

QUARTERLY STATUS REPORT				
Project Name			Date	
Applications Area			9.1.2007	
Report Period			Author Name	
2006 Q4			Pere Mato	
Milestones for the Quarter			Status	Comments
SPI-4	31.03.06 30.09.06 31.12.06	Generate CMT configuration and distribution kits from the common (XML based) configuration description.	Cancelled	After the AF decided to move the build environment for the projects to CMT, this milestone was replaced by a new one (see SPI-11 below).
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.	Work in progress Rescheduled	The work of moving the build infrastructure to CMT is done for Linux (SLC3 and both SLC4) and Windows platforms. Work is ongoing to adapt CMT to the Mac OS X platform. Discussion with the experiments have started, an initial document summarising the needs will be prepared.
ROOT				
ROOT-9	30.06.06 31.12.06	First version of CINT running directly with the Reflex data structures as part of the ROOT June 06 release	Completed	The version of CINT using Reflex as its backend was uploaded to ROOT for the December 06 release. This version of CINT is known as Cint 7.0. It uses Reflex to store the information regarding Typedef and to do the typedef lookup. It also uses Reflex objects as a replacement for some of its global variables. New milestones (ROOT-15 and ROOT-16) to continue the work
ROOT-10	30.06.06 31.10.06	The new Fit GUI released as part of the ROOT June release.	Completed	Released in the December release version 5.14.00
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.	Work in progress Rescheduled	A plan for the migration of the remaining functionality has been discussed with the experiments and the AA projects and has been agreed. The migration will be completed by Q1 2007.
ROOT-11	15.12.06	PROOF demonstrated in production in at least one of the LHC collaborations.	Completed	PROOF development in the last quarter was focused on providing the needed features for the ALICE analysis use cases. The developments included an extensive monitoring facility to track performance on the ALICE CAF cluster and to provide the infrastructure to successfully run the ALICE analysis. ALICE measured a very satisfying speedup of the analysis with high cluster usage efficiency. At the end of 2006 first interactions with CMS were started and we expect a lot to happen in the coming quarters.
ROOT-12	31.12.06	Speed-up I/O performance with remote files by eliminating as much as possible the number of network transactions.	Completed	Most of the work that we intended to do on I/O speed is done. One could still gain get improvement in case of WANs with very high latency when opening a large number of files and reading only a very small subset of each file. Currently each file opening requires 4 to 5 network transactions. This could be changed to 2, but requires some work. Also, all the improvements done so far concern ROOT Trees for which the cache mechanism is automatic. More automatism could be introduced for the case of non-Tree ROOT objects.
ROOT-13	31.12.06	Improvements in the PROOF system to support a realistic analysis environment for an experiment.	Completed	
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	In progress. Rescheduled	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-8.
POOL-4	30.09.06 30.11.06	Development and deployment of LFC-based lookup and DB authentication services of CORAL	Completed	The LFC based DB lookup service prototype has been provided and released in CORAL 1.5.4. The production version, extended to allow authentication based on LFC is completed and released with CORAL 1.6.3. It is expected to be validated by the experiments and deployed within the first quarter 2007.

POOL-5	30.10.06	Complete migration to CORAL (AttributeList) and the SEAL component model of all POOL components	Completed	The migration of to the SEAL component model has been completed in the POOL CVS repository for most packages. The same applies for the migration to the CORAL AttributeList. However, no corresponding releases have been made available yet and the finalization of the development has been canceled as a consequence of the recent AF decision to migrate the SEAL functionality into CORAL and to deprecate the use of SEAL in POOL and CORAL. This is reflected by the new milestone POOL-9.
POOL-6	31.12.06 31.01.07	Make all CORAL components thread-safe.	In progress. Rescheduled	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 will release by 31.01.07.
POOL-7	31.12.06	Provide a python interface for CORAL	Completed	A Python C++ extension module, implemented based on the Python C API, has been developed in collaboration with RRCAT, Indore, India. It is available in every CORAL release as of version 1.6.3.
COOL				
COOL-4	30.06.06 30.09.06 31.12.06 31.03.07	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.	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 Q1 2007.
COOL-7	31.12.06 31.03.07	New RecordSpecification API (to specify the precision of persistent data types) and port to AMD64.	Ready for release.	The new RecordSpecification API and the port to AMD64 have been completed and will be included in the next COOL 2.0.0 release (scheduled for 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).	Ready for release.	The dynamic replication tool has been added to package PyCoolUtilities. It is ready to be included in the next COOL 2.0.0 release (scheduled for 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).
COOL-9	31.12.06 31.03.07	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). Two more 'phase-2' Tier1 sites (Nordugrid, 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). One more 'phase-1' and two 'phase-2' Tier1 sites (CNAF; Nikhef/SARA, PIC) are expected to join in Q1 2007.
COOL-10	31.12.06 31.03.07	Implement a tag 'locking' mechanism to prevent changes to locked tags.	In progress.	The next COOL 2.0.0 release (scheduled for January 2007) will include all schema changes relevant to this task. A 'tag lock status' column has been added to the node/tag table. The actual tag locking functionality will be included either in COOL 2.0.0 or in a later release during Q1 2007.
SIMU				
SIMU-1	30.09.05 15.12.06 30.03.07	Apply the Fluka-Geant4 (Flugg) geometry interface to one of the LHC calorimeter test-beam simulation (VD524)	In progress. Rescheduled.	Some unexpected problems, some of which related to the lack of support for FLUGG, has delayed the massive generation of the samples needed for the analysis. Finally, after a meeting with some of the members involved in the original ATLAS Tile Cal 2002 test-beam analysis (A. Dotti, I. Vivarelli), the generation with both Fluka and Geant4 (the latter with more recent versions) has started at the end of December, and regular phone meetings are planned to monitor the status and discuss the results. First results are expected for 30 March 2007. Meanwhile, the writing of three LCGAPP notes, two of which aimed to describe the technical details of the novel method adopted, and a final one on the physics results, has started.

SIMU-6	31.10.06	First release of a common framework for handling MC truth information to be used by experiment's simulation programs (SF613)	Completed	A special class called 'MCTruthManager' has been implemented; the object interacts with the HepMC event record and allows to store the MCTruth information consistently. In particular MCTruthManager deals with cases where intermediate particles are not stored, and special 'linking' needs to be introduced in order to keep all the branches of the MCTruth tree connected. The class MCTruthManager and its application is now included and demonstrated within an 'extended' example released with Geant4 8.2.
SIMU-7	31.10.06	Validation of shower parameterization packages completed. (VD612)	Completed	Presentations have been made at recent Physics Validation meetings by ATLAS and CMS showing good improvements in the different applications specific to the experiments of the various parameterisation techniques and tuning of the parameters.
SIMU-10	30.06.07	Application of corrections of test-beam data, for validation of stand-alone simulation, to the LHC calorimeter test-beams (VD703)	In progress.	After having shown for a test-beam (electrons in the central ATLAS barrel accordion calorimeter) how is possible to correct data to allow stand-alone simulation validation, work is in progress to apply it to other test-beam cases.
SIMU-11	31.12.06	Report on the main physics effects responsible for the hadronic shower development in Geant4 simulations (G4618)	In progress.	A report on the physics effects found responsible for hadronic shower development (G4618) is being prepared. This will address also milestone G4615 (merged now with G4618). Further work is expected in this area, to address issues found, and to investigate additional effects.
SIMU-13	15.12.05 31.10.06 31.04.07	Refinement to GDMLSchema to support user extensions of elements (SF608)	In progress. Rescheduled.	New development received as external contribution is under evaluation and being integrated. To be rescheduled for end of April 2007.
SIMU-14	31.05.06 15.11.06	G4 development release. Including new features for parallel navigation enabling scoring charged particles at arbitrary locations, improvements to stability of showering for changes in cuts, and additional verification tests for hadrons between 10 and 50 GeV (G4606)	Completed	Milestone completed with the November development release (1st December 2006). The new feature for parallel navigation and scoring of charged particles at arbitrary locations is available as an option, which the user can configure. Additional verification was undertaken for hadron projectiles of 15 GeV, using the data of the BNL AGS experiment E802, for proton-induced reactions [T.Abbott et al., Phys.Rev. D45, 3906 (1992)].

Summary Of Progress

Production releases for Geant4 and ROOT have been made available at the end of the year. Version 8.2 of Geant4 includes improvements in the standard electromagnetic physics such as multiple scattering, which provide improved results for large angle scattering; better particle transport near geometry boundaries and less cut dependence for sampling calorimeters. In the hadronic physics, coherent elastic scattering processes have been reviewed and data tables are now computed on-flight. The physics lists are now built as part of the kernel libraries by default. ROOT version 5.14/00 includes many new functionalities and improvements in basically all areas. The release notes in <http://root.cern.ch/root/Version514.news.html> give all the details. The work of re-engineering CINT to use Reflex is progressing steadily. A new version of CINT, known as CINT 7.0, that uses Reflex to store the information regarding Typedef and to do the typedef lookup has been released in parallel with the old one for test purposes in the production release. New milestones have been defined to monitor the work.

The Relation Abstract Layer (CORAL) have had the first release of authentication functionality based of LFC and the Python API. The Conditions Database (COOL) version 2.0.0 is almost ready for release and includes an API for the Record Specification and the port to AMD64 architecture. This new version is being currently tested for integration by ATLAS and LHCb since requires some changes in the DB schema and API.

These new versions of the AA packages ROOT, Geant4, CORAL, COOL are currently being integrated by the experiments and will basically be the versions, besides possible bug fixes, that are going to be used for the startup of the LHC experiments.

The detailed program of work for the MC Generator services sub-project has been discussed and reviewed by all the stakeholders in a planning meeting end of October. Rapid progress is currently being made to release all the required generators in a new structure more suited for the needs of the experiments.

A nightly build system has been put in place following the recommendation of the AA internal review. The main goal for this system is to be able to tests/validate new versions of the AA software by the experiments before they are released, thus speeding up the overall development and release cycle. The introduction of the nightly build system has been synchronized with the migration from the SCRAM configuration and built system to the CMT one, which was also supported by the internal review. The system starts being functional and has been very useful for the experiments. Additional platforms such as Windows and MacOS need to be added in the near future together with better web interface and reporting system.

PROOF development in the last quarter was focused on providing the needed features for the ALICE analysis use cases. The developments included an extensive monitoring facility to track performance on the ALICE CAF cluster and to provide the infrastructure to successfully run the ALICE analysis. ALICE measured a very satisfying speedup of the analysis with high cluster usage efficiency. At the end of 2006 first interactions with CMS were started and we expect a lot to happen in the coming quarters. New plans are in the area of a PROOF-lite, which is aimed at using PROOF on single multi-core machines (simplification of daemon architecture) and in helping CMS getting their environment PROOF enabled.

Outstanding Issues since Last Report

Milestones Changes and Actions

References and Hyperlinks				
New Milestones Proposals			Status	Comments
SPI-10	31.03.07	Move the HyperNews service and the remaining web pages from lcgapp to new server hardware.	New	
SPI-11	31.06.07	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.	New	
ROOT-15	31.03.07	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.	New	
ROOT-16	30.06.07	Cint 7.2 will use Reflex for storing all information regarding types (aka	New	
POOL-8	31.01.07	CMT migration finished for POOL/CORAL	New	The migration will be achieved with CORAL 1.7.0 and POOL 2.5.0. The old scram setup will be preserved for an overlap period of one release and then be removed.
POOL-9	31.03.07	POOL and CORAL independent from SEAL	New	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 Persistence Framework project scope. The work of migrating the code has already started an a prototype release is expected by 28.02.07, followed by a production release on 31.03.07.
COOL-15	31.03.07	Move from SCRAM to CMT. Integration with the nightly build system and QMTEST.	New. In progress.	The CMT configuration to build COOL and its integration with the nightly build system and QMTEST have been completed in December 2006. COOL 1.3.4 (December 2006) was released using CMT. SCRAM developments have not been completely phased out yet. The next COOL 2.0.0 release (scheduled for January 2007) will be released using SCRAM. It is planned that SCRAM should be abandoned during Q1 2007.
COOL-16	31.03.07	Move from the SEAL component model to the new CORAL component model.	New	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.
COOL-17	31.03.07	Integration with the CORAL LFC-based lookup service.	New	
SIMU-15	28.02.07	Move all the requested (by experiments) generators to the new structure SCRAM-free (GS704)	New	Milestone consisting in the generation of the new GENSER setup structure and organization and installation of the different generators packages in the AFS lcg/external/MCGenerators area
SIMU-16	28.02.07	Redesign of the Generator Services web pages and creation of a GENSER Savannah portal (GS705)	New	New web pages following suggestions from the users (table of supported generators/versions, clear user information, link to validation web page)
SIMU-17	31.03.07	New Generators Validation web page (GS707)	New	Creation of new Validation web page for GENSER where results of all performed tests will be made available at every new version of the generators.
Comments and Additional Information				