| QUARTERLY STATUS REPORT | | | | |
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| **Project Name** | | | **Date** | |
| Applications Area | | | 16.01.06 | |
| **Report Period** | | | **Author Name** | |
| **2005 Q4** | | | Pere Mato (editor) | |
| **Milestones for the Quarter** | | | **Status** | **Comments** |
| SPI-1 | 31.12.05 | Provide the tools for generating CMT and SCRAM configurations from a common generic configuration description based on XML description files. Be able to update the web and distribution's kits from the same description. | Partial completion | Tools were developed, to provide from a common configuration description based on XML files the following outputs:<br>a) SCRAM and CMT configuration information ("mocom") the part for scram is already in use, the deployment for CMT is planned for Q1/06 after discussion with the maintainers of CMT and the main users.<br>b) a web page to show the configuration of the external packages for a given configuration tag (http://spi.cern.ch/config/viewConfig.html)<br>Work on generating the distribution kits from the same description was postponed. |
| ROOT-1 | 30.09.05 | Make available prototypes addressing different topics for the SEAL+ROOT merge (Math libraries, Dictionary libraries, etc.) such that detailed planning for the experiments migration can be established. These prototypes should be available by the ROOT workshop at the end of September. | Completed | The libraries MathCore and MathMore, Reflex and Cintex have been migrated from the SEAL CVS repository to ROOT CVS. |
| ROOT-2 | 30.09.05 | Demonstration of the new the Parallel ROOT facility (PROOF) in a cluster of 32 CPU's provided by CERN/IT. This new version of the system should include asynchronous queries, GUI session controller, interactive batch mode | Completed | PROOF in asynchronous mode has been demonstrated at the ROOT workshop in September. The new GUI session controller is part of ROOT 5.08 released in December. |
| ROOT-4 | 31.12.05 | Finalization of the fitting and minimization application programming interfaces and integration of the new C++ implementation of Minuit in the ROOT release. | Completed | The Minuit2 package originally in SEAL has been reworked and interfaced with the ROOT Virtual fitter. It is part of ROOT 5.08. Fitting in ROOT can be done with the previous versions of Minuit and Fumili as well as the new versions Minuit2 and Fumili2. |
| POOL-1 | 31.10.05 | Production quality release of the relational database API (RAL) package, which should include the new interface recently reviewed. | Completed | The first public release of CORAL, was made available on 22/11/2005 (version 1.0.0) which contained all of the new functionality exposed through the reviewed interfaces. Prior to that there had been a few internal releases allowing beta-testers from the COOL development team and the experiment software integrators to send early feedback. Since the first public release, two other main and one minor (bug-fix) ones have been made available.<br>As of CORAL version 1.1.0, a plugin based on the frontier-client is included in the releases. The plugin allows to transparently use FroNtier servers (possibly cached via SQUID) as read-only Database backed. This new functionality has been tested by the CMS experiment with the full POOL software stack (including object relational mapping) as part of their LCG 3D work and several enhancements went into the Frontier code and the first production release of the plugin in POOL 2.3. |
| POOL-1 | 31.12.05 | POOL framework based on new C++ reflection libraries (Reflex) available for the experiments to be used in production. Validation by the experiments completed. | Completed | The POOL code is based on SEAL Reflex as of version 2.2.0, released on 21/9/2005. Since then 7 bug-fix releases have been produced which allowed the experiments to gradually pick up this part of the SEAL software through POOL. POOL will migrate to the ROOT version of Reflex (moved with SEAL 1.8) with the upcoming POOL 2.3 release. |
| COOL-1 | 30.11.05 | Conditions Database (COOL) release based on the latest version of RAL including bulk insertion operations and extended tagging functionality. | In progress | COOL release based on CORAL will be released this week (CORAL_1_2_1 released on January 14 was the first release with full support for all three backends)<br>Bulk insertion functionality is not yet implemented in COOL. Its implementation in COOL depended on the implementation in RAL/CORAL of bulk update/delete, which was only provided in CORAL (not in RAL). This is the first new feature available in CORAL that will need to be picked up in COOL (for providing bulk insertion). Extended tagging functionality has not been implemented yet. |
| COOL-2 | 31.12.05 | First prototypes of API and command line tools for data extraction and cross-population of COOL databases. These tools are important for supporting partial or complete distribution of the experiment's conditions databases with several databases technologies. | Completed | Basic prototype of a data extraction and copy tool has been implemented in the new package PyCoolUtilities. Basic prototype of a data inspection tool has been implemented in the same package |

| SIMU-1 | 15.12.05 | Apply the Fluka-Geant4 (Flugg) geometry interface to one of the LHC calorimeter test-beam simulation. | In progress | It is now technically possible to get hits from Fluka and then digitize and analyse them exactly as for Geant4. A very preliminary plot comparing the visible energy obtained with the two simulation engines (Fluka and Geant4) has been produced. Some cross-checks are now needed, together with a proper selection of the thresholds used in Fluka in order to be as close as possible to the Geant4 configuration. After that, a production with Fluka, and one with the latest Geant4 version can start. A presentation of these developments will be scheduled in the next Physics Validation meeting. Final results are expected for the first quarter of 2006. |
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| SIMU-2 | 15.12.05 | Production quality release of the MC generator level production framework. | Delayed | Software was recently reviewed by both LCG and CMS (Q3 2005): dependencies introduced at a preliminary stage turn out not to respect the agreed design. A common CMS/LCG interest to develop the framework in a single branch was re-verified (Q4 2005). The pursued design is confirmed. Support on the CMS side has been increased (supervision of the current PRS Generators conveners, development in the context of the new CMS-SW). Support on the LCG side has been also increased (GENSER integrator now acts as advisor for interfacing/testing each single Monte Carlo package). Next official report on the status of the software will be given to the LCG Generator meeting of January 2006. Verifications on the overall status of the package are expected at the end of each quarter. |
| SIMU-3 | 20.12.05 | New Geant4 public release including positron annihilation and geometry voxelisation improvements in addition to the regular bug fixes and small improvements included on each release. | Achieved | Deliverable achieved as release 8.0 of Geant4 was made on December 16th, with key scheduled developments, including several developed by team members, or in which team members contributed. A key release feature was the significant revision of the multiple scattering model and process. Team members tested this for typical HEP calorimeter test cases. New correction factors were introduced in the ionisation process for heavy ions and exotic particles. New transition radiation models were created for straw tubes (ATLAS), and for transparent regular (ALICE) radiators. In the geometry we added an option to check for overlaps when a volume is constructed. New constructors for volumes and solids enable direct persistency with Pool/Root. Nested volume parameterisations can be used to navigate fast and use less memory use for regular or voxel-like structures. In hadronics, the precise high energy elastic scattering was extended to protons. New processes were created for capture of negative particles, and for charged current interactions of neutrinos. The physics lists were revised adapting to new design of particles. The EM |
| SIMU-4 | 31.12.05 | First results of the ATLAS combined and 2004 test-beams data comparisons. | In progress | Many activities are undergoing in ATLAS to analyse the 2004 combined test-beam data, and the first results are now expected for the first quarter of 2006. |

| **Summary of Progress** |
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During this quarter the main work of consolidation of the AA software has continued, as well as the support for production deployments in the experiments.

The migration to the new Reflex library for the persistency framework (POOL) and Python scripting has been completed. Several iterations of POOL have been made available to the experiments to validate the changes. The final version of Reflex and Cintex has been released as part of ROOT 5.08 in December and will be used instead of the SEAL ones in the coming weeks. At the same time the appropriate components will be removed from SEAL releases and this will be an important milestone towards the completion of the SEAL and ROOT merge.

The first public release of the new re-engineered version of the relational database API package (CORAL) was made available. The adaptation of POOL and COOL (conditions database) to this new package is ongoing and finishing soon. This will be on time for the experiments to be integrated in their production software to be used in this year's major data challenges.

End of the year production versions has been released of ROOT and Geant4 which include a long list of new functionality required by the experiments.

Andreas Pfeiffer has replaced Alberto Aimar as SPI project leader. The project scope has been reassessed during the quarter. The reduction of exclusive manpower for SPI ac

| **Outstanding Issues since Last Report** |
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None

| **Milestones Changes and Actions** |
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Reschedule SIMU-1 to 31.03.06

SIMU-2. It is proposed to be renamed as "New generator level production framework: beta release", and the expected due date: 30 June 2006.

Reschedule SIMU-4 to 31.03.06

Reschedule COOL-1 to 31.03.06

| **New Proposed Milestones** | | | | |
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| SPI-? | 31.03.06 | Provide the interconnection/interoperability between the savannah and HyperNews services. | | Clarify the needs of the experiments on the interconnection/interoperability between the savannah and HyperNews services and provide an initial implementation |
| SPI-? | 31.03.06 | Generate CMT configuration and distribution kits from the common (XML based) configuration description. | | Completion of the milestone SPI-1 |

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| SIMU-? | 30.06.06 | Investigation of correction for test-beam data for validation of stand-alone simulation engines (VD617) | | Investigate the possibility to get, for at least some observables,e.g. the shower shapes, corrections of data for digitization and reconstruction effects, in such a way to allow direct comparison with stand-alone simulation, provided with the correct geometry imported from a GDML file. As a concrete case, the ATLAS electromagnetic barrel calorimeter test-beam of 2002 will be considered |
| SIMU-? | 30.06.07 | Application of corrections of test-beam data, for validation of stand-alone simulation, to the LHC calorimeter test-beams (VD703) | | In the case of success for milestone SIMU-6, then generalize the machinery to apply to other test-beam analyses, providing to the detector simulation developers important validation data to be preserved through the years |
| ROOT-? | 31.03.06 | Have the rootcint dictionary code generator interfaced with the Reflex and gccxml options | | The CINT data structures will be filled automatically from the Reflex data structures via the Cintex gateway. This is the first step to allow serious work in adaptation of the CINT intepreter to Reflex. |
| ROOT-? | 30.06.06 | First version of CINT running directly with the Reflex data structures as part of the ROOT June release | | The time scale for this milestone is very tight. If we realized by end of April that we cannot meet this milestone, it would have to be postponed to the December release. |
| ROOT-? | 30.06.06 | The new Fit GUI released as part of the ROOT June release. | | At the same time an extension of the Virtual Fitter that uses the new libraries in MathCore and MathMore will be developed. |
| ROOT-? | 15.12.06 | PROOF demonstrated in production in at least one of the LHC collaborations. | | This new version should include monitoring of the resources, interfaces with a priority scheduler, dynamic allocation and deallocation of servers. An improved client/server I/O is available using read-ahead combined with the file cache. |

| Additional Information |
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| *Additional pertinent information (web links) and other documents that contain useful details on the status of project.* |

| Milestones for Next Quarter | | | Status | Comments |
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| **SPI-2** | **28.02.06** | Provide a web based "user discussion forum" service interfaced with Savannah. This new service should allow projects and experiments to easily setup and manage discussion subjects. | | |
| **ROOT-5** | **31.03.06** | 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. | | |
| **ROOT-6** | **30.04.06** | The ROOT C++ interpreter (CINT) adapted to use the new C++ reflection library (Reflex). Applications will require a single dictionary with reflection information in memory. Backward compatibility will need to be provided to old ROOT and POOL applications. | | |
| **COOL-3** | **31.03.06** | POOL overall performance study and validation of the experiments requirements. This study should identify the areas that will require further work and optimization. | | |
| **SIMU-5** | **31.03.06** | Monte Carlo event generator files database (MCDB) publicly available and able to deal with large files. | | |

| Comments and Additional Information |
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| *Any other information or comment.* |
| *Improvements to the template or other aspects of the planning of the project.* |