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 30 November 2007
  - Slides and minutes available from
    - http://indico.cern.ch/conferenceDisplay.py?confId=24411
- 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
  - 23 generators installed
    - http://lcgapp.cern.ch/project/simu/generator/
    - 1 new added on request of experiments since the last review
      - POWHEG
    - 2 more to be installed
      - baurmc (Wγ / Zγ), MC@NLO
  - More generators build on Windows (in progress)
    - Pythia6, LHAPDF, Photos,
      Pythia8, Herwig, Jimmy, Hijing, Alpgen
    - Automatic procedure

Evaluate autotools for a more robust building of some generators

- GENSER uses the original building mechanism for each generator, if this is provided. If it is not present (e.g. Pythia, Herwig, Jimmy, Photos, Tauola, etc.) then a hand-made shell script (configure) is prepared and used
- This shell script is fragile: it breaks in some platforms like Ubuntu Linux, Fedora Linux, MAC OS X, etc. which are required by Rivet users
- Autotools could offer a more robust solution for building these generators: GENSER is evaluating a solution used in Rivet (thanks to Andy!). The delicate, tricky issue to be tested carefully is the deployment in the Grid…

Progress report: Validation

- Validation
  - All generators tested regularly as soon as new versions are installed
  - At least one test per generator
    - exceptions: POWHEG, HIJING, STAGEN
  - Tests provided by LHCb already included in GENSER; when ATLAS and CMS provide their tests they will be included and then used regularly
  - The general approach we are following is to keep extending the number of tests of the installed generators, given priority to the most used and to the new ones
  - We are starting using the MC-Tester tool to compare the decays of some particles (τ^-, B_d^0 , B^- , B_s^0) between 2 generators or versions of the same generator

MC-Tester

- http://mc-tester.web.cern.ch/MC-TESTER/
- Authors: P.Golonka, T.Pierzchala, Z.Was, N.Davidson
- Originally created to compare TAUOLA τ-decays between two versions, using HEPEVT
- Compare branching ratios, and invariant mass distributions of the decay products
- Recently extended to handle HepMC
- Tested so far with: TAUOLA, Pythia6, Pythia8, EvtGenLhc
- Installed in: /afs/cern.ch/sw/lcg/external/MCGenerators/mctester
- Nadia D. will present MC-Tester in one of the next LCG Generator Services monthly meetings

Progress report: HepMC

- Regular bug-fix releases of HepMC 2.03
- ATLAS and CMS have moved to HepMC-2
  LHCb is moving to HepMC-2
  - Transition more complicated by the request of being able to read older files written with HepMC-1
    - HepMC-1 uses CLHEP vectors; HepMC-2 simple vectors
    - Work in progress by Lars with help from ROOT team
- New major release in progress: HepMC 2.04
  - New approach
    - LCG Generator Services monthly meeting dedicated to HepMC
    - Minutes written
    - Savannah discussion thread to collect feedbacks
    - Beta-release
    - 1 major release per year (bug-fix releases when needed)

Highlights of HepMC **2.04**

- PdfInfo
  - **x•f(x)** should be stored
  - 2 new integer data members to store the unique pdf set id
- IO_GenEvent
  - **IO_ExtendedAscii** has been removed
  - **IO_Ascii** is deprecated and will be removed in 2.05
- Units
  - HepMC should allow to specify units (transient & persistent)
  - Momentum units: MEV , GEV
  - Position units: MM , CM
  - Default units can be specified at configuration time.
    In AFS the HepMC libraries will have MEV and MM as default
- Particle status code
  - Discussion postponed to 2.05 . Use HEPEVT status

Progress report: MCDB

- CMS is evaluating MCDB
  - for storing intermediate parton-level events
  - to allow exchange of files with people outside the collaboration
- Requests on MCDB
  - It should work for large Grid productions
  - Automatic upload and download of generated samples
- MCDB integrated in CMSSW
- Automatic upload completed
  - Main extension of MCDB made in March by Lev and Sergei
- Started testing MCDB in the MadGraph production

Milestones overview

GENSER_1	01/06/2008	include new versions of supported generators	DONE
GENSER_2	*01/06/2008*	include POWHEG and MC@NLO	ONGOING
GENSER_3	01/06/2008	evaluate autotools for Pythia and Herwig	ONGOING
VALIDATION_1	*01/06/2008*	get input from ATLAS and CMS for new tests and implement them	waiting for input
VALIDATION_2	01/06/2008	extend Rivet validation to new C++ generators	ONGOING
HEPMC_1	01/03/2008	complete migration to HepMC-2	ONGOING
HEPMC_2	01/06/2008	define a new release process for HepMC	DONE
MCDB_1	01/06/2008	integrate MCDB in CMSSW	DONE

Manpower overview

- Satisfactory number of FTE
  - ~**1.5 FTE** for GENSER, ~**0.5FTE** for MCDB
- Long term plan of regular visits put in place
  - Improvements in the rotation of people
- Still some problems when an integrator starts working on something and then leaves before finishing
  - Documentation for the next integrator needs to be improved
  - It should be possible to contact (by email or telephone) the integrator, at least for a couple of weeks after he leaves CERN
  - Both the integrator who finishes his shift, and the new coming one should be responsible for a smooth transition
- A.R. has replaced Witek Pokorski in February 2008

Proposed plan

- GENSER
  - Continuation of the same service
  - Evaluation of autotools for building
- Validation
  - Implementation of new tests
  - Extend Rivet validation to new C++ generators
- HepMC
  - Complete LHCb migration to HepMC-2
  - Complete release HepMC 2.04
- MCDB
  - Test MCDB in CMS large productions

Proposed milestones

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

Summary

- Project running according to the plan
  - GENSER stable
  - Testing suite extended
  - Regular technical meetings
- Evaluate a more robust building system for GENSER based on autotools
- Continue to enlarge the set of tests and physics validations
- Next planning meeting in Nov/Dec 2008