expected to finish during August.

COOL				
COOL-4	30.06.06 30.09.06 31.12.06 31.03.07 30.06.07	Support for multi-channel bulk insertion operations. This task requires the implementation of a channels table, which is also needed for channel name management.	Achieved	<p>The implementation of the channels table and channel name management was achieved in COOL 2.0.0 (January 2007).</p> <p>Full support for multi-channel bulk operations has been implemented in COOL 2.2.0 (July 2007). Tests have shown that the new implementation does provide a significant performance improvement. This task was rescheduled several times because it was allocated to the one of the two ATLAS developers who left the COOL project during Q2 2006. The same developer resumed work on the project in Q4 2006 (even if only at the 20% FTE level) and ensured its completion during Q2 2007.</p>
COOL-9	31.12.06 31.03.07 30.06.07 30.09.07	Deployment of COOL database services at Tier0 (separate instances for online and offline) and Tier1 for Atlas and LHCb with Streams replication.	<p>For Atlas: completed.</p> <p>For LHCb: in progress, rescheduled.</p>	<p>For Atlas: a test service setup was prepared with two-step Streams replication between CERN online (IT-PSS 'Atlas-online' RAC), CERN offline (IT-PSS 'integration' RAC), six 'phase-1' and one 'phase-2' Tier1 sites (BNL, CNAF, Gridka/FZK, IN2P3, RAL, Taiwan/ASGC; Nikhef/SARA, Triumpf) by Q4 2006. Of the two remaining 'phase-2' Tier1 sites, Nordugrid joined in Q1 2007 and PIC in Q2 2007. The production T0 setup was also completed in Q2 2007, with the move from the 'integration' RAC to the production IT-PSS 'Atlas-offline' Oracle RAC server.</p> <p>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. T0 setup is expected to be completed in Q3 2007, with the move to the production 'LHCb-online' RAC server, installed and managed by LHCb at the pit.</p>
COOL-11	31.03.07 30.06.07 30.09.07	Support for MacOSX.	In progress. Rescheduled.	<p>A full build of COOL on PowerPC MacOSX (using SCRAM) was first completed in November 2006, using a private build of CORAL and a private installation of Oracle.</p> <p>A public installation of COOL for PowerPC MacOSX (using CMT) has been prepared for the first time in the COOL 2.2.0 release (July 2007).</p> <p>All C++ tests are successful on MySQL, and all except one on Oracle (where the failure is due to a known bug in the Oracle 10.1 client library - 10.2 is not yet available for MacOSX). Several problems observed for SQLite are under investigation.</p> <p>Support for PyCool port has not been completed due to missing support for PyROOT on PowerPC MacOSX.</p>
COOL-12	31.03.07 30.06.07	Server-side (SQL query) performance optimization for SV single-channel and MV user-tag retrieval.	Completed.	<p>Two server-side SQL performance optimizations, for single-channel retrieval from single-version (SV) folders, and for user tag retrieval from multi-version (MV) folders, have been included in COOL 2.1.0 (March 2007).</p> <p>Other important performance optimizations, including those for MV tag retrieval, have been rescheduled as milestones COOL-18, COOL-19 and COOL-20.</p>
COOL-13	31.03.07 30.06.07	New relational schema with fewer tables.	In progress. <i>Removed.</i>	<p>The COOL 2.0.0 release (January 2007) includes several schema changes relevant to this task. In addition to the global (database) schema version, it is now possible to define a schema version at the folder level. In the future, it will thus be possible to create new 2.x.0 folders (using fewer relational tables) on a 2.0.0 database which can still be read (except for the new 2.x.0 folders) using the 2.0.0 software.</p> <p>This milestone has been removed because there is no agreed date to complete it for the moment.</p>

COOL-14	31.03.07 30.06.07 30.09.07	Support for simple payload queries (lookup of IOVs by payload data).	In progress. Rescheduled.	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 functionality has been rescheduled and is currently felt to be lower priority than other development tasks (such as milestone COOL-13).
COOL-16	31.03.07 30.06.07 30.03.08	Move from the SEAL component model to the new CORAL component model.	In progress. Rescheduled (depends on POOL-10).	The COOL team, together with the CORAL and SEAL teams, actively contributed to the debugging and testing of the SEAL component model in multi-threaded mode during Q3/Q4 2006. These activities led to the SEAL 1.9.0 and 1.9.1 releases in Q4 2006 and to the decision to drop the SEAL component model and move into CORAL. The C++ API changes relevant to this task were completed in COOL 2.0.0 (January 2007). There are no SEAL classes left in the COOL C++ API (with one minor exception requested by the Atlas users as long as SEAL is not dropped completely). Work on the internal implementation changes will start as soon as a CORAL prototype based on the new component model is available (currently expected for February 2008).
COOL-18	30.06.07	Server-side (SQL query) performance optimization for SV multi-channel retrieval.	Completed.	The SQL performance optimization for multi-channel retrieval from SV folders has been included in COOL 2.2.0 (July 2007). This improvement was the main focus of CORAL and COOL changes in Q2 2007, as the poor data retrieval performance for this use case was a blocker for the distributed conditions database stress tests performed by Atlas at T0 and T1 sites.
COOL-19	30.06.07	Client-side performance (C++ profile) optimization.	Completed.	Important client-side performance improvements have been achieved in COOL 2.2.0 (July 2007). This release includes C++ API extensions that allow data retrieval with minimal overhead with respect to CORAL (the data retrieved by CORAL are now available to COOL users without any additional in-memory data copy).
COOL-20	31.03.07 30.06.07 30.10.07	Server-side (SQL query) performance optimization for MV tag retrieval.	Rescheduled.	The server-side performance optimizations for standard tag retrieval from MV folders was originally foreseen in the COOL-12 milestone due in March 2007. It has been rescheduled several times due to more urgent performance improvements, such as the SQL query optimizations for data retrieval from SV folders.
SIMU				
SIMU-1	30.09.05 15.12.06 30.03.07 30.06.07 01.12.07	Apply the Fluka-Geant4 (Flugg) geometry interface to one of the LHC calorimeter test-beam simulation (VD524)	In progress. Rescheduled.	The work has been thoroughly discussed with Geant4 and Fluka developers, with positive responses. There is consensus that the results obtained so far (mainly the 20 GeV pion- case) are mature enough to be presented in the next LCG Physics Validation meeting (scheduled on 25 July). It is important to emphasize that the original analysis of the ATLAS TileCal 2002 test-beam, made in 2003 with Geant4 5.2, has been considerably extended and improved, in particular as far as the estimation of the beam composition, in order to provide a more precise test for the simulations. The milestone should be rescheduled for December 2007.
SIMU-18	30.06.07 30.09.07	Completion of integration of the GDML Geant4 binding in the Geant4 toolkit (SF709)	In progress. Rescheduled.	The work has started by the previous technical student (B.Lloyd) who left end of April. Not yet completed. Awaiting the new technical student starting beginning of July. Rescheduled for September 2007
SIMU-19	30.06.07	Implementation of quasi-elastic model and improved diffraction in Geant4 (G4710)	Achieved	Level-2 milestone, based on the recent studies on the quasi-elastic simulation in Geant4, and, independently, on an improved diffraction modelling in the FRITIOF string model, the Geant4 release in June included the new developments aimed to produce a significant improvement in the longitudinal hadronic shower shapes.
Summary Of Progress				

A number of complete software configurations (LCG_50, LCG_51 and LCG_52) have been made available with special emphasis on consolidation and getting as stable as possible for the scheduled LHC technical run. The HyperNews and Savannah services in use by the collaborations have been consolidated. The AA nightly build system has been put in production. All the AA projects have been adapted to use the CMT build and configuration tool and have standardized on the way to run the tests using the QmTest tool. All projects are built every night in various configurations and platforms. These builds are directly usable by the LHC experiments to validate new versions. The MacOSX(intel) and Windows platforms are being finalized.

Geant4 version 9.0 has been released end of June. Developments for this version include modifications of EM class interfaces for performance improvement, revised geometrical biasing that utilises the coupled transportation in parallel geometries, a revised implementation of geometry tolerances to enable the setting of relative geometrical tolerance at initialization time.

The main activity in the Physics Validation has been the comparison of the Bertini Cascade extension of Geant4 to the calorimeter test-beam data. Preliminary results from ATLAS and CMS test-beams consistently show that the hadronic showers get longer and wider, in better agreement with the data. Another important activity has been the Fluka extension of the ATLAS TileCal 2002 analysis, which is aimed to benchmark both Geant4 and Fluka simulations in high-energy calorimetry. A new simple benchmark, aimed to validate the diffraction physics, which is known to play an important role in the longitudinal hadron shower development, is starting now.

A number of patch releases of ROOT 5.14.00 have been produced on request of the LHC experiments. At the same time new functionality and improvements has been developed and have been released at the end of June as version 5.16.00. In particular, the repackaging and modularization of the ROOT core libraries have had large impact on the size of the ROOT executable module and its start-up time. Work is also ongoing to substantially reduce the size of dictionaries. The merge of the CINT and Reflex packages is progressing well, and an opportunity to make more fundamental changes in CINT, such as the support for multi-threading, has been taken. New developments in the GUI and remote client servers to browse html pages containing ROOT files and to execute one or more remote sessions and displaying the results on the client laptop are being completed. Other developments are in the area of 2-D and 3-D graphics to visualize histograms with OpenGL, and in the mathematical packages to include random number generation from multi-dimension distributions and improvements in the vector package.

Several CORAL, COOL and POOL releases have been produced on request by the experiments. The main focus for CORAL and COOL were server-side improvements in COOL single-version multi-channel queries, to allow the experiments to do scalability tests with realistic conditions data workloads against the Tier 1 database replicas provided by the LCG 3D project. Two other important performance improvements were also implemented in COOL 2.2.0: the long standing issue of server-side optimization of single-version multi-channel bulk insertion, as well as an improved API to minimise the time spent in client-side data manipulation. With the CORAL 1.9.0 release, support was added for OSX/PPC (OSX/Intel is expected to be added soon). Libraries for OSX/PPC were also built for the first time in COOL 2.2.0, although Oracle support is incomplete due to a bug in the Oracle 10.1 client library, and PyCool could not be ported because of missing support for PyROOT on PPC. The POOL framework released a significant update on the collection implementation, which became available with POOL 2.6.0. The CORAL and POOL project schedules are affected by replacements in the development team.

All the Monte Carlo generators requested by the LHC experiments have been moved to the new GENSER structure (within the LCG external area) and have been integrated within the software frameworks of the experiments. Several new tests have been implemented and are now used on the regular bases for the validation of the generators. In particular, a number of tests explicitly requested by the experiments have been added.

Outstanding Issues since Last Report

Milestones Changes and Actions

References and Hyperlinks

New and Next Quarter Milestones			Status	Comments
ROOT-14	31.03.07 30.09.07	Improvements in the PROOF system to allow generic parallel processing and the introduction of resource scheduling.	In progress.	The GUI controller is constantly updated to support the new functionality provided by the API. A priority-based worker-level scheduler allowing to guarantee resource quotas to group of users is under test by ALICE. A prototype for a central scheduling framework based on an abstract interface is expected by end of May, with concrete implementations based on MAUI and LSF. Full support for TTree-independent analysis and for dynamic selection of feedback objects are expected by the Summer.

ROOT-15	31.03.07 30.09.07	The next Cint release (7.1) will use Reflex for storing all data member and function members as well as relying on Reflex::Type for storing types.	In progress.	The intermediate release CINT 7.0 uses Reflex to store typedef and contextual parser information; CINT 7.1 is well underway (all data but class types are stored by reflex). CINT's data structures are expected to be fully converted in 6 months. Additional development needs are foreseen because Reflex does not yet support required features like pruning of dictionary data (cf. re-loading of macros), dictionary initialization on demand (cf. memory usage), support of friendship, storage of declaration location; name lookup speed needs to be drastically improved. This has to be implemented despite of the reduction of the development team by 1 FTE.
SIMU-20	30.09.07	Evaluation of Rivet tool for possible application to GENSER (GS711)	Not started.	Level-2 milestone, evaluation and possible adoption of the Rivet tool for validation of MC codes.
SIMU-22	01.12.07	Inclusion of new versions of supported generators in GENSER (GS719)	New	
SIMU-23	01.12.07	Migration to HEPMC2 for ATLAS and CMS completed (GS720)	New	To provide assistance for achieving full migration to the new HEPMC 2.X series in ATLAS and CMS
SIMU-24	30.09.07	TARC benchmark for neutron production, interaction and transportation (VD721)	New	The TARC (Transmutation by Adiabatic Resonance Crossing) experiment has been simulated with the Geant4 toolkit. The experiment measured neutron production from 2.5 GeV/c and 3.5 GeV/c protons incident on high purity lead. The neutron time-energy correlation, absolute fluence spectrum and radial dependence, true calorimetry and transmutation capture on technetium will be compared between data and simulation, allowing to test neutron production, interaction and transportation in Geant4
SIMU-25	30.03.08	4th simple benchmark for Geant4 and Fluka: diffraction of nuclei (VD801)	New	The HELIOS data published on the paper "Diffraction dissociation of nuclei in 450 GeV/c proton-nucleus collisions", Z. Phys. C 49 (1991) 355, will be used to test the diffraction physics of Geant4 and Fluka. This process plays an important role in the longitudinal development of hadronic shower shapes at high energies.
SPI-12	30.09.07	Use the CMT based build configuration for automatic build and distribution of the LCG/AA s/w stack both from source and in binary form.	New	
SPI-13	31.12.07	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.	New	
Comments and Additional Information				