# LCG Generator Services
# **planning meeting**

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# Outline

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

# Introduction

- Previous Generator Services planning meeting on 23 May 2008
  - Slides and minutes available from
    - http://indico.cern.ch/conferenceDisplay.py?confId=32134
- Regular monthly meetings with technical presentations
- Purpose of the present meeting
  - Review the progress since last meeting
  - Plan the work for next 6 months

# Generator Physics meetings

- In collaboration with **MCnet,** we would like to propose a new type of meetings dedicated to **physics** aspects of Monte Carlo Event Generators for both experimentalists and MC authors.
- We are thinking to start in February 2009, with a meeting every 2-3 months, lasting an afternoon or a day.
- The idea would be to concentrate on one or few topics in each meeting, proposed by experimentalists or authors. We foresee short presentations, not taking more than 50% of the time, to allow plenty of time for discussions.
- Ordinary LCG Generator Services meetings, dedicated to more technical/software issues, will continue as usual in the other months.

# Meetings in early 2009

- Mini-workshop on EVTGEN : Tuesday 13 January, 3-6 pm
- 1st Generator Physics meeting in February
- HepMC 2.05 meeting : Wednesday 18 March

# 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/
    - 1 new added on request of experiments since the last review
      - MC@NLO
    - 2 more ready, waiting for ATLAS feedback
      - baurmc (Wγ / Zγ), AcerMC (SM bkg processes for LHC)
  - 1 new testing package: MC-Tester
  - More generators built on Windows
    - Pythia6, LHAPDF, Photos,
      Pythia8, Herwig, Jimmy, Hijing, Alpgen

# 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
- Based on Andy's experience with autotools in Rivet, we have prepared an ``autotoolized" version of Pythia 419:

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

  This should be equivalent to the one built with the hand-made configure script. Experiments are invited to test it, especially in Grid productions.

# 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
- Not more than 1 version for the following utility packages should be specified: HepMC, FastJet, CLHEP, ROOT
- One or more generators (including LHAPDF) can be built, and for each of them one or more versions can be specified (otherwise the latest version will be assumed)
- A first version, working for only some of the generators is available; it is based on *pkgsrc*; work in progress

# Inconsistencies of GENSER libraries

- In GENSER we build a new generator version as it comes, using normally the latest version of HepMC (and similarly for any other common package)
- So different generators, and different versions of the same generator, could have been built with incompatible versions of HepMC (and any other common package)
- To avoid this, Andy B. and James M. have suggested to introduce an extra level of subdirectory in MCGenerators to deal with versions, similar to libtool libraries...
- This is possible but more complicated to manage… if ATLAS and LHCb agree to use the same HepMC v. (CMS is building from source), as now with 2.03.09, we can keep the current simple GENSER structure.

# Progress report: Validation

- Validation
  - All generators tested regularly as soon as new versions are installed
  - Tests consist in comparing numbers (e.g. cross-sections) between two versions, new vs. current
  - There is only one distribution-based test, for b-bbar production with Pythia6, provided by LHCb
  - Plan to extend the distribution-based tests
    - Test all aspects of MC event generators (hard process, showering, underlying event, hadronization, decay, PDFs)
    - Use HepMC to have generator-independent tests

  by using the "HepMC Analysis Tool" developed by the DESY MC group (J. Katzy, C. Ay, et al.)
  *see LCG Generator Services monthly meeting on 5 November*

# Progress report: HepMC

- HepMC **2.04** has been released in June, but experiments are still using **2.03.09**
- So far we have considered only two situations:
  - A major HepMC release once per year (dedicated meeting, minutes, beta release… : this takes 1-2 months)
  - Bug-fixes : quick fixes as bugs are reported

However a third case should be considered: urgent change of HepMC. My proposal:

- High threshold: it should be required by at least one experiment
- Short but open list of people interested to discuss the proposed change and its implementation
- Discussions mainly by e-mail, eventually with a special meeting if needed to converge: release out in 1-2 weeks

This will be discussed also at the next HepMC meeting

# Progress report: MCDB

- CMS is interested in MCDB
  - for storing intermediate parton-level events
  - to allow exchange of files with people outside the collaboration
- CMS is currently testing MCDB for Grid productions
  - results are expected before the end of December
- The requests on MCDB made by CMS so far have been fulfilled, and passed first partial tests
- If CMS continues to use MCDB, LCG Generator Services will maintain its support for next year
  - Reduced mostly to maintenance due to LCG budget cut

# Milestones overview

| | | | |
|---|---|---|---|
| GENSER_1 | 01/12/2008 | include new versions of supported generators | DONE |
| GENSER_2 | 01/09/2008 | include MC@NLO, add test to POWHEG | DONE |
| GENSER_3 | 01/12/2008 | evaluate autotools for Pythia and Herwig | ONGOING |
| GENSER_4 | 30/06/2008 | complete the porting to Windows of the generators required by LHCb | DONE |
| VALIDATION_1 | 01/12/2008 | extend the set of tests | DONE |
| VALIDATION_2 | 01/12/2008 | extend Rivet validation to new C++ generators | ONGOING |
| HEPMC_1 | 30/06/2008 | complete LHCb migration to HepMC-2 | DONE |
| HEPMC_2 | 30/06/2008 | release HepMC 2.04 | DONE |
| MCDB_1 | 01/12/2008 | test MCDB in CMS large productions | ONGOING |

# Proposed plan

- GENSER
  - Continuation of the same service
  - Test autotools for building generators
  - Complete the bootstrap approach for building GENSER
  - Be ready for SLC5: test generators with g++ 4.3.2 and gfortran
- Validation
  - Install and use HepMC Analysis Tool
- HepMC
  - New release HepMC 2.05
- MCDB
  - Support MCDB for CMS productions

# Proposed milestones

| | | |
|---|---|---|
| GENSER_1 | 01/06/2009 | include new versions of supported generators |
| GENSER_2 | 01/06/2009 | test autotools for building generators |
| GENSER_3 | 01/06/2009 | complete the bootstrap approach for building the whole GENSER |
| GENSER_4 | 01/06/2009 | prepare the migration to SLC5 : test generators with g++ 4.3.2 and gfortran |
| VALIDATION_1 | 01/06/2009 | install and use the HepMC Analysis Tool |
| HEPMC_1 | 01/06/2009 | release HepMC 2.05 |
| MCDB_1 | 01/06/2009 | Support MCDB for CMS productions |
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# LCG budget for 2009

- LCG financial support for the Generator Services project is likely to decrease by about 25% in 2009
- This will affect a bit GENSER but more MCDB

# Summary

- Project running according to the plan
  - GENSER stable
  - Testing suite extended
  - Regular technical meetings
- Get feedback from experiments on autotools and be ready to move other generators
- Need to complete the bootstrap approach
- Prepare for the migration to SLC5
- Next planning meeting in May 2009