QUARTERLY STATUS REPORT				
Project Name			**Date**	
Applications Area			31.3.2007	
Report Period			**Author Name**	
2007Q1			**Pere Mato**	
Milestones for the Quarter			**Status**	**Comments**
SPI				
SPI-8	31.12.06 15.02.07	Move the build infrastructure of the LCG AA projects from scram to CMT. Discuss with the experiments their needs in terms of modularity for the packages provided in LCGCMT.	Completed	The move of the LCG AA projects to CMT is finished. Verification for the MAC OSX platform from the projects is pending. Discussion with the experiments have started, an initial document summarising the needs will be prepared.
SPI-10	31.03.07 30.06.07	Move the HyperNews service and the remaining web pages from lcgapp to new server hardware.	Rescheduled to next quarter	In connection with the re-organisation of the SPI project, also the web pages fed from lcgapp will be changed. This will happen during this quarter. Hypernews, being a high availability service, needs careful planning for the move. The meetings with the responsible persons to do that are set up and the move shall also happen during this quarter.
ROOT				
ROOT-7	31.10.06 30.03.07	Complete the merge of SEAL and ROOT functional components into a single set of libraries. All the functionality provided by the existing SEAL libraries will be available in the new set of libraries.	Completed	A plan for the migration of the remaining functionality has been discussed with the experiments and the AA projects and has been agreed. New plugin service was released in ROOT end of 2006. Nothing else is needed from ROOT in oder to complete the merge.
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.	In progress. Rescheduled.	A basic implementation of PyROOT that can use Reflex directly has been released. This implementation can handle simple concepts such as builtins, object instantiation, class methods, etc. It also lays the groundwork on which the other functionality will be build.
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. Rescheduled.	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. Rescheduled.	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.
POOL				
POOL-3	30.08.06 31.12.06 31.02.07	Finalize the migration POOL/CORAL to the new platforms (MacOSX, SLC4_amd64) with regular builds, and full running of the functional and data regression tests. Migration to scram v1	Completed	Regular builds for slc4_amd64 exist for CORAL and POOL as of versions 1.4.1 and 2.4.2 respectively. The support of MacOSX will arrive as soon as the underlying externals become available (expected date 31.02.07). Migration to scram v1 has been replaced last quarter by the AF decision to move POOL and CORAL to CMT based builds. This is reflected by the new milestone POOL-9.
POOL-6	31.12.06 31.01.07	Make all CORAL components thread-safe.	Completed	The work started with updates in the SEAL component model to make sure the problems manifesting in multi-threaded applications are fixed. CORAL has been updated to allow the switching off of the "cleanup thread" in ConnectionService, in case the problems still persist. The high level CORAL services (ConnectionService, RelationalService) have been already made thread safe, as well as the high level classes (up to ISchema) in OracleAccess. The relevant system test is exercising the relevant use cases defined by the experiments (mainly ATLAS online) are passing and the new functionality has been released with CORAL 1.7.0.

POOL-8	**31.03.07**	Provide schema evolution for relational data according to a priority list of required use cases provided by the experiments.	In progress	The time this milestone is expected needs to be confiermed by the feedback from the experiments.
POOL-9	**31.01.07**	CMT migration finished for POOL/CORAL	Completed	The migration has been achieved with CORAL 1.7.0 and POOL 2.5.0. In addition, both CORAL and POOL have been integrated into the AA nightly build system, which involved migrating all integration and system tests to the use of Qmtest, while the POOL regression tests are still pending (see POOL-11)
POOL-10	**31.03.07** **31.05.07**	POOL and CORAL independent from SEAL	In progress. Rescheduled.	Following a AF decision the few parts from SEAL which are used by POOL and CORAL will be moved as internal component (no direct use by the experiments) into the Persistency Framework project scope. The work of migrating the code has already started. A prototype release is expected by 31.05.07, followed by a production release on 31.06.07.
		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.	In progress. Rescheduled.	The implementation of the channels table and channel name management was achieved in COOL 2.0.0 (January 2007).

Full support for multi-channel bulk operations has been 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 has resumed work on the project in Q4 2006 (even if only at the 20% FTE level) and should ensure its completion during Q2 2007. |
| **COOL-7** | **31.12.06** **31.03.07** | New RecordSpecification API (to specify the precision of persistent data types) and port to AMD64. | Completed | The new RecordSpecification API and the port to AMD64 were achieved in COOL 2.0.0 (January 2007). This development required a schema change (the description of user-defined payload specifications is now stored using a different format). In addition to the record and field specification classes (and interfaces), the new API also includes the record and field data classes (and interfaces). |
| **COOL-8** | **31.12.06** **31.03.07** | Dynamic replication (at each replication request, only data inserted in the master database after the previous replication request is replicated). | Completed. | The dynamic replication tool was released as part of package PyCoolUtilities in COOL 2.0.0 (January 2007). Its implementation required several schema changes (a column indicating the last modification date of each row had to be added to several tables).

This milestone was actually completed in the COOL 2.1.0 release (March 2007), which includes several important bug fixes for COOL dynamic replication. |
| **COOL-9** | **31.12.06** **31.03.07** **30.06.07** | Deployment of COOL database services at Tier0 (separate instances for online and offline) and Tier1 for Atlas and LHCb with Streams replication. | In progress. Rescheduled. | Atlas: test service setup 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, Triumf) by Q4 2006. Of the two remaining 'phase-2' Tier1 sites, Nordugrid joined in Q1 2007, while PIC will only join later in 2007.

LHCb: test service setup prepared with two-step Streams replication between CERN online (private LHCb test 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, while the last 'phase-2' site (PIC) will join later in 2007.

For both experiments, the production T0 setup (using production |
| **COOL-10** | **31.12.06** **31.03.07** | Implement a tag 'locking' mechanism to prevent changes to locked tags. | Completed. | All schema changes relevant to this task have been included in COOL 2.0.0 (January 2007). A 'tag lock status' column has been added to the node/tag table.

The actual tag locking functionality and the corresponding API extensions were included in the COOL 2.1.0 release (March 2007). |
| **COOL-11** | **31.03.07** **30.06.07** | Support for MacOSX. | In progress. Rescheduled (waiting for CORAL and SPI/ROOT). | A full build of COOL on MacOSX (using SCRAM) was first completed in November 2006, using a private build of CORAL and a private installation of Oracle. All C++ tests are successful (except for a failure due to a bug in the Oracle 10.1 client library - 10.2 is not yet available for MacOSX). The PyCool port has not been completed due to inconsistencies between the ROOT and Python installations on CERN AFS. Detailed status is in https://savannah.cern.ch/task/?2062. |

COOL-12	31.03.07 30.06.07	SQL query strategy optimizations (mainly for MV data retrieval, but also for other insertion and retrieval use cases).	In progress. Rescheduled.	Two important 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). Other performance optimizations, including those for standard HEAD tag retrieval from MV folders, still need to be completed in future COOL releases.
COOL-13	31.03.07 30.06.07	New relational schema with fewer tables.	In progress. Rescheduled.	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 2.2.0 folders (using fewer relational tables) on a 2.0.0 database which can still be read (except for the new 2.2.0 folders) using the 2.0.0 software.
COOL-14	31.03.07 30.06.07	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-15	31.03.07	Move from SCRAM to CMT. Integration with the nightly build system and QMTEST.	Completed.	The CMT configuration to build COOL and its integration with the nightly build system and QMTEST were completed in December 2006. Nightly tests of COOL have been executed against SQLite since December 2006. Since February 2007, they are now also executed against Oracle, MySQL and Frontier. While COOL 1.3.4 (December 2006) was released using CMT, SCRAM developments were not immediately dropped. COOL 2.0.0 (January 2007) was the last release prepared using SCRAM. COOL 2.1.0 (March 2007) was then released again using CMT.
COOL-16	31.03.07 30.06.07	Move from the SEAL component model to the new CORAL component model.	In progress. Rescheduled (waiting for CORAL).	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 reimplement a simpler one in 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.
COOL-17	31.03.07	Integration with the CORAL LFC-based lookup service.	Completed.	The integration of COOL (both in C++ and in PyCool) with the CORAL LFC replica service was completed in COOL 2.1.0 (March 2007). The use of the LFC replica service with COOL has been tested and a user example has been included in the COOL Examples package.
SIMU				
SIMU-1	30.09.05 15.12.06 30.03.07 30.06.07	Apply the Fluka-Geant4 (Flugg) geometry interface to one of the LHC calorimeter test-beam simulation (VD524)	In progress. Rescheduled.	Fortnightly meetings are held between M. Gallas, W. Pokorski and A. Ribon together with the Pisa ATLAS TileCal group (M. Cascella, T. Del Prete, A. Dotti, I. Vivarelli) to discuss the progress and the work to do. Fluka and Geant4 simulations are generated by Manuel and Witek, and then analysed by the Pisa group. Some problems with the way the beam spread was generated in Fluka were identified and fixed. Once the simulation samples were considered of good quality, a large production started, followed by the comparison with the test-beam data. The analysis has been improved with respect to the original one (made only for the old Geant4 version 5.2), in several aspects (photo-statistics, beam composition, selection, etc.). Preliminary results should be discussed with Fluka and Geant4 experts by the end of April 2007.The milestone is being rescheduled for end of June 2007.
SIMU-10	30.06.07 31.12.07	Application of corrections of test-beam data, for validation of stand-alone simulation, to the LHC calorimeter test-beams (VD703)	No progres. Rescheduled	The experimental groups are currently very busy to finish their test-beam analyses, and this is delaying the work for correcting the data for stand-alone simulation. Proposing to be rescheduled for December 2007.

SIMU-11	31.12.06	Report on the main physics effects responsible for the hadronic shower development in Geant4 simulations (G4618)	Completed	The LCG note "Hadronic Shower Shape Studies in Geant4" (CERN-LCGAPP-2007-02, see http://lcgapp.cern.ch/project/docs/noteShowerShapes.ps) has been released at the end of March 2007. This note describes the studies dedicated to understand and improve the simulation of hadronic shower shapes in Geant4 for high-energy calorimetry applications. In particular, use cases relevant for LHC experiments have been studied. This report provides an overview of the various investigations made so far, and also an outlook for further studies and directions of research.
SIMU-13	15.12.05 31.10.06 30.04.07	Refinement to GDMLSchema to support user extensions of elements (SF608)	Completed	New examples have been implemented demonstrating how to extend the schema. Detailed description is also provided in the manual. The new mechanism of the users' extensions to the schema can be used to add user-specific information to different GDML elements, for instance the sensitive detector names for given logical volumes.
SIMU-15	28.02.07	Move all the requested (by experiments) generators to the new structure SCRAM-free (GS704)	Completed	All the generators are available in lcg/externals/MCGenerators. GENSER 2.0.0 is released.
SIMU-16	28.02.07	Redesign of the Generator Services web pages and creation of a GENSER Savannah portal (GS705)	Completed	Web pages redesigned and restructured. See: http://lcgapp.cern.ch/project/simu/generator/.
SIMU-17	31.03.07	New Generators Validation web page (GS707)	Completed	See: http://lcgapp.cern.ch/project/simu/generator/genval.html. Will be further extended (with plots, histograms) as new tests are implemented.

Summary Of Progress
During the first quarter of 2007 the AA has been consolidating the functionality released at the end of the year. Several LCG configurations have been made available to LHC experiments and are being used in their latest releases. The nightly build system for the LCG software stack has been put into production. It allows the build of all LCG AA projects on most of the LCG platforms, windows is about to be finished. Apart from the LCG projects also the Gaudi software framework used by ATLAS and LHCb has been added to the builds. The nightly builds are used by the experiments for validation of changes and new features.
The 7th ROOT workshop took place from 26-28 Match at CERN with a participation of about 80 people. The complete status and representative use cases of the ROOT software were presented in 38 talks and 7 posters.
All persistency framework builds are now based on CMT and regularly tested via the nightly build and test system. CORAL improvements, in particular for the online environments, have been delivered such as thread safety and access to stored procedures. The recent COOL releases include a new API for user payload specification, a port to the AMD64 architecture and new locking' and 'dynamic replication' functionalities as well as examples on how to use the CORAL LFC Replica Service.
Important deliverables has been achieved for the different Simulation sub-projects. Two LCG notes (one on the results of the 3rd simple benchmark analysis, and one on the studies in Geant4 related to the simulation of hadronic shower shapes) have been published. In particular, the joint investigations performed by the Physics Validation and Geant4 teams for understanding the key components responsible for the development of the hadronic shower shapes, has already produced good positive results in the preliminary developments made available in the last Geant4 development releases.
The Generator Services subproject after the reorganisation initiated few months ago is now stable and well progressing, the new GENSER release (2.0.0) which follows the new structure and configuration policy defined in December 2006, is now available and used by the experiments.

Outstanding Issues since Last Report

Milestones Changes and Actions

References and Hyperlinks

	New Milestones Proposals		Status	Comments
POOL-11	30.04.07	Complete the porting of the POOL data regression tests into the nightly build system	New	Given the different nature of the data regression tests, w.r.t. the standard functional integration and system tests, the porting of the former into the AA nightly build system requires more work which expected to be completed by 30.04.07.
POOL-12	31.03.07	Extend the CORAL API for the new functionalities requested by the experiments: Execution of stored procedure, Interface for Replica re-ordering.	New, Completed.	The support of stored procedure has been added in the general RelationalAccess API, and fully implemented for the Oracle plug-in. Similar support for the MySQL and SQLite(?), requires further developments. The abstraction for the replica re-ordering and its access in the configuration has been also added in the RelationalAccess API. The corresponding Connection Service implementation has been updated accordingly. The new features have been released on 4.6.2007 with CORAL_1_8_0.
SIMU-18	30.06.07	Completion of integration of the GDML Geant4 binding in the Geant4 toolkit (SF709)	New	Level-2 milestone, concerning the release of a GDML plug-in module in the Geant4 toolkit, which can be optionally installed together with the Geant4 libraries.

SIMU-19	30.09.07	Evaluation of Rivet tool for possible application to GENSER (GS710)	New	Level-2 milestone, evaluation and possible adoption of the Rivet tool for validation of MC codes.
SIMU-20	30.11.07	Review, redesign and debugging of the FLUGG tool (SF711)	New	Level-2 milestone, review status of the FLUGG tool for interfacing Fluka to Geant4; update the tool to make it compatible with the latest version of Geant4; simplify its design and implementation according to the current specifications and interfaces available in Geant4; investigate and debug functionality and known problems.
SIMU-21	15.12.07	Thin-target validations of Geant4 forward physics (G4712)	New	Level-2 milestone, the forward physics of Geant4, in particular quasi-elastic and diffraction, plays an essential role in the longitudinal development of the hadronic showers. Validations of these processes on thin-target benchmarks are therefore expected. Some published experimental data that could be useful for this physics validation studies have been already identified; it is now needed to prioritise them, and then exploited.
Comments and Additional Information				