LCG Generator Services project planning meeting

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Outline

- Introduction
- Progress report
- Planning for the next 6 months
- Summary

Introduction

- **Previous Generator Services planning meeting on 28 November 2008**
  - Slides and minutes available from
    - http://indico.cern.ch/conferenceDisplay.py?confId=41826
- **Regular monthly meetings with technical presentations**
- **Purpose of the present meeting**
  - Review the progress since last meeting
  - Plan the work for next 6 months

Work-packages

- Generator libraries repository [GENSER]

- Testing and Validation of generators [VALIDATION]

- Event Record [HEPMC]

- Event Database [MCDB]

Progress report: GENSER

- **GENSER**
  - Structure stable and used by experiments
  - 24 generators installed
    - http://lcgapp.cern.ch/project/simu/generator/
    - No new generator added since the last review
    - 2 new generators ready, waiting for ATLAS feedback
      - baurmc (Wγ / Zγ), AcerMC (SM bkg processes for LHC)

  - Most of the generators have been ported on SLC5
    - Latest version used
    - Main platform: 32-bits gcc 4.3   i686-slc5-gcc43-opt
    - Second platform: 64-bits gcc 4.3   x86_64-slc5-gcc43-opt
      available only for few generators

LHCb-related items

- Anders Ryd has created a new EvtGen version, by merging different branches (BaBar, CDF & D0, LHCb & ATLAS & CMS). This version is under testing, bug fixings and improvement by LHCb. Updated decay table with PDG2008.
  When ready (few weeks) it will be installed in GENSER.

- HIJING generator, whose authors are not supporting it any longer, is under revision by LHCb in order to have consistent behaviour in 32- and 64-bits architectures…
  As soon as we receive it, we will install it in GENSER (including SLC5 platforms).

- LHCb is requiring support for Mac OS X for at least the main generators (LHAPDF, Pythia6, PHOTOS, EvtGen, HIJING and few others).

Development in MC@NLO 3.4

- We are working with one of the MC@NLO authors in order to improve the structure of the package, using the latest release, 3.4 (not yet in GENSER)

- The main idea would be to create an "utility library" (containing all the common code for all processes), plus "process-specific libraries"
  - one library per process
  - only one library can be used in each application
  - If two or more of them are linked in the same application, one would get errors (because identical routine names are used but with different behaviour)

- It should be ready in few weeks

Building generators with autotools

- The building mechanism provided by GENSER for some generators (e.g. Pythia6, Herwig, Jimmy, Photos, Tauola , Pythia8, etc.) is fragile: it breaks in some platforms like Ubuntu Linux, Fedora Linux, Mac OS X

- Autotools could offer a platform-independent way for building these generators

- For the ``autotoolized" version of Pythia 419:

  /afs/cern.ch/sw/lcg/external/MCGenerators/pythia6/**419.ac**(**.2**)

  available since November 2008, we did not get any feedback from the experiments: they are very busy and consider it with low priority, given that they are happy with the current building system…

GENSER bootstrap

- A bootstrap script that allows to build all generators supported by GENSER has been required (by Rivet and Desy MC group)

- This is useful if you want to build a local copy of GENSER and/or to build some generators with a different version of an utility package, e.g. HepMC

- A first version is ready and about half of the generators supported in GENSER can now be built with it

- Progress has been very slow in the last 6 months, due to lack of man-power. It could be completed easily if we move to autotools for building all generators in GENSER

Main proposal for the next 6 months

- To build all new versions in GENSER with autotools only

- In this way we will have feedback from the experiments

- We are committed to fix any problem promptly as they are reported. If an acceptable fix is not found within, let's say, few days, we will use (temporarily) the old approach.

Advantages

- Speed up the transition to autotools

- As soon the autotools building system is adopted for a generator, we can easily build it with the bootstrap script

- New platforms, like Mac OS X, can be built easily without extra effort

Progress report: Validation

- ## Validation

  - ❑ All generators tested regularly as soon as new versions are installed

  - ❑ Most of the tests consist in comparing numbers (e.g. cross-sections) between two versions, new vs. reference

  - ❑ Distribution-based tests:
    - ▪ for b-bbar production with Pythia6, provided by LHCb
    - ▪ MC-Tester
    - ▪ HepMC Analysis Tool : developed by the DESY MC group (J.Katzy et al.) and included in the LCG Generator Services.

  - ❑ Plan to try also Rivet for regression testing

Progress report: HepMC

- The experiments are still using HepMC **2.03.09**

- Last year's new version, HepMC **2.04**, was never used or tested by the experiments so it will no longer be supported

- The new version, HepMC **2.05**, will be released next week
  - Dedicated meeting, with minutes, on 28 January
  - Delay in the first beta release, ready on 16 April
  - Got useful feedback, mainly on how to include cross-section information. Second beta release available on 14 May. Third and final beta release available on 26 May.

- Next HepMC meeting, devoted to a "pre-discussion" for HepMC **2.06** (planned for 2010), is scheduled on
  Wednesday 8 July at 16:30 (CET)

Progress report: MCDB

- **CMS is using MCDB**
  - for storing intermediate parton-level events

- **CMS is also interested in MCDB**
  - to allow exchange of files with people outside the collaboration

See presentations at the LCG Generator Services monthly meeting
on 8 April 2009 :

http://indico.cern.ch/conferenceDisplay.py?confId=56034

Milestones overview

GENSER_1	01/06/2009	include new versions of supported generators	DONE
GENSER_2	01/06/2009	test autotools for building generators	PENDING
GENSER_3	01/06/2009	complete the bootstrap approach for building the whole GENSER	PENDING
GENSER_4	01/06/2009	prepare the migration to SLC5 : test generators with g++ 4.3.2 and gfortran	ONGOING
VALIDATION_1a	01/06/2009	evaluate HepMC Analysis Tool	DONE
VALIDATION_1b	01/06/2009	evaluate Rivet for regression testing	ONGOING
HEPMC_1	01/06/2009	release HepMC 2.05	ONGOING
MCDB_1	01/06/2009	Support MCDB for CMS productions	DONE

Proposed milestones

GENSER_1	01/12/2009	include new versions of supported generators
GENSER_2	01/12/2009	build all new versions with autotools
GENSER_3	01/12/2009	complete the bootstrap approach for building the whole GENSER
GENSER_4	30/07/2009	complete the migration to SLC5
VALIDATION_1	01/12/2009	try Rivet for regression testing
HEPMC_1	30/07/2009	release HepMC 2.05 and prepare for 2.06
MCDB_1	01/12/2009	support MCDB for CMS productions

Summary

- Project in good shape, but running a bit slower than planned

- The main focus for the next 6 months should be the use of autotools for all generators

- Then, we can complete the bootstrap approach

- Next planning meeting: end November 2009