QUARTERLY STATUS REPORT				
Project Name			**Date**	
Applications Area			06.10.2009	
Report Period			**Author Name**	
2009Q3			**Pere Mato**	
Milestones for the Quarter			**Status**	**Comments**
SPI				
SPI-18	**30.09.08** **31.03.09** **30.06.09** **30.09.09** **31.12.09**	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 .	First parts of the SPI web are currently being fed into the new Drupal web page infrastructure, but the migration of the contents is still ongoing.
SPI-26	**30.09.09**	Infrastructure setup for Drupal web pages	Completed	The infrastructure has been presented to all interested parties in a meeting in August. Several instances of the web page infrastructure have been set up and proposed to be picked up by the potential users / projects.
SPI-27	**30.09.09**	Code coverage testing for nightly builds	Completed	Code coverage testing has been implemented as part of the LCG / AA nightly build system. This has been implemented in the context of a new version of the nightly build scripts which will be in production soon.
SPI-28	**30.09.09**	Database infrastructure for nightly builds	Completed	The database infrastructure and a new web page with the LCG / AA nightly builds overview has been developed and will go into production with the new version of the nightly build scripts..
ROOT				

POOL				
POOL-15	**30.09.08** **31.03.09** **30.06.09** **30.09.09**	CORAL Server (read-only) scalability and stress tests pass. Validation using the Atlas HLT tests.	Completed	
POOL-17	**31.10.08** **30.04.09** **30.07.09** **31.12.09**	Release of CORAL Server with secure authentication. All functional tests pass.	In progress. Rescheduled	This is a rescheduled milestone, previously expected for October 2008 as part of POOL-16. A first implementation of secure data transmission and grid certificate authentication using VOMS and ssl was prepared in Q1 2009, using the new design for component architecture. During Q2, the implementation was completed with the addition of VOMS-based authorization, of a tool for maintaining a list of connections and credentials, and of a more complete test suite. The package has not yet been released because its external dependencies and integration with LCGCMT still need to be finalised in the wider context of LCG AA dependencies on Grid packages. There was no progress on these issues in Q3. The CORAL server software was developed and tested (on SLC4 and SLC5) using a 1.9 VOMS package that uses the system version of ssl and does not depend on Globus. However, this may lead to incompatibilities with other Grid packages (like gfal) that on SLC4 can only be supported using the Globus version of ssl. It is likely that the secure CORAL server will be released during Q4, either only on SLC5 using the no-Globus VOMS, or also on SLC4 using the Globus-based VOMS.

POOL-18	**31.10.08** **30.04.09** **30.09.09** **31.12.09**	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-23	**30.06.09** **30.09.09**	Remove gcc4.3 build warnings for POOL.	Completed	This is a rescheduled milestone, previously included in POOL-20. It consists in getting rid of all build warnings caused by the stricter gcc4.3 standard. This task has been renamed because, in contrast to what was incorrectly claimed in the Q1 2009 report, no change was required in the public POOL API. The relevant changes in the POOL implementation code and build configuration have been completed in August 2009.
POOL-24	**30.09.09**	Full support for Oracle connection sharing in the CORAL server	Completed	This is a rescheduled milestone, previously included in POOL-16. Complete support for Oracle connection sharing is needed to fully exploit the multiplexing capabilities of the CORAL server in the absence of an intermediate caching proxy. To achieve this, the deadlock observed in the CORAL Oracle plugin when connection sharing is enabled must be addressed. The hang has been investigated and is now fully reproducible in queries against BLOB or CLOB columns from parallel sessions opened on multiple threads but sharing the same physical connection to Oracle. A workaround has been implemented in CORAL to avoid the Oracle OCI calls which cause the hang. In parallel, the issue has been followed up with Oracle Support and is now confirmed as a bug in the Oracle 10.2.0.4 client libraries. The upgrade to the 11.2.0.1.0 Oracle client has been proposed for the next configuration.
POOL-25	**30.09.09** **31.12.09**	Performance optimizations in the CORAL LFC replica service.	In test. Rescheduled	Performance issues with the LFC replica service have been observed by LHCb during Q2 2009. A first patch to fix some of these problems was included in CORAL 2.3.2 (July 2009). Another patch was added in Q3 to address other pending issues and is currently being tested.
		COOL		
COOL-29	**30.09.08** **31.12.08** **31.03.09** **30.09.09** **31.12.09**	Expose transaction management in the user API.	In progress. Rescheduled.	Prototypes of the API and implementation have been prepared in Q4 2008 and are ready to be internally reviewed for inclusion in one of the upcoming COOL releases. This task has been postponed due to more urgent priorities for the PF (new platforms and externals in Q1 2009, CORAL server developments in Q2-Q3 2009).
COOL-30	**30.09.08** **31.12.08** **31.03.09** **30.09.09** **31.12.09**	Allow session sharing in the user API.	Rescheduled. Depends on COOL-29.	This milestone depends on transaction management (COOL-29).
COOL-39	**30.09.09** **30.11.09**	Performance improvement for CLOB data (bulk retrieval).	In test. Rescheduled	During Q2 2009 Atlas reported slow performance for read access to COOL folders containing CLOB data. The COOL implementation has been changed so that CLOB data are retrieved in bulk via CORAL rather than row by row. The patch has been validated through performance tests, but it still needs to undergo full functional tests before it is committed to CVS and released.
		SIMU		
SIMU-10	**30.06.07** **31.12.07** **31.12.08** **30.09.09**	Application of corrections of test-beam data, for validation of stand-alone simulation, to the LHC calorimeter test-beams (VD703)	No progress. Canceled	The experimental teams involved in test-beam analysis (ATLAS HEC, ATLAS TileCal, ATLAS CTB, and CMS HCAL) seem keen to provide prompt feedback to the Geant4 developers regarding new versions. Because of that, the interest and need of the corrections of test-beam data to allow stand-alone simulation is fading away. Proposed to cancel this milestone.
SIMU-37	**30.04.09** **31.07.09**	Prepare the migration to SLC5 and gcc-4.3.2 in GENSER (GS902)	Completed	The milestone can be closed
SIMU-38	**1.06.09** **1.12.09**	Evaluation of Rivet and HepMC Analysis Tool for regression testing based on distributions (GS905)	Partially completed Rescheduled	The HepMC Analysis Tool is already included and used in GENSER; missing the Rivet part. To be rescheduled for December 2009

Summary Of Progress

In the last quarter the SPI project was concentrating in the areas of Drupal and the nightly build system. For Drupal the infrastructure setup has been finished and presented to the AA project leaders in a meeting in August where it was approved. Several instances of Drupal pages have been setup in this environment and proposed to the AA project web admins for further testing. In the area of nightly builds the new infrastructure for the web page displaying the overall results of the building and testing has been finished and the code coverage testing has been implemented and presented to AA project leaders. Both feature s will become available with the next incarnation of the nightly build scripts currently in preparation.

A development version 5.25/02 of ROOT was released end of September. It includes a number of new features and improvements in the I/O sub-system such as an automatic tool to optimize the Tree branches buffer size. It minimizes the amount of memory required and improves the read performance. A better interface to the Tree Cache has been implemented and documented. The major developments in the Math package are concentrated in the RooFit and RooStats packages. Several improvements have been put in RooFit in particular in the Workspace area and in the toy MC generation. The interfaces of the RooStats methods have been modified to use now the new Model configuration class. Furthermore, several new example and tutorials have been prepared for RooStats.
Focus has been given on an analysis of the issues with CINT7 using the CMS framework as test case. For the production version of CINT, the loading of dictionaries was accelerated by a large factor and a new development has started which will reduce the memory footprint of dictionaries. The prototype of a new reflection collector and interpreter based on LLVM has been extended.

Support for producing large images was added to OpenGL. This allows the creation of high-resolution images required for publications, posters and outreach material. Several extensions of functionality requested by ALICE, CMS and K2K collaborations were implemented.
The PROOF activities during the last quarter focused on the milestones (see below) and consolidation. In addition, a new functionality requested by ALICE and ATLAS regarding the possibility to automatically register datasets produced on the worker nodes during a query has been implemented and made available in ROOT 5.25/02. The new functionality is already being used for the ALICE parallel reconstruction.

In the last quarter the main activities of the Simulation Project were focused on physics validation in Geant4, where the studies on the energy transition between hadronic models have made good progress and led to improvements to at least three physics models in Geant4. A public patch release of Geant4 (9.2.p02) has been delivered in August, including fixes in several areas, some of which requested also by ATLAS. The full porting of GENSER to SLC5 with gcc-4.3.2 has been completed and the revision of the installation mechanism to become based on 'autotools' is now rather advanced.

New versions of all PF projects have been released in Q3 2009 for the two new configurations LCG_56c (July 2009) and LCG_57 (September 2009). The latter is based on ROOT 5.24 and is used by LHCb, while the former is based on ROOT 5.22 and is used by ATLAS and CMS, that have expressed their intention not to migrate yet to the more recent ROOT. It is therefore likely that the two branches will have to be maintained in parallel for several months, which may imply the need to rebuild the same code base of PF projects for the two different configurations.

The two releases include several enhancements specific to PF projects. The LCG_56c release features a new Oracle client library 10.2.0.4p1 for Linux (fixing a long-standing problem with Oracle client initialization reported by several CORAL users), as well as an optimization of the CORAL LFC replica service (used by LHCb). The LCG_57 release includes a new Oracle client library 11.2.0.1.0 for Linux (fixing both a long-standing incompatibility with SELinux on SLC5 and a blocking issue for connection multiplexing in the CORAL server), as well as substantial performance optimizations of the COOL test suite and the validation of COOL performance against Oracle 11g servers. Since Q3, the CORAL and COOL software is also being tested against a dedicated instance of the CORAL server in the nightlies.

The main achievement for PF in Q3 is the full production deployment and validation of the CORAL server and proxy software for the ATLAS system. Following initial tests in August using a dedicated test partition of the ATLAS online system, which were successful basically on the very first try, the software has been installed on the production ATLAS partition and is now used instead of M2O/DbProxy for the configuration of the high-level trigger. The system is now running smoothly and no problems have been observed.

Issues During the Quarter

Milestones Changes and Actions

References and Hyperlinks

New and Next Quarter Milestones			Status	Comments
SPI-29	**31.12.09**	ICC environment for AA building	New	In order to improve the code stability it will be beneficial to provide compilations with the icc compiler suite through the AA nightly build system.
SPI-30	**31.12.09**	Moving to Mac OSX 10.6 32 and 64 bit	New	Moving on to the next Mac OSX 10.6 "snow leopard" operating system for the LCG external area and subsequently to the AA project building. This will include moving the environment to cross compiling 64 -> 32 bit
SPI-31	**31.12.09**	Extending Nightly builds for non CMT based projects	New	A request to use the nightly build system within the CMT HLT environment was done. The feasibility of extending the system to software projects not based on the CMT configuration tool has to be checked first.
SPI-32	**31.12.09**	Extending the nightly builds to CernVM	New	The CERNVM platform will be used for also testing the AA project stack in the context of the nightly builds. For this purpose the build system has to be extended such that it provides automatic migration of the build products into the CERNVM file system and CERNVM virtual machines can then automatically run the test suites and provide feedback.
ROOT-24	**31.12.09**	Implement automatic test suites for fitting histograms, graphs and trees.	In progress	Developments for a new test program for fitting all the ROOT data object has almost been completed and will be released in the ROOT test suite for the next production release in December
ROOT-25	**31.12.09**	Provide implementations in RooStats for hypothesis tests and interval estimation with various techniques	In progress	The new development release of ROOT, 5.25.02, provides now several tools for hypothesis tests and limit estimation based on frequentists or Bayesian principles. This release improves also the methods previously released in 5.24, with new interfaces and bug fixes. The consolidation and testing of all the tools will be completed for the 5.26 production release of December.
ROOT-26	**31.12.09**	Testing CINT7 with CMS Framework	Canceled	CINT7 has been tested with the CMS framework. Fundamental issues were identified e.g. the incompatibility of type descriptions by CINT and GCCXML which made a co-existence of the two data sources fragile and unfeasible: combining Reflex with CINT did not simplify their collaboration but instead dramatically increased the complexity. At the same time, the lack of performance (memory, CPU time) did not justify pursuing this milestone.

ROOT-27	**31.12.09**	Implement delayed loading for genreflex dictionaries	In progress	First results already exists; working on further improvements in collaboration with e.g. POOL.
ROOT-28	**31.12.09**	Implement a better PROOF benchmark suite to measure real performance	In progress	A new benchmark utility has been designed consisting in a new module (instead of a set of macros) with a steering API class (currently named TProofBench) providing tools for creating the relevant files, running the tests and performing the statically analysis. A first version should be available in SVN within the expected timescale.
ROOT-29	**31.12.09**	PROOF dynamic parallel merging	In progress	A version is being tested on the ALICE CAF at CERN. Expect to commit to SVN by mid November.
ROOT-30	**31.12.09**	PROOF worker auto-discovery using bonjour/avahi	In progress	The recently introduced TBonjour... classes have been used to test mutual master-worker discovery. The next step is to make this information available to the scheduler to be used in determining then available worker machines. A first version should be available in SVN within the expected timescale.
ROOT-31	**31.12.09**	Implementation of 2D graphics entirely based on OpenGL. Also based on OpenGL, development of techniques allowing 5D data set representations.	In progress	On Going work. Picture output must be fixed ("Save as"). This requires the implementation of the frame buffer object for multipad case. A new option for 5D data representation can be used for TTree::Draw with 4 variables. To finish it, a stable and fast way to estimate the value of the 5-th variable in the nodes of a mesh is needed.
ROOT-32	**31.12.09**	Interfacing the Pad-GL to the 3-D GL viewer	In progress	On Going work. Painting of 3D histograms that are natively drawn with OpenGL is already possible. Most of the infrastructure for inclusion of 2D pads is implemented. Some work is required in clearing up the relationship between TPad, 3D viewers and pad-painters.
ROOT-33	**31.12.09**	Implementation of an interface for the "graphviz" package	In progress	On going work. Three new classes have been implemented to manage the graphs, the nodes and the edges. The code is now in the SVN trunk. More work is required to: - link with the static version of the graphviz library in order to ease the distribution (end users should not have to install graphviz). - Extend the functionality to fulfill the needs of packages like THTML.
ROOT-34	**31.12.09**	Finalization and consolidation of the Event Recorder	New	Finalize/consolidate Event Recorder: - Fixing remaining issues (e.g. problem of window registration with very complex GUIs like fit panel, not working with GUI Builder, ...) - Making it more cross-platform reliable (it is now dependent on OS & Window manager)
ROOT-35	**31.12.09**	Consolidation of the GUI builder	In progress	The ROOT GUI builder has been improved, its interface has been made more user friendly and many features have been implemented, especially for the different layout mechanisms, making it much more easy to use. There are still some widgets missing (e.g. menu bar, tool bar, ...)
POOL-26	**31.10.09**	Monitoring tools for the CORAL server and CORAL server proxy.	In progress. Rescheduled.	A new package CoralMonitor has been added during Q3 2009. This presently allows the collection of timing and other statistics from the CORAL server and client components and their dump to a csv file or their real-time visualization. More work is needed to allow fine-grained monitoring of individual resource-intensive requests, as well as the monitoring of the CORAL server proxy.
POOL-27	**31.07.09**	Install new Oracle client libraries to fix the "Cannot allocate an OCI environment handle" intermittent failure in CORAL applications.	New. Completed.	Several CORAL users have reported intermittent failures of their applications with the "Cannot allocate an OCI environment handle" error message, since the end of 2007. This problem has been difficult to reproduce because it does not happen all the time (e.g. during an Atlas data challenge it only affected 2% of the jobs at a single Grid site). The problem was reported to Oracle Support and was eventually identified as a bug in the Oracle 10.2.0.4 client libraries. A patch for Linux was received and new "10.2.0.4p1" libraries were installed for the LCG56c configuration, including CORAL 2.3.2 (July 2009). The patch is also included in the 11.2 libraries used for the LCG_57 configuration, including CORAL 2.3.3 (September 2009).
POOL-28	**31.08.09**	Deployment of a CORAL server instance for executing the nightly CORAL and COOL tests.	New. Completed.	A CORAL server instance dedicated to the nightly tests (coralserver.cern.ch) has been deployed in July 2009. Simple R/O tests are executed against it since August 2009, within both the CORAL and COOL nightly test suites. More tests will be added with time (including R/W tests when this functionality is implemented for milestone POOL-18).
POOL-29	**28.02.10**	Fast merge of POOL files.	New. In progress.	Support for fast merge of POOL files has been requested by ATLAS. The feasibility of its implementation is presently under investigation.
POOL-30	**28.02.10**	CORAL API for Oracle partitioning	New	
POOL-31	**28.02.10**	Deployment of a general-purpose CORAL server instance for CERN users.	New	

COOL-35	**30.06.09** **30.12.09**	Migration from CVS to SVN.	Rescheduled.	This task has now a lower priority and has been rescheduled because the CVS service will be maintained until all experiments have migrated to SVN, which is not expected to happen before the winter 2009-2010 shutdown.
COOL-37	**30.10.09**	Full support for Oracle on Linux SLC5.	Completed.	For LCG releases using Oracle 10.2 (up to the LCG_56 series), support for Oracle on SLC5 can only be provided if the SELinux security layer is partially disabled. This is due to the presence of text relocations in the Oracle 10.2 client libraries, which may result in failures at runtime ('cannot restore segment prot after relocation') if SElinux is fully enabled. The issue, which has been followed up with Oracle Support by the PF team, can only be solved by an upgrade to the latest version 11.2 of Oracle, released in September 2009. The Oracle 11.2 client libraries for Linux have been installed and used to prepare the latest LCG_57 release, including COOL 2.8.3 (September 2009). According to Oracle, the upgrade to 11.2 should fully solve the problem for OCI-based applications like the PF, even with SELinux fully enabled. It is worth noting that the issue is instead still unsolved for OCCI-based applications (such as some CMS packages, which reported the problem also with 11.2)
COOL-40	**30.09.09**	Validate COOL performance against Oracle 11g servers.	New. Completed.	The production database servers for physics users are presently running the Oracle 10.2 software. It is foreseen that from 2010 onwards the servers will progressively be migrated to the latest Oracle 11.2 version, released in September 2009. To ensure no disruption in the quality of COOL services, the performance of COOL queries has been analysed and validated in Q3 2009 against dedicated test servers running Oracle 11.1, which already contains most of the new performance-relevant changes in Oracle 11.2.
COOL-41	**30.09.09**	Speed up the execution of the COOL nightly tests.	New. Completed.	The very large COOL test suite has been a key ingredient of the success of COOL. As new features have been added to COOL, the test suite has kept growing and its execution time in the nightlies has significantly increased. Most of this time is spent in tests against Oracle and MySQL database servers, which were getting increasingly overloaded from the simultaneous tests on all platforms (~10) and slots (~3). Oracle tests were especially suffering from repeated DDL operations (table creation and drop) from concurrent sessions on the same schema. Several improvements have been prepared in the COOL and CORAL versions for LCG_57 (September 2009). First, COOL tests have been modified to avoid table creation and drop unless strictly necessary. This alone has reduced the single-client execution time by more than a factor 3 for some Oracle tests. Second, the CORAL OracleAccess plugin has been modified to optimize queries against the Oracle data dictionary. Tests against Oracle now run faster than those against MySQL, which are the new bottleneck of the COOL nightlies. Third, MySQL and Oracle tests can now be selectively disabled on test slots not relevant to upcoming releases, keeping only the faster tests against SQLite.
COOL-42	**28.02.10**	Oracle partitioning for the COOL relational schema.	New. In progress.	Oracle partitioning is being evaluated as a component of the strategy for the long term archiving of the large volumes of COOL conditions data from the LHC experiments. Tests of COOL query performance on partitioned schema prototypes have been resumed in Q3 2009, giving more optimistic results than previous tests performed in 2008 using earlier software versions. The tests will continue in Q4 2009: if successful, this will lead to implementation changes in CORAL and COOL by Q1 2010.
SIMU-20	**30.11.07** **30.11.09**	Review, redesign and debugging of the FLUGG tool (SF711)	In progress.	The technical student G.Camellini made some progress in isolating and understanding the problem of FLUGG with the ATLAS HEC test-beam setup. It seems that the Geant4 geometrical description of the set-up is fine, and the likely culprit of the problems of running RAYs (the equivalent of "geantinos" in Fluka) could be related to the way FLUGG uses the navigation information provided by Geant4. A meeting with one of the original authors of FLUGG will be organized shortly to speed up further progress.
SIMU-21	**15.12.07** **31.12.08** **30.10.09**	Thin-target validations of Geant4 forward physics (G4712)	In progress.	The new fellow, A.Dotti, who started July 1st, has been assigned to work on this topic. Andrea is getting familiar with Geant4 and has discussed with A.Ribon about the problems of Helios published data on target diffraction, and the need for cleaner p - p(bar) diffraction data.
SIMU-39-b	**01.12.09**	Investigation and improvements of the transition between Geant4 hadronic models (G4901)	In progress.	The studies of Geant4 hadronic models have continued, with the inclusion of more variables (like strange particles, total energy conservation, RMS, etc.), and with the evaluation of more hadron-nucleus interactions, besides the main pi- Fe, like p - Fe, pi- Pb, k+ - Fe, pbar - Fe. There have been important developments in the following three hadronic models: Bertini (revision of cross-sections; inclusion of higher-multiplicity final-states; inclusion of strange hadron production); CHIPS (extension at model-level of CHIPS to all particles and all energies); Fritiof + Pre-Compound (now coupled to a new Reggeon-based cascade). In all these cases, it was observed that the relevant model-level variables are getting smoother and closer to each other.

SIMU-40	**19.12.09**	Contributions to the December 2009 public release of Geant4 (G4908)	In progress	Developments scheduled for the public release of December 2009 include: improvements to the QGS hadronic model fragmentation; the extension and tuning of the CHIPS model for hadron-nucleus collisions up to 100 GeV; a review of the internal cross section in binary cascade and QGS model; a review of physics models to identify and fix cases of event irreproducibility; tuned model of fluctuations for ion ionisation; prototype for applying strict production thresholds for EM particles per geometrical regions; improvement of the Spline interpolation for physics vectors; the extension of geometrical regions to local magnetic fields; improved implementation of selected CGS shapes; interface for computing isotropic safety and geometry step for multiple and single scattering.
SIMU-41	**01.12.09**	Complete build of all versions of generators with 'autotools' (GS911)	New	2nd level milestone
SIMU-42	**01.12.09**	Support MCDB for CMS productions (GS912)	New	2nd level milestone
SIMU-43	**01.12.09**	Evaluation of Rivet for regression testing based on distributions (GS913)	New	2nd level milestone
Comments and Additional Information				