# MCDB - DataBase for Monte-Carlo partonic events files

Sherstnev Alexandre,
CompHEP group (Moscow State University)

- Motivations for MCDB.
- Previous experience: PEVLIB and MCDB in FNAL.
- MCDB for CMS.
- Migration of CMS MCDB to LCG environment: our plans.

# Motivation for MCDB

- Some physics processes (the most difficult for generation) should be prepared by experts or MC generators authors.

- Experimental physics groups want:
  - to use Monte-Carlo events,
  - do not prepare these events sample,
  - to believe in the correctness of the MC samples.

- Different physics groups and experimental collaborations request for the same parton level MC events and often do not kow that such events already has been created by other groups.

- Users in collaborations need a common place for rapid, effective and publically available communication with authors of MC events/generators.

# Previous experience: PEVLIB & FNAL MCDB

- PEVLIB MC events Data Base (main developer: V. Iliyn):
  /afs/cern.ch/cms/physics/PEVLIB/

  - the database is just a some set of directories on afs without any handy interface.
  - contains parton level events generated by the CompHEP generator (~2 Gb) with full description (README files in the every dir).
  - MC events author should have a write access to the directories.
  - User should have a read access to the afs system.

- Monte-Carlo Data Base in FNAL (main developer: Lev Dudko):
  http://www-d0.fnal.gov/~dudko/mcdb/ & ENSTORE system

  -Web based interface for documentation about events files.
  - Events are stored in STDHEP format (on parton and particle levels) in FNAL tape system (ENSTORE, now ~200Gb).
  - Author/user should have write/read access to the ENSTORE system.
  - Essential feedback: the web documentation system and the storage system are made independently of one another.

# Principles of the MCDB's construction

- Content of the MCDB is parton level events files. In ideal situation, these files should be stored in a single uniform format (The CompHEP group has developed a format of this sort).
- MCDB should have interfaces of 2 different types:
  - interface based on the Web: a web site with simple access to full description of available events samples and the samples themself.
  - handy programming interface: an user will install the interface on its local machine and set just some parameters in the interface. After that, the interface will find and attach required events files to the showering and hadronization (S/H) programs (PYTHIA, etc.).
- Web part of MCDB has to be divided for 2 zones:
  - Public area: for all users who are interesting in MC events. There they may find all information about the events samples, download events files, and attach any comments/questions about the events.
  - Authors area: authorized users (authors) can change dynamically the content of MCDB – create/edit arcticles, described events, upload events files, and reply to users questions/comments.

# MCDB in CMS (main developer: Lev Dudko)

- This CMS MCDB is located on cmsdoc.cern.ch server:
  http://cmsdoc.cern.ch/cms/generators/mcdb/
- The data are stored in afs (now on three 2Gb disks).
- The MCDB is based on Berkley DBM via a Perl interface: all authors articles place in the Berkley hash database with direct links to the events files. Administration toolkit is based on Sanitarium WebLoG (free software) - a system of Web publishing (perl scripts).
- Events authors have a write access to the disks via special Web interface. The access is given by a MCDB administrator. The authors use afs password to come to Authors Area (with using of SSL).
- Currently the CMS MCDB has 4 administrators: A. De Roeck, L. Dudko, A. Sherstnev, and S. Slabospitsky.
- Now MCDB contains events generated by CompHEP only. We have a program to transfer the events to PYTHIA. The tar-ball of the interface also attaches to the MCDB. The interface still demands of downloading of events files to a user local machine by the user.

# Migration from CMS MCDB to LCG MCDB

In future LCG MCDB we have to provide:

- Simple and handy interface for events users: effective search of events files, web access to all available information about events files, simple access to the files themself via the Web and programming interfaces.
- The effective toolkit for authors: the toolkit should allow to manage with created articles by the author in a simple manner, the author have to fill some necessary minimum of information about the uploaded events file with minimal probability of errors in the description.
- Simple administration of a future MCDB site with possibility of a mirroring of the site.

Now MCDB is based on hash database technology. If a number of articles will increase rapidly and become of order of some thousands, we plan to migrate to a relational database technology ( MySQL???).

The LCG MCDB will be a fisrt project developed in GENSER, as development environment.

# Our the nearest plans in development

## Improvements in functionality of MCDB:

- mechnism of creation of subcategories in MCDB categories.
- possibility to attach articles to several categories via extra HTML ref.
- create handy templates for authors, which help to describe events samples in simple manner with some necessary minimum of data.
- create mechanism of automatic receiving the data from events files stored in the CompHEP format.
- separate toolkits for authors and MCDB administrators.
- improve/create the documentation, HOWTO, and HELP files for MCDB.

## The very important thing is to develop of really automatic programming interface to the S/H generators (PYTHIA, HERWIG, etc.):

- create mechanism of automatic search/attachment of the file as set by user.
- organize possibility to use of other events files formats in the interface
- develop some visualisation tools of events via ROOT, etc.

# Our plans:

- For real migration from CMS to LCG we should transfer MCDB to an independent server with:
  - necessary storage capacity;
  - reliable security;
  - posibility of large traffic.

- Now we are advertising this project in MC experts comminity and collaborations:

MCDB is a really handy and simple tool in a communication between MC experts and experimentalists!

- The first milestone: transfer CMS MCDB to LCG environment with improvments listed in the previous page before the end of the automn.