

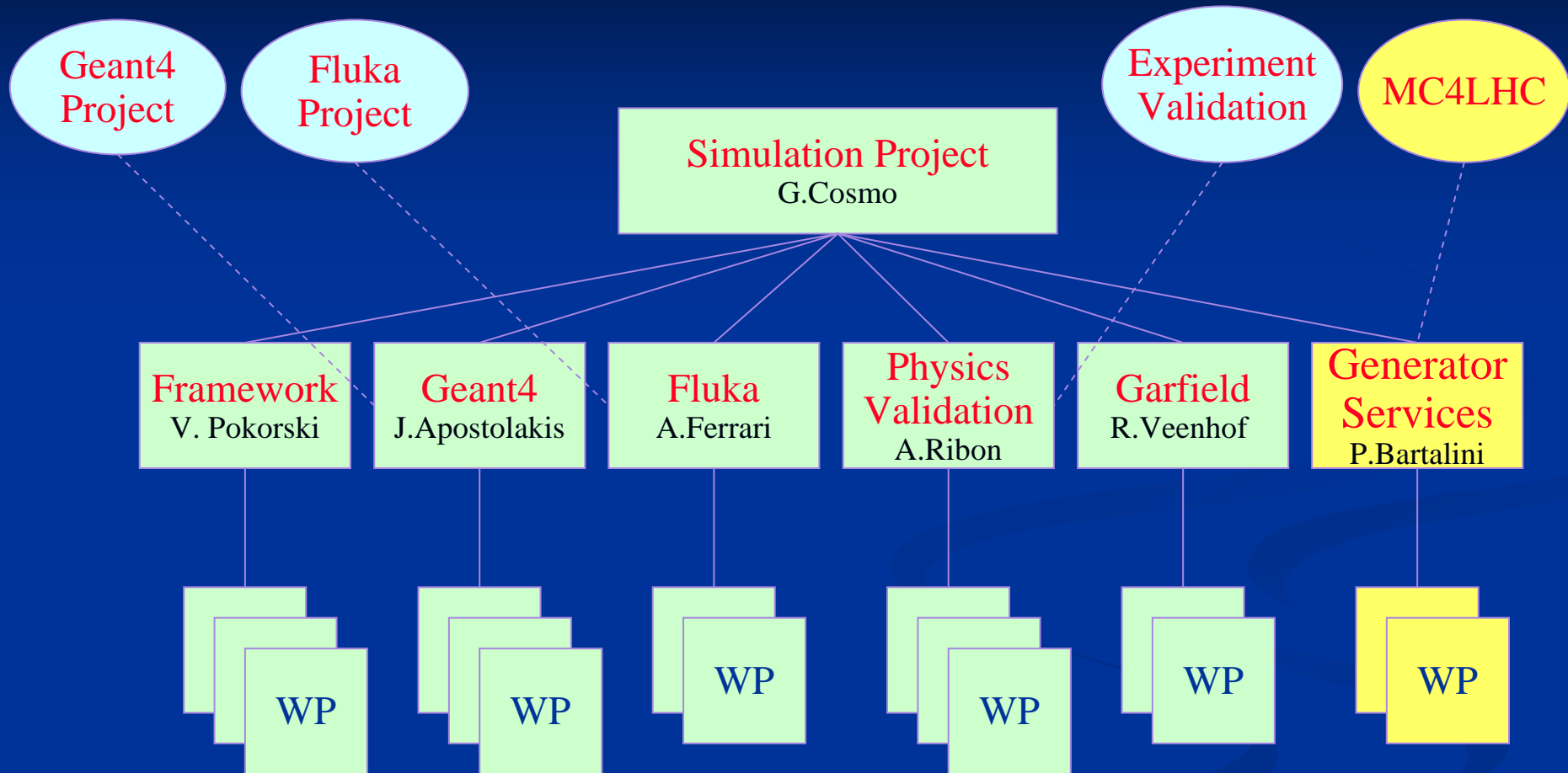


Activities promoted by LCG-Generator

Supporting Monte Carlo Generators in the
LHC era

P. Bartalini
(University of Florida)

LCG Simulation Project Organization



LCG Generator Services



GOAL: to guarantee the generator support for LHC

WP1: GENERATOR SERVICES LIBRARY (GENSER)

WP2: EVENT FORMATS AND EVENT INTERFACES

WP3: SHARED EVENT FILES: FRAMEWORK & DATA BASE (MCDB)

WP4: VALIDATION

Florida (Coordination) ~0.30 FTE (+Activity on LHAPDF/LHAGLUE)

CERN (Library, Event Interfaces) ~0.50 FTE (+1 Research associate on Pythia 8)

LCG-Russia (Library, Data Base) ~1.75 FTE

LCG-Spain (Framework) ~0.50 FTE

INFN (Validation) ~0.50 FTE

Collaboration with independent projects: Phenogrid, CEDAR

Contact persons/Collaborators in MC Projects and LHC Experiments

Started May 2003
Long Term Project

Organisational Issues



WEB page

<http://lcgapp.cern.ch/project/simu/generator>

→ Links to relevant documentation, CVS repository, release.notes etc.

[CDS Agenda Home](#) > [Projects](#) > [LHC Computing Grid](#) > [Physics Generators](#)

→ Minutes of meetings, slides of presentations

Meetings:

→ First Tuesday of the month at 5 PM in CERN-40-4-C01 & VRVS

Simulation project mailing list:

project-lcg-simu@cern.ch

*Permanent Forum on Physics and Software Issues
related to Monte Carlo development & usage*

MC4LHC Work Plan



Meeting on Tuesday AM

The LCG Generator Library (**M.Kirsanov**)

The Monte Carlo Data Base (**L.Dudko**)

The HepML meta data format (**A.Sherstnev**)

Very interested in CEDAR Meeting on Wednesday AM

CEDAR expression of interest to use GENSER (and MCDB)

LCG Generator expression of interest to support CEDAR packages

- HZTool/HZSteer, Rivet/RivetGun, JetWeb, RunMC
- work already started!

LCG and CEDAR agreement to converge to a unique meta data schema for documentation of Monte Carlo samples

Work

Tag denotes possible work to develop in the context of this workshop

WP1. The LCG Generator Library



**GOAL: to provide Monte Carlo Generator code @ LHC
replacing the obsolete CERN Library**

→Mandate:

- ❖ To collaborate with MC authors to prepare LCG Compliant Code
- ❖ To maintain older MC packages on the LCG supported platforms

→Clients:

- ❖ Addressed to LHC experimentalists and theorists both at CERN and in external laboratories

→GENSER

- ✓ CVS Repository, AFS Distribution
- ✓ MC Packages & Example/Test Code
- ✓ Shared and Archive Libraries
- ✓ Tested by all the LHC experiments
- ✓ Quarterly Release Scheme

**ATLAS, CMS and LHCb
Productions rely on GENSER**

Documentation: <http://lcgapp.cern.ch/project/simu/generator>

Savannah Portal: <http://savannah.cern.ch/projects/simu/>

AFS: [/afs/cern.ch/sw/lcg/app/releases/GENSER](http://afs.cern.ch/sw/lcg/app/releases/GENSER)

The Generator Library

(contact person M.Kirsanov)



- ❖ **GENSER:** HERWIG, HERWIG++, PYTHIA6, PYTHIA8, HIJING, ISAJET, ALPGEN, PHOTOS, STAGEN (TRUENOIR), FEYNHIGGS, MCATNLO, TAUOLA, EVTGENLHC, CHARIBDYS, CASCADE, MADGRAPH, JIMMY, PHOJET, TOPREX, LHAPDF, PYQUEN, HYDJET.
- ❖ **LCG EXT:** SHERPA, CompHEP, EVTGEN.

GENSER_1_4_0:
27 Packages
 slc3_gcc323
 slc3_gcc323_dbg
 slc3_ia32_gcc323
 slc3_ia32_gc344
 slc4_amd64_gcc345

**Archive and
Shared Libraries**

- Number of generators starts to saturate.
 Accent being shifted towards
 Support to new OO MCs, Tests, Validation,
 User Support.
- Default CERN Linux SLC4 is built on gcc4.
 f77 is no longer available
 We have to switch to gfortran and/or g95
 GENSER tests started ~ 1 year ago
 (M.Kirsanov)
 Currently still ongoing (R.Yaari)

Work

WP2. Event Formats and Event Interfaces



GOAL: standardize interfaces, support the new OO MCs

- **The modularization**
 - **ThePEG (used in Herwig++)**
 - From April 2004 LCG Generator participates to the development of **ThePEG**, mostly concentrating on doxygen documentation
 - LCG contact person A. Ribon

- **The MC truth Interface**
 - **HepML**
 - Meta-data format for automated documentation of generator samples
 - Two proposals (hopefully soon a unique common proposal!)
 - CEDAR: <http://hepforge.cedar.ac.uk/hepml/>
 - LCG: <https://twiki.cern.ch/twiki/bin/view/Main/HepML>
 - contact persons L.Dudko, A.Sherstnev

 - **HepMC**
 - Used for both generator level and MC truth in particle transport
 - LCG will take care of the development & maintenance in the LHC era
 - Work plan proposed in previous talk from L. Garren

Work

Work



Collaborations with "new" Monte Carlo projects

(contact persons **A. Ribon, M.Kirsanov**)

- ❖ Pythia 8 (GENSER integration, validation)
 - ❖ Herwig++ (GENSER integration, validation)
 - ❖ EvtGen (porting to LHC, including physics)
- Contacts: P. Robbe (LHCb), M. Smizanska (ATLAS)

} OO MCs

Further Details on the status of these MCs
in Next Talks

Work

- ❖ New generator framework of the CMS experiment (development)
- Contact: H. Naves

WP3 . Monte Carlo Data Base



(MCDB)
(contact persons L.Dudko)

■ Motivations

- To Provide Configuration, Book-keeping, Documentation, Storage for the Shared Event Files
- To keep track of the full generation chain, Exploiting the Competences of Monte Carlo Experts and Monte Carlo Authors

■ CMS MCDB <http://cmsdoc.cern.ch/cms/generators/mcdb/>

- Only parton level files; AFS storage; No Searchable; No SQL

■ LCG MCDB [hep-ph/0404241]

- Same authors + Additional human resources and technical support
- Core software supported by LCG Software Project Infrastructure
 - MySQL; POOL; CASTOR (RFIO); CGI; Perl; Apache
- Web Interface, Dedicated Web Server <http://mcdb.cern.ch>
- Authentication via afs and GRID certificates
- Twiki: <https://twiki.cern.ch/twiki/bin/view/LCG/SUMMARY>
- Currently populating the data base and promoting usage in LHC collaborations.
 - Emphasis on the development of specific APIs to LHC collaboration software

Work



GOAL: to cross-check MCs and compare with data

- ❖ **Basic Sanity Checks**
- ❖ **Reference distributions (multiplicities, P_T Spectra etc.)**
- ❖ **Promoting common LHC activities on MC Validation**
 - ❖ **LCG Generator Meeting of October 2005**

➤ **Standalone Studies**

- ✓ Work on GENSER subpackages **Integrator, Beta Testers in Experiments**
- ✓ HIJING Validation (V.Uzhinsky et al.) → Encouraged to contribute to JetWeb
- ✓ NRQCD models in Pythia 6.3, 6.4 (M.Bargiotti et al.)
 - ✓ **presented to HeraLHC06,**

➤ **Validation Framework**

- ✓ JetWeb would be nice, provided it plan to gradually increase the number of supported generators (a good starting point is the adoption of GENSER).

BACKUP



WP1. Procedure of GENSER Releases



- Quarterly official releases (second digit incremented)
 - Pre-releases targeted for mid of the quarter
- Requests from LHC experiments collected in LCG Generator Monthly Meetings
 - Additional MC sub-packages pursued for inclusion
 - Update of already integrated Sub-package versions
- Interactions with Monte Carlo authors
 - Authors are contacted by group leader and/or liaison person (version verification)
 - Integrator takes care of validation and technical interaction/collaboration with authors
- GENSER Pre-releases (performed by the LCG Librarian)
 - Integrator provides tags to be used for building and installing GENSER pre-releases
 - In average three weekly pre-releases before official releases
 - Access guaranteed to beta testers (contact persons in LHC experiments)
- GENSER releases (performed by the LCG Librarian)
 - Final debug through Mandatory Post-installation Checks
 - Checking existence of libraries; Running tests
 - Advertised in LCG-AA, LCG-SIMU, and MC4LHC mailing lists
- Feedbacks submitted through Mail and/or Savannah and/or Monthly Meetings
- Bug fixes (third digit incremented) → Recently improved through partial releases
 - Further special releases can be arranged under request