QUARTERLY STATUS REPORT				
Project Name			**Date**	
Applications Area			3.3..2008	
Report Period			**Author Name**	
2007Q4			**Pere Mato**	
Milestones for the Quarter			**Status**	**Comments**
SPI				
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.	In test, re-scheduled	The dynamic web-based information system for LCG configurations and dependent software has been developed. We derive the necessary information from LCGCMT and store it in a mysql database, this database is then interrogated by dynamic webpages (written in python) to display all kinds of views on LCG software. Examples are differences between certain releases, a list of packages contained within a LCG configuration, specific information about a certain sw package, etc. The pages are currently in testing phase. The deployment of the pages should be seen with the new milestone SPI-15 and SPI-16.
SPI-14	**31.12.07**	Make use of the build procedures in the LCG/AA nightly build system to implement post build procedures for the release process. This includes taring up of binary packages and providing installation kits, filling a database with release information which is used for the generation of dynamic web pages.	Done	The nightly build system has been successfully used to deploy the last 3 LCG configurations with different setups. I.e. once the whole stack had to be released another 2 times only certain LCG projects were released out of the stack. The configurations released are in production and used by the experiments. New scripts which complete the release process for taring up the build products (and sources) have been put in place. In addition also the doxygen documentation generation of the LCG/AA project software now solely depends on LCGCMT. Completing the centralization of all scripts which are used for building, releasing, configuring the LCG/AA software stack inside LCGCMT
ROOT				
ROOT-16	**30.06.07** **31.12.07** **31.12.08**	Cint 7.2 will use Reflex for storing all information regarding types (aka replace the G__struct global array).	In progress. Rescheduled.	We had successfully merged Reflex into CINT in December 2007: CINT now uses all of Reflex to store its reflection data. This new version of CINT cannot be put into production: Reflex makes it almost 20 times slower than the original version of CINT, and several prerequisite features (delayed loading of dictionaries, using directives etc) are missing in Reflex. Reflex is currently rewritten to address all of these issues. We plan to introduce the new CINT as an option into ROOT in the March development release. We plan to switch to the new CINT as default for the December production release of ROOT.
ROOT-17	**30.06.07** **31.12.07**	A major upgrade of the 2-d graphics system calling directly OpenGL is under investigation. If we succeed: - one we could get rid of the X11 and win32 interfaces - speed-up the graphics - easily mix 2-d and 3-d graphics in the same OpenGL viewer A report on this work will be given at the ROOT workshop end of march. One could hope to have a full implementation by end 2007.	Done	A Canvas can contain pads with OpenGL 3D graphics rendering. It means that in the same graphics window some parts are painted using OpenGL (detectors geometries, Lego plots, Surface plots, etc ...) and other parts are painted using basic X11 2D graphics. PostScript files generated from such "mixed" canvases are a combination of gl2ps output (for the OpenGL parts) and normal ROOT PostScript output (for the X11 parts). The possibility to render 3D text A(using FTGL) and 3D axis has also been implemented. Despite the fact it has been now demonstrated that it's possible to mix standard 2D graphics and 3D OpenGL graphics in the same pad, the complete replacement of X11 and win32 by OpenGL has not been completed. One of the main reason was that the memory overhead introduced by OpenGL (25M) was bigger than ROOT itself. The developments around GL are now more focused on the Events Display with the new EVE (Event Visualization Environment) package.
ROOT-18	**31.12.07** **30.06.08**	Specifications of the API for the support of complex data schema evolution in ROOT	In progress. Rescheduled.	The planned extensions to the existing class schema eveolution system in ROOT have been discussed with Atlas and CMS during the Autumn and presentations of the API indicating the way it will be supported made to both collaborations in September and October. It was agreed that the new system should be in the June release. A more detailed design is currently happening (collaboration with Atlas). We still expect to have the new system in production for the June release.
POOL				

POOL-8	**31.03.07** **30.09.07** **15.02.08**	Provide schema evolution for relational data according to a priority list of required use cases provided by the experiments.	Done	The Schema evolution features in POOL/ORA have been defined in collaboration with the CMS team, who has provided a set of concrete use cases. The implementation of the new features has been completed and tested. The related code has been included in the POOL release since POOL_2_7_0. The CMS team is currently working on the testing of the new features.
		COOL		
COOL-9b	**31.12.06** **31.03.07** **30.06.07** **30.09.07** **31.12.07** **01.04.08**	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 (waiting for the LHCb online RAC).	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 is expected to be completed in Q4 2007, with the move to the production 'LHCb-online' RAC server, installed and managed by LHCb at the pit."
COOL-20	**31.03.07** **30.06.07** **30.10.07** **31.12.07**	Server-side (SQL query) performance optimization for MV tag retrieval.	Done	The optimization that was missing for LHCb is there but not yet tested by LHCb.
		SIMU		
SIMU-1	**30.09.05** **15.12.06** **30.03.07** **30.06.07** **01.12.07** **30.04.08**	Apply the Fluka-Geant4 (Flugg) geometry interface to one of the LHC calorimeter test-beam simulation (VD524)	In progress. Rescheduled.	The analysis is completed. Discussion of the results with Fluka and Geant4 experts is undergoing. Final results will be presented at the LCG Physics Validation meeting on February 27th. The milestone will be closed at the next quarterly report.
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 progres. Rescheduled	No progress. ATLAS and CMS are still working on their respective test-beam analyses. This milestone should be rescheduled for 15 December 2008.
SIMU-18	**30.06.07** **30.09.07** **31.12.07**	Completion of integration of the GDML Geant4 binding in the Geant4 toolkit (SF709)	Done	The GDML “reader” has been integrated in the Geant4 toolkit and has been released in release.9.1 of Geant4. The GDML “writer” is under development and will be integrated in Geant4 by mid 2008.
SIMU-20	**30.11.07**	Review, redesign and debugging of the FLUGG tool (SF711)	On hold	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**	Thin-target validations of Geant4 forward physics (G4712)	Done	A new implementation of quasi-elastic scattering introduced in Geant4 release 8.3 (May 2007), and comparisons were undertaken (cross section presented at the LCG Physics Validation meeting, 28 March 2007). Fixes were undertaken for release 9.1 of December 2007. A prototype model for projectile diffraction was created, and tuned using HELIOS data. It is utilized in two dedicated physics lists, QGSP_DIF and QGSP_BERT_DIF.
SIMU-22	**01.12.07**	Inclusion of new versions of supported generators in GENSER (GS719)	Done	All new versions of the generators are being regularly added to GENSER: Herwig++, Hydjet, Lhapdf, Powheg, Pyqgen, Pythia, ThePeg, Winhac.
SIMU-23	**01.12.07**	Migration to HEPMC2 for ATLAS and CMS completed (GS720)	Done	Migration in CMS is completed. For ATLAS, migration has been done in release-14 of their software which is expected to be adopted by the end of February.
SIMU-24	**30.09.07** **15.12.07**	TARC benchmark for neutron production, interaction and transportation (VD721)	Done	The final results have been presented by A.Howard at the LCG Physics Validation meeting on November 21st. An LCG note is in preparation.

SIMU-26	**15.12.07**	Contributions to the minor release 9.1 of Geant4 (G4722)	Done	Geant4 9.1 included a number of new developments from members of SFT, including the extension of the Binary Cascade for incident pions and for use in transporting the remnants of high energy collisions, new physics lists FTFP_BERT and QGSC_BERT (reduce use of parameterized modeling). Fixes were identified for a number of cases, including a problem in quasi-elastic scattering. In addition fixes were identified, in collaboration with external contributors for a problem reported by ATLAS of high energy collision of sigma+ and a nucleon which produced an unphysically-high energy backward proton. Small improvements in CPU performance are seen in hadronic tests, around 3%.

Summary Of Progress

During last quarter the main activity in the Applications Area has been working towards to the release of the end of the year production versions of Geant4 and ROOT. We paid special attention to validate these releases as much as we could by own test suits but also by the experiments themselves because we think that the software in this release cycle will be the one used for LHC startup. The SPI nightly build system was essential to this validation.

We have been hit by some reduction of manpower that has taken place immediately. Further reduction is expected to take place in the coming months. In order to cope with this situation some activities has been put on hold, mainly in the Physics Validation for the time being. Additional activities will also be affected, and for this input from the experiments will be requested to prioritize the work and make the best optimization of the resources.

The SPI team has been putting a large among of effort in the direction of simplifying and centralizing the information required for the different services, such as the build of externals, the management of configurations, and the release procedures. This new approach was successfully tested with the latest releases of the LCG/AA configurations (LCG 54, 54a, 54b, 54c). The time to produce a complete release of the AA software stack has improved enormously going down from several days (sometimes weeks) to one working day. The nightly build system which has been developed for the LCG/AA software stack is also being adopted by other experiments and collaborations (Geant4, LHCb). The Hypernews and Savannah services continue to be highly used within the LHC experiments (Savannah also outside LHC).

The ROOT project has been focused in the last quarter mainly on the quality assurance procedure to deliver a good production release 5.18 in January. This new version includes several new packages and consolidation of existing packages. The release notes are visible at http://root.cern.ch/root/Version518.news.html. The QA procedure called roottest consists of about 150 major tests, each one including between a few and 50 specialized tests with a total of about 35000 lines of code or makefiles calling in turn 60000 lines of code of compiled or interpreted tutorials. The result of the nightly builds is visible at http://lcgapp.cern.ch/spi/aaLibrarian/nightlies/

<need some input from POOL and COOL>

Geant4 version 9.1 was released in December, as planned. It provides a number of fixes and several new features, including: a new GDML plug-in for importing detector description setups; new scoring capabilities steered by run-time command, based on the improved parallel navigation feature; a new navigation technique for voxel geometries; and refinements in electron multiple scattering. In addition it saw the first release of the Liege intranuclear cascade in Geant4 (HIP/Saclay), a new, native, low-energy QMD nucleus-nucleus model (SLAC) and the extension of the Binary Cascade to re-scattering inside a nucleus the particles resulting from a (high energy) collision.
Efforts have been undertaken to enable the LHC experiments to migrate to newer Geant4 releases. Pre-release versions and intermediate development versions were provided to and tested by experiments, providing valuable feedback. Robustness testing was extended with additional, longer testing, enabling the identification and fixing of a number of software issues. Convergence is being sought on using a single recent Geant4 version in production during an agreed period, to enable the concentration of the available effort for the support, maintenance and the provision of fixes.

New versions of MC generators has been released during last quarter completing the list of requirements from experiments. This includes also the new C++ version of Pythia, Pythia 8, and the most recent production version of Herwig++.
A new major version of HepMC (the C++ Event Record package for MC Generators), HepMC 2, has been also released; the package is now completely standalone and is already in use in production by ATLAS and CMS.

Outstanding Issues since Last Report

Milestones Changes and Actions

References and Hyperlinks

New and Next Quarter Milestones			Status	Comments
ROOT-19	**30.06.08**	Implementation of the complex data schema evolution in ROOT	In progress	The new functionality to support more complex data schema evolution cases will be released for the experiments to validate and integrate in their frameworks
POOL-10	**31.03.07** **31.05.07** **30.11.07** **31.03.08**	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 30.03.08
SIMU-25	**30.03.08**	4th simple benchmark for Geant4 and Fluka: diffraction of nuclei (VD801)	On hold	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.

SIMU-27	**30.04.08**	Status report on comparisons with shower shapes and relevant physics modeling (G4802)	In progress	Final status report on hadronic shower shapes study
SIMU-28	**30.06.08**	Contributions to expected Geant4 public release (G4803)	In progress	Expected contributions are on hadronic interaction modelling, and on improvements in performance and maintainability.
SPI-16	**30.06.08**	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.	New	Documentation and information about SPI related topics currently is spread over different web systems (static, dynamic web pages, twiki, etc.). We would like to achieve a centralization of this information into one system providing all necessary information. As a first step a survey on the available content management systems will be carried out to check
SPI-17	**30.06.08**	Development of a tool to bootstrapping LCG-AA software infrastructure. This tool should download the essential ingreedients to be able to install the rest of the LCG-AA software stack.	New	We need a tool for boostrapping LCG/AA software. This tool shall be completely standalone and responsible for setting up the basic infrastructure for building and using LCG/AA software.
SPI-18	**30.09.08**	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.	New	Concerning the centralized web base information system, once a technical solution was found the content of the current pages has to be migrated into the new system. In certain cases this might be done in an automatic way, in most cases this will require the manual inspection and possibly correction, re-writing of the pages in order to update or to provide them in a way compliant with the chosen content management system
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.	New	In the past few months a major effort has been invested in the QA procedures. Several hundred tests have been developed and run every day in the nightly builds. We want to consolidate this test suite to improve the robustness of the system in general. We also need to invest more time in testing the new (or development) versions of the compilers on all systems (eg today gcc4.3 or VC++9). This requires that the SPI team provides access to these new compilers in the nightly build system
ROOT-21	**30.06.08**	Development of the Event Display library (first version).	New	A big effort is currently on going to provide a powerful experiment independent library suitable for high performance event displays. We are currently collaborating with Alice and CMS for the development of their event displays. Both are expected to be in production this spring. Several people in Atlas have also expressed a big interest in this library. Although more developments are expected in this area, the two prototypes for Alice and CMS should give good indications of our directions.
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 optimized the I/O by trying to use memory mapped I/O. Due date December 2008
SIMU-30	**15.05.08**	New release process for HepMC defined (GS806)	New	Level-2 milestone. HepMC plays a central role in the simulation of the LHC experiments, it is therefore important to ensure that its changes are discussed and agreed between all its users, by defining and establishing a proper development plan and release process
SIMU-31	**01.06.08**	Extend Rivet validation to new C++ generators (GS808)	New	Level-2 milestone. Rivet is now the main tool used for validation and tuning of MC Event Generators. So far mostly Fortran generators have been used in the context of Rivet; the natural extension to the new C++ generators is foreseen.
SIMU-32	**15.09.08**	First version of System Integration Testing of Geant4 running on SPI-nightly platform (G4811)	New	Level-2 milestone. Provide migrated test suite for integration in the SPI-nightly facility.
SIMU-33	**15.12.08**	Contributions to Geant4 release of December 2008, including improvements in hadronic models (G4812)	New	Level-2 milestone. Contributions to the scheduled December release of Geant4, focusing on improved physics performance.

Comments and Additional Information