

# Current GENSER status

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## GENSER 1\_4\_1 status

- Based on GENSER 1\_4\_0 release; many symlinks.
- 14 packages are tested in `tests 1_02`
- Platforms: `slc3_ia32_323`, `slc4_ia32_gcc34`,  
`slc4_amd64_gcc34`
- The last monolithic release.

## New GENSER2 structure

Reasons to move away from GENSER 1\_X\_X structure are:

- SCRAM limitations:
  - fixed structure is required for a package source tree
  - low flexibility while building packages
  - manual work needed to make author's sources fit into SCRAM build requirements
  - the previous item is a potential source of errors
- Need for a possibility to choose an arbitrary combination of generator versions within one GENSER release.
- Using native UNIX build tools allows to
  - maximally preserve author's structure of sources
  - rapidly adopt author's modifications and fixes for a particular package independently of others, therefore – continuous release cycle
  - *subjective(?)*: reduce manual work of GENSER integrators

## Release policy

- Less frequent freezing of the set of generators as a whole.
- Several recent generator versions are simultaneously available in a binary form.
- The latest version of a generator can be built via

```
% cvs -d :kserver:simu.cvs.cern.ch:/cvs/simu checkout \  
simu/GENSER2/TOOLS/Generator_Name
```

```
% cd simu/GENSER2/TOOLS/Generator_Name
```

```
% ./mknewGenerator_Name
```

```
% cd $TMPDIR/simu/GENSER2/Generator_Name
```

```
% ./configure && make && make install
```

# GENSER2 directory structure

*(Trying to reproduce the structure of “external” packages)*

## Binaries and include files

/afs/cern.ch/sw/lcg/external/MCGenerators/.....

.../Generator\_Name/Version/Platform\_Name/lib/lib\*.so

```
      |           |           |
      |           |           |
      |           |           |./archive/lib*.a
      |           |           |
      |           |....../include/*.{h,inc}
      |
      |../share/src/
      |
      |....../data/
```

---

/afs/cern.ch/sw/lcg/external/MCGenerators/tarFiles/Generator\_Name.Version.tgz

/afs/cern.ch/sw/lcg/external/distributions/Generator\_Name.Version.Platform.tgz

## A “bootstrap” directory structure

↓ bootstrapping script

```
.... /simu/GENSER2/TOOLS/Generator_Name/mknewGenerator_Name
                                           /Generator_Name.patch_0
                                           ...
                                           /Generator_Name.patch_N
                                           ...
```

---

### Functions of the `./newGenerator_Name` script:

1. Download the latest version of generator source code from author’s site.
2. Impose GENSER2-specific patches (both for source code and author’s build scripts).
3. Add GENSER wrappers for author’s `./configure` & `Makefile`’s if needed.
4. Inflate the build directory structure (cf. next slide) and put new sources and build scripts there.

---

`./configure [ options ] && make ....` in the build directory is up to end user.

## Build directory structure

```
.... /simu/GENSER2/Generator_Name/configure
      |   /Makefile
      |   /README
      |   /INSTALL
      | ..... /src/Makefile
      |                                     /*.{f,c,cc}
      |
      | ..... include/*.{h,inc}
      |
      | ..... examples/Makefile
      |                                     /*.{f,c,cc}
      |
      | ..... bin/
      |
      | ..... lib/lib*.so
      |                                     |
      |                                     |./archive/lib*.a
```

# Using GENSER2 repository

```
/afs/cern.ch/sw/lcg/external/MCGenerators/ .....  
...../pythia6/408/slc3_ia32_gcc323/lib/libpythia6.so  
        /libpythia6_dummy.so  
        /libpythia6_pdfdummy.so  
        /librootinterface.so  
        /archive/libpythia6.a  
            /libpythia6_dummy.a  
            /libpythia6_pdfdummy.a  
            /librootinterface.a  
        /include/gen_pyt_s.inc  
            /gen_pyt_short.inc  
            /general_pythia.inc  
            /hepevt.inc  
            /pyt_cms_s.inc  
            /pyt_cms_short.inc  
            /pythia_cms.inc  
            /pythia_cms_short.inc  
...../pythia6/408/slc3_ia32_gcc323_dbg/.....  
...../pythia6/408.2/slc3_ia32_gcc323/.....  
...../pythia6/406/slc3_ia32_gcc323/.....  
.....  
...../herwig/6510/slc3_ia32_gcc323/.....  
.....
```



## Usage differences w.r.t. GENSER 1\_X\_X

- Multiple versions of any generator are available simultaneously within one release.
- No more explicit version numbers in library names.

Build rules should include, e.g.:

```
MCGENERATORS=/afs/cern.ch/sw/lcg/external/MCGenerators
```

```
PLATFORM=slc3_ia32_gcc323
```

```
PYTHIA_VERSION=408
```

```
LIBS=-L${MCGENERATORS}/pythia6/${PYTHIA_VERSION}/${PLATFORM}/lib/\
-lpythia6
```

Usage of GENSER2 packages is similar to that of “external” ones.

# Current status of GENSER2

## Generators installed

Generator	Version	Platform
pythia6	406	slc3_ia32_gcc323
	408	
	408.2	
pythia8	060	slc3_ia32_gcc323
herwig	6.510	slc3_ia32_gcc323
lhpdf	5.2.3	slc3_ia32_gcc323
sherpa	1.0.5	slc4_ia32_gcc34
	1.0.8	slc3_ia32_gcc323

## Generators to be installed by 31.12.2006

Generator	Version	Platform
Jimmy	4.2	slc3_ia32_gcc323
Photos	2.1.5	slc3_ia32_gcc323
EvtGenLHC	1.3	slc3_ia32_gcc323
Alpgen	2.0.6	slc3_ia32_gcc323
MCatNLO	3.1.0	slc3_ia32_gcc323
Herwig++	2.0.0	slc3_ia32_gcc323

Priority list can be revised according to experiments' demands.

# Validation

## Current set of tests (tests-1.02):

- pythia 1            Cross section of Z + jet with lower Qt cut 20 GeV
- pythia 2            Fraction of events from Z + jet (Z -> all leptons) with  
2 detectable electrons or muons and 2 jets.
- pythia 3            Same as pythia 1,2 (using HepMC/PythiaWrapper.h and event  
pythia 4            analyzers from libtests\*, see ../include/ANNHEPMC/)
- pythia 5-26         Cross section of single W+- production is calculated using  
various proton PDF sets via LHAPDF library. Tests were up to  
27 (up to 70350), but 70350 stopped to work in lhapdf 5.2.1
- 
- photos 1            Fraction of events  $Z' \rightarrow e^+e^-$  with at least one detectable gamma  
as simulated by PYTHIA with QED corr. on (no photos in fact)
- photos 2            Fraction of events  $Z' \rightarrow e^+e^-$  with at least one detectable gamma  
as simulated by PYTHIA(QED off) + PHOTOS
- 
- herwig 1            Cross section of Z + jet (Z -> all leptons)
- herwig 2            Fraction of events from Z + jet (Z -> all leptons) with  
2 detectable electrons or muons and 2 jets.
- herwig 3            Same as 1,2 above but with Z->e,mu  
herwig 4            and using HepMC. (see ./herwig\_hepmc.cc)
- herwig 5-26         Cross section of single W+- production is calculated using  
various proton PDF sets via LHAPDF library.
- 
- Herwig++ 1          Cross section of the default process as run with LHC.in  
In the version 2\_0\_0 the default process is qq2gZ2ff (note  
that it was different in earlier versions)
- 
- isajet 1-24         cross section of single W production (Drell-Yan) at LHC for  
different PDF sets of lhapdf (same as pythia-lhapdf)
- 
- evtgenlhc 1         In Dalitz decay: average invariant mass of particles 1 and 2

evtgenlhc 2    In Dalitz decay: average invariant mass of particles 2 and 3  
  
 lhpdf 1-20    PDF sets values with self-explanatory comments  
 lhpdf 21-40   PDF sets values obtained using lhaglu with self-explanatory  
                   comments  
  
 tauola 1      E( $\pi^{+-}$  +  $K^{+-}$  +  $A1^{+-}$ ) / E(TAU) ratio  
                   in  $f + \bar{f} \rightarrow Z0 + W^{+-}$  with  $Z0 \rightarrow \tau^+ \tau^-$  and  
                    $W^{+-} \rightarrow \tau^{+/-} \nu_{\tau}$  with TAU decayed BY PYTHIA (no tauola)  
 tauola 2      E( $\pi^{+-}$  +  $K^{+-}$  +  $A1^{+-}$ ) / E(TAU) as above TAU decayed by TAUOLA  
  
 pythia8 1     Do the same as pythia tests 1 and 2. Note that for new  
 pythia8 2     versions one could need to change the code of the test  
                   since now part of parameters are set in Fortran part of pythia.  
  
 pyquen 1      Mean mult. in QCD jets events simulated by PYTHIA (no PYQUEN)  
 pyquen 2      Mean  $|\eta|$  in QCD jets events simulated by PYTHIA (no PYQUEN)  
 pyquen 3      Mean Pt in QCD jets events simulated by PYTHIA (no PYQUEN)  
 pyquen 4      Mean mult. in QCD jets events simulated by PYTHIA - PYQUEN  
 pyquen 5      Mean  $|\eta|$  in QCD jets events simulated by PYTHIA - PYQUEN  
 pyquen 6      Mean Pt in QCD jets events simulated by PYTHIA - PYQUEN  
  
 toprex 1      cross section of the  $tW$ -channel single top production  
  
 alpgen 1      Cross section of  $Z + 2$ jets with lower Pt cut 20 GeV  
 alpgen 2      Fraction of events from  $Z + 2$ jets ( $Z \rightarrow$  electrons) with  
                   2 detectable electrons and 2 jets. (alpgen + pythia)

The examples also use (and thus test) ThePEG and HepMC

## Primary goals w.r.t. tests suite:

- Migration of existing tests-1.02 suite to GENSER2
- Adding new tests for Sherpa, etc.

**An input from experiments is needed to implement more complex tests**

## Conclusion

- A complete migration to GENSER2 is expected by the end of 2006
- Experiments should start adopting to new GENSER2 structure soon