The Generator Sub-project In The LCG Simulation Project

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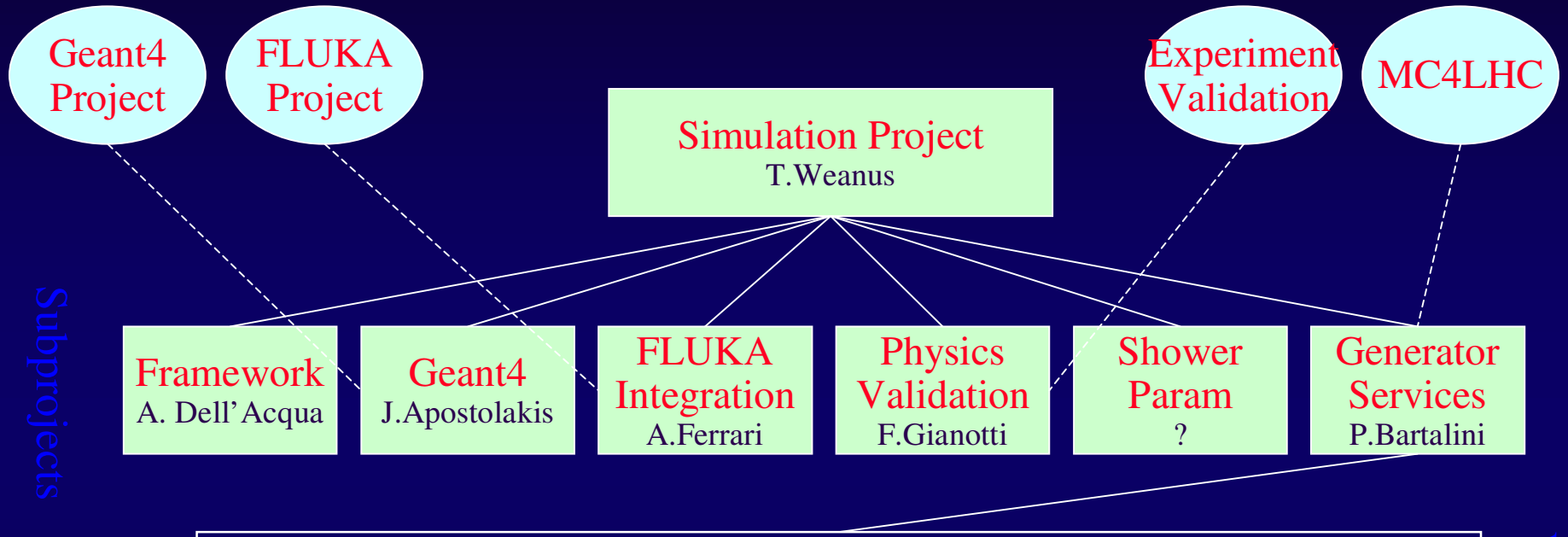
Simulation project in LCG-APP



Work packages

- -- GENERATOR LIBRARY
- -- STORAGE, EVENT INTERFACES AND PARTICLE SERVICES
- -- COMMON EVENT FILES, EVENT DATA BASE
- -- TUNING AND VALIDATION OF EVENT GENERATORS

MC generator RTAG report: http://lcgapp.cern.ch/project/simu/generator/MCGenRtag.doc

Project context of LCG SPI

LHC grid software applications
(LHC experiments, projects, etc)

LCG Application Area

LCG Infrastructure

- Common services
- Similar ways of working (process)
- Tools, templates, training
- General QA, tests, integration, release

LCG Application Area software projects

- POOL: Persistency
- SEAL: Core common software
- PI: Physics Interfaces
- Simulation
- Detector Description
- …etc…

LCG SPI project

Milestones of LCG-Generator

- **ALPHA version of the generator repository (GENSER) ready by 06/30/2003 (OK!)**
- **BETA version of the generator repository ready by 09/15/2003**
- **MCDB in the LCG framework by 11/30/2003**

-- Resources (1FTE) allocated by MSU and other Russian institutions participating to LCG.
-- A.Sherstnev at CERN since middle may (rotation with Y.Bugaenko and S.Makarichev expected).
-- From mid July we will have a person with a software oriented background.

→Need more resources and collaborations with the LHC experiments to cover other generator work packages

GENSER: The Generator Library

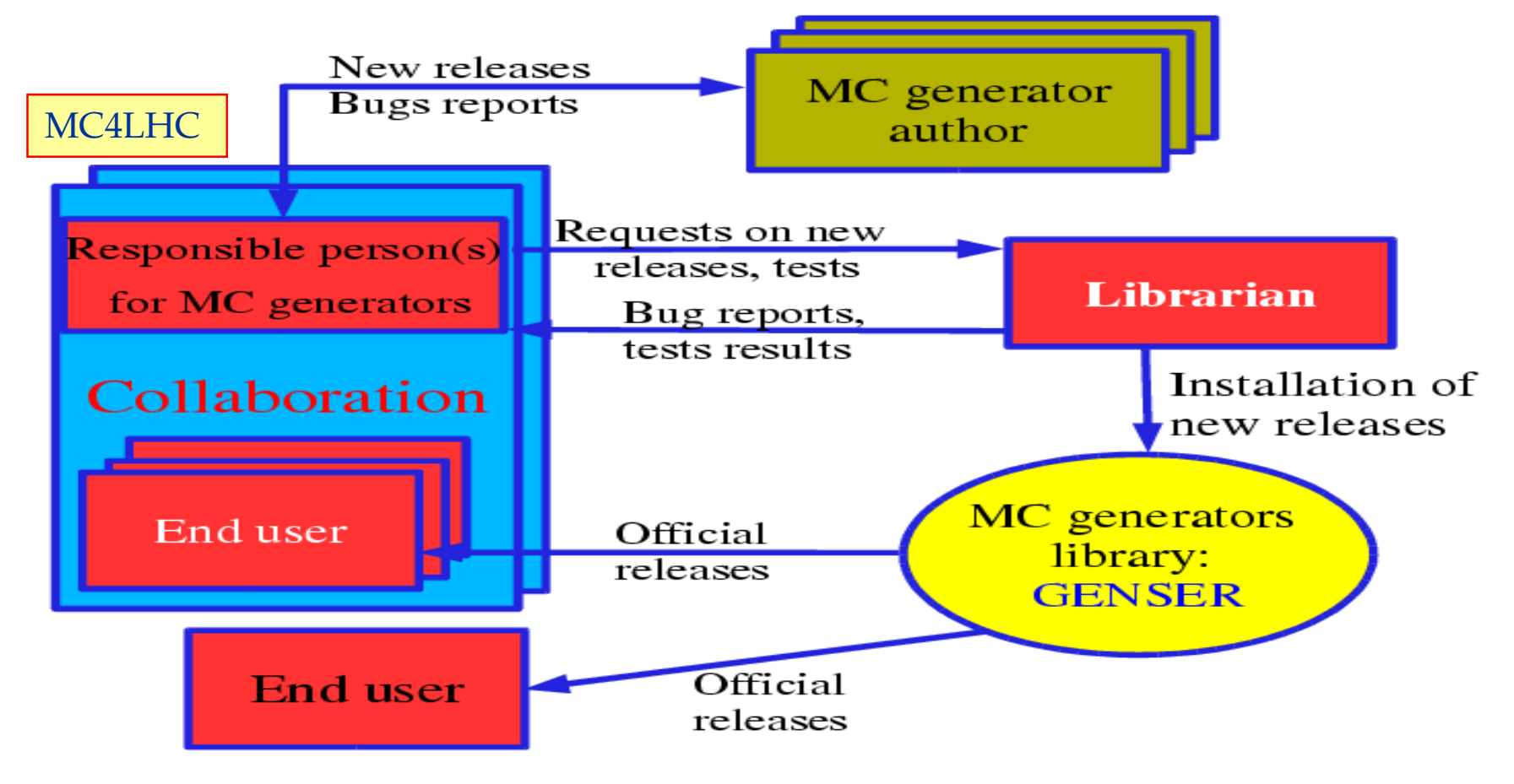
→ Centrally organized code repository for generators and common generator tools
→ Quick releases decoupled from large library releases
→ Maintenance for all LCG supported platforms
→ Top priority: HERWIG, HIJING, ISAJET and PYTHIA.
→ 2nd priority: ALPGEN, COMPHEP, DPMJET, EVTGEN, GRACE, HEPMC, LHAPDF, MADGRAPH, MCDB, NEXUS, PHOJET, PHOTOS, SFM & TAUOLA

Need a second generator librarian to share the 1 FTE job

GENSER: Sub-package Versions and Validation Scheme

- CVS repository.
- SCRAM release and building tool for librarian and end users.
  - Binary distribution also provided.
- All versions released by the authors will be installed.
- Version control: old versions will be maintained as long as they are required by the end users.
- Test/Validation software for new versions has to be provided by the experiments/theory groups and can be part of the GENSER sub-packages.

Working with GENSER



Internal And External Generator Packages

- **There are two possibilities for the MC generator packages.**
  - **To fully store the MC generator code in GENSER defining the corresponding sub-package.**
    + All the details are available to the librarian and to the end user.
    + GENSER can become the development environment.
    - The current structures may not comply with LCG rules.
  - **To install the MC generator as external software packages in the LCG environment and to store in GENSER just tests suites and other related code (examples etc.).**
    + Less stringent requirements on coding/structure.
    - Limited access to the structure.
    - Not entirely handled by LCG-generator (slower response time).
- **Since both solutions have advantages and drawbacks, we do not have a final solution yet...**

GENSER as a Developer Environment

- GENSER could become a development environment

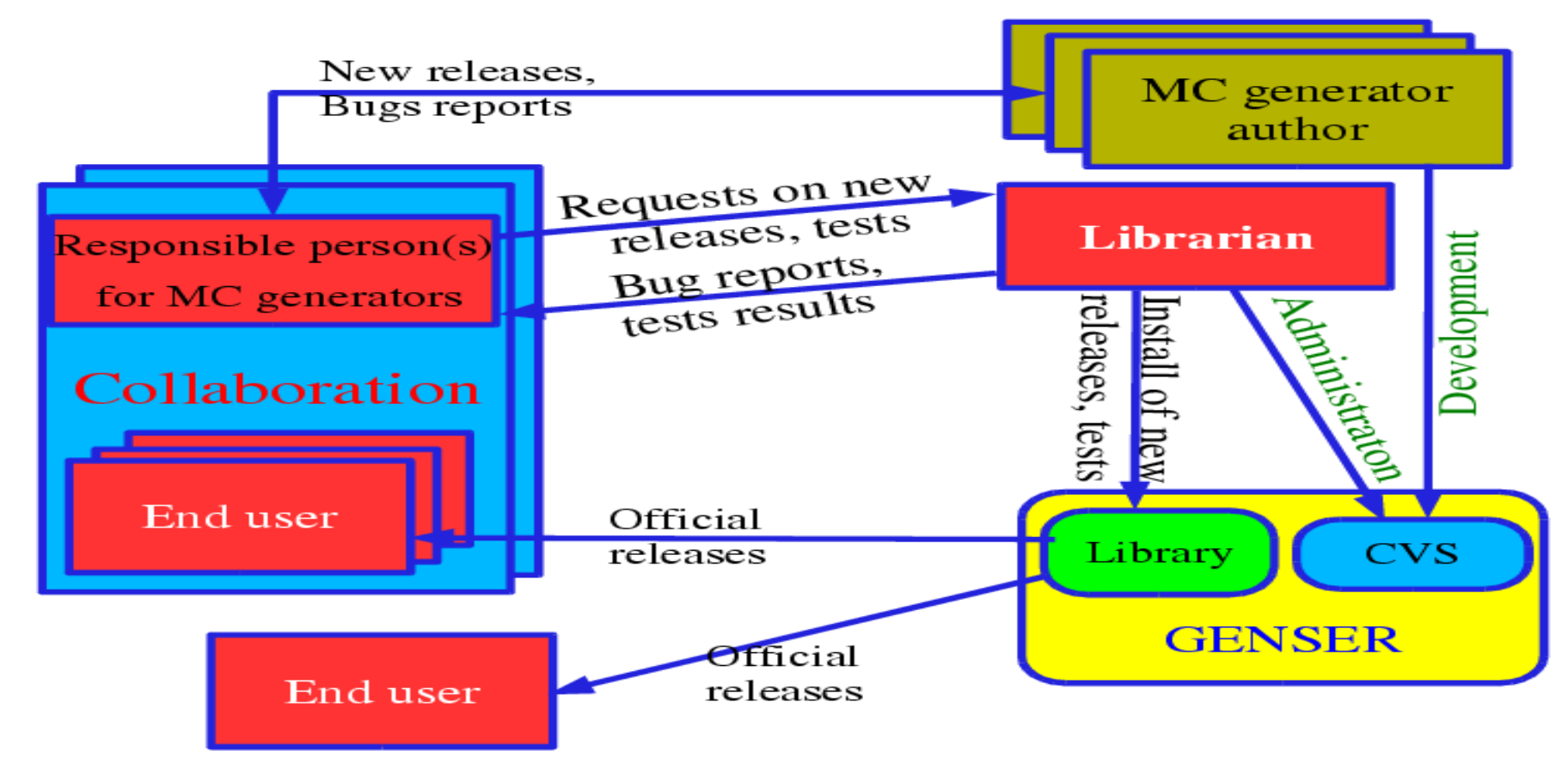
  The authors of MC generators can use the GENSER CVS repository for development of the MC generators code.

  This should apply in particular to new projects!

Advantages:

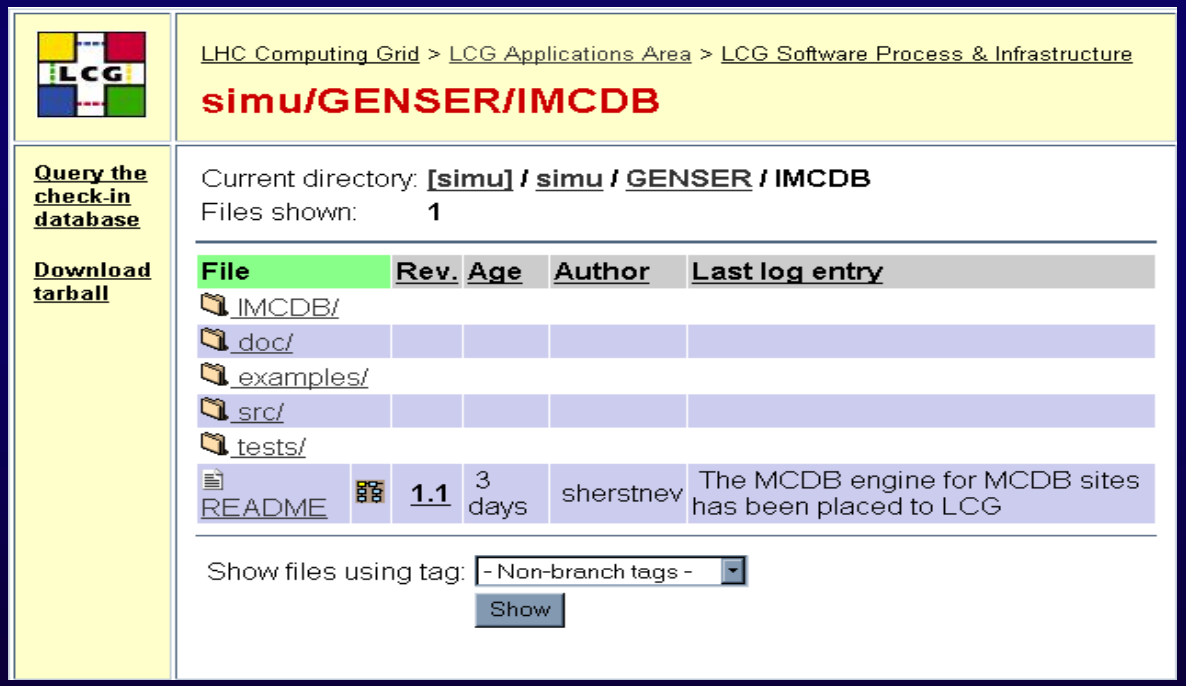
- MC generators authors would have a convenient environment for development (SPI Tools).
- Coding compliance to LCG rules would be guaranteed.
- Release, Feedbacks and bug fixes would speed up.

Working with GENSER as a Development Environment



LCG-Generator Progress Report

- **ALPHA version of the generator repository (GENSER) ready by 06/30/2003**



LHC Computing Grid > LCG Applications Area > LCG Software Process & Infrastructure

simu/GENSER/IMCDB

Query the check-in database

Download tarball

Current directory: [simu] / simu / GENSER / IMCDB

Files shown: 1

File	Rev.	Age	Author	Last log entry
IMCDB/				
doc/				
examples/				
src/				
tests/				
README	1.1	3 days	sherstnev	The MCDB engine for MCDB sites has been placed to LCG

Show files using tag: - Non-branch tags -

Show

First milestone of the project achieved in time!!!

LCG repository for GENSER defined (thanks to A. Aimar).

Begin to fill the repository with the available code
→ first MCDB
→ Herwig and Pythia will follow

Interactions between authors, librarian and end users

- Now our main task in the GENSER project is to collect opinions and suggestions of LHC collaborations and theoretical groups about:
  - How we can organize effectively cooperation between MC developers, contact persons in the LHC experiments and our GENSER team.
  - Defining time scale and milestones on the transition to the LCG-generator environment for end-users (in particular for the simulation frameworks of the LHC experiments).
- We start to develop the effective ways of this cooperation with the LHC collaborations and with some developer of the generator packages.
  - The LHC collaborations and the developers should nominate a contact person to interact with LCG-Generator (MC4LHC)

Storage, Event Interfaces And Particle Services

- The MC truth (from /HEPEVT/ to HepMC)
  - Problems with duplication of versions/Missing translators.
  - CLHEP maintenance not satisfactory.
  - Can GENSER provide a solution ?
- The modularisation
  - Basic idea in Pythia 7, Herwig++. What are the dependencies ?
  - EvtGen: how to reuse the Fermilab experience ?
    How to avoid duplication of versions ?
- Persistency
  - How to define the common event files ?
- Particle properties in the physics generators and in the simulation/analysis frameworks.
  - Is everybody relying on HepPDT ?

Common Event Files, Event Data Base

- Motivations
  - Some physics processes (the most difficult for generation) should be prepared by experts or MC generators authors.
  - Sharing the same generator events does simplify the comparisons and save CPU time
- Currently there's a product fulfilling such requirements: MCDB, developed for CMS by Lev Dudko et al.
  - http://cmsdoc.cern.ch/cms/generators/mcdb/
- MCDB has interfaces of 2 different types
  - interface based on the Web: a web site with simple access to the available event samples with relative bookkeeping.
  - handy programming interface: automatic generation from local machine once some basic parameters have been set.
- It would be desirable to study how to extend this model to the new ME+PS packages

Tuning And Validation Of Event Generators

New Fitting/Tuning Tool: JetWeb

- Based on HERA HZTOOL package – updated to include Minimum Bias data, Tevatron Jets…[J.M.Butterworth and S.Butterworth hep-ph/0210404] also submitted to Comput. Phys. Commun.
- Web page - http://jetweb.hep.ucl.ac.uk/
- Database of data, MC and comparisons
- Web interface allows access to DB and submission of jobs to generate MC plots
- Good starting point for the LCG-Generator Validation working package

Other issues

-- The parton distribution functions
→ from PDFLIB to LHAPDF
-- The “software” and “physics” aspects of the event generator validation
-- Migration to LCG
→ the user, the librarian and the developer point of view)
-- HepMC
-- JetWeb (Hztool in C++)

Kick-off Meeting of LCG-Generator Mini w/s (20 June 2003)

17:00	Introduction (Paolo Bartalini)
17:10	GENSER, the generator repository in LCG (Alexander Sherstnev)
17:25	Parton Shower MC's (Stefan Gieseke)
17:50	Event Simulation Tools in ALICE (Andreas Morsch)
18:15	LHCb event generators status (Witek Pokorski)
18:40	CMS event generators status (Albert De Roeck)
19:05	---long coffe- / short dinner- break---
20:10	Generator support in ATLAS (Ian Hinchliffe)
20:35	HepMC Event Record - Status (Matt Dobbs)
21:00	The requirements from TH (discussion) (tba)
21:25	The MCDB project (Alexander Cherstnev)
21:40	JetWeb (Ben Waugh)
22:05	The LCG Generator subproject - organizational issues (Paolo Bartalini)

Organisational Issues

WEB page:

http://lcgapp.cern.ch/project/simu/generator
-- links to relevant generator pages
-- minutes of meetings, slides of presentations

CDS Agenda Home > Projects > LHC Computing Grid > Physics Generators

Applications area mailing list:

project-lcg-peb-apps@cern.ch

Meeting frequency:

-- one per month
-- proposal: last Thursday of the month at 5 PM
(with VRVS connection)
-- next meeting: during this MC4LHC workshop on the 31/7 !