

Belle MC Production on Grid

2nd Open Meeting of the SuperKEKB Collaboration

Soft/Comp session

17 March, 2009

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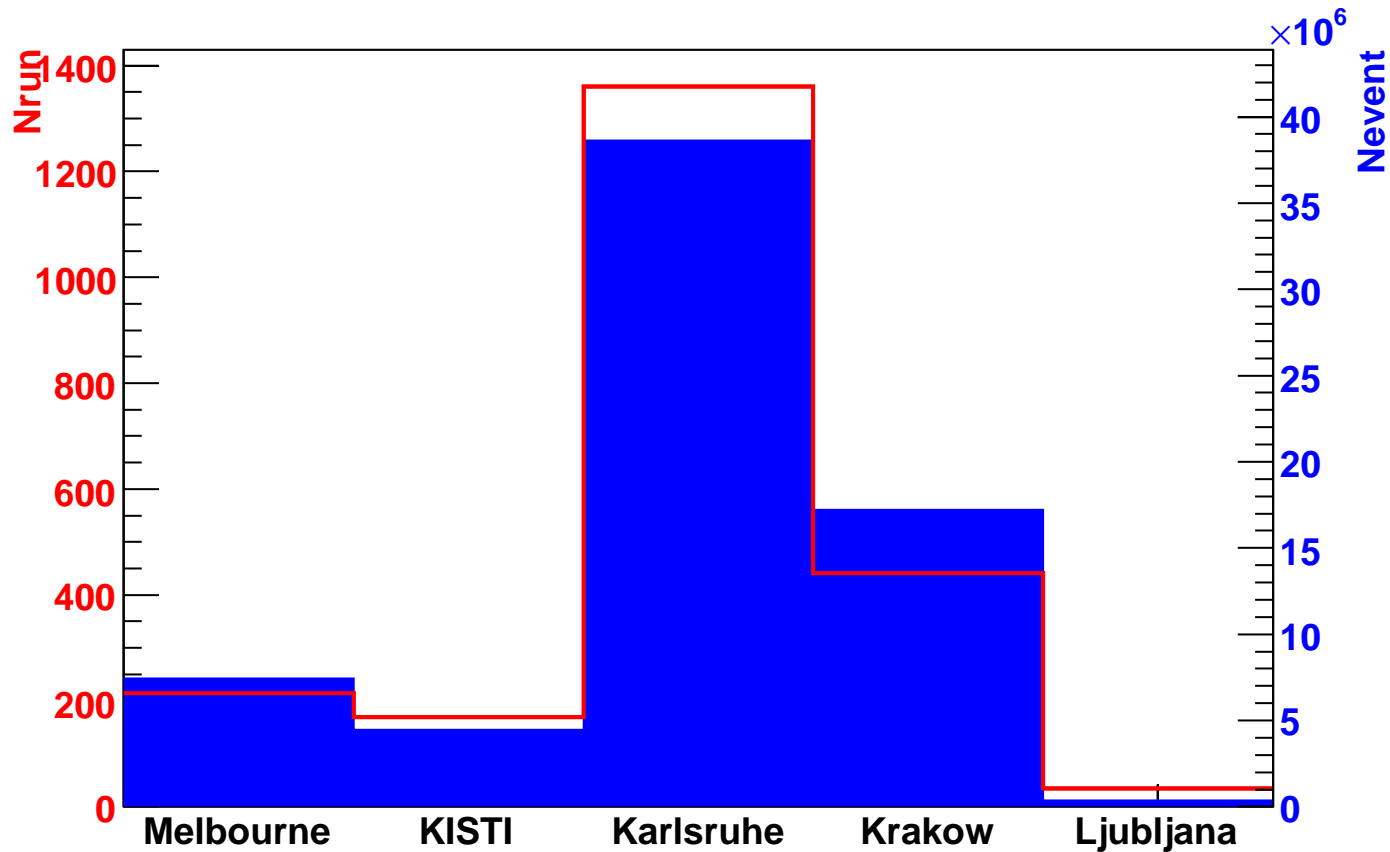
MC Production Status

- Long down time since last June
- Just resumed
- New sites
 - KISTI, Melbourne, Ljubljana, Karlsruhe

Belle VO sites

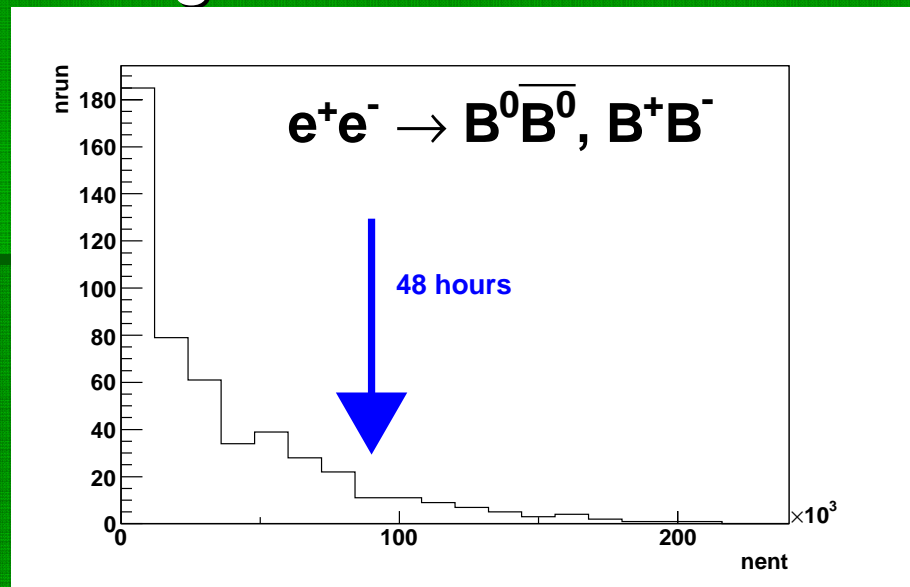
Institute	CPU	Status
KISTI	60	new
Merbourne	60	new
Karlsruhe	400	new
Ljubljana	80	new
ASGC	120	Stop due to fire incident
KEK01	12	Unavailable due to old OS
KEK02	32	Under upgrading
Krakow	90	

One Week Statistics



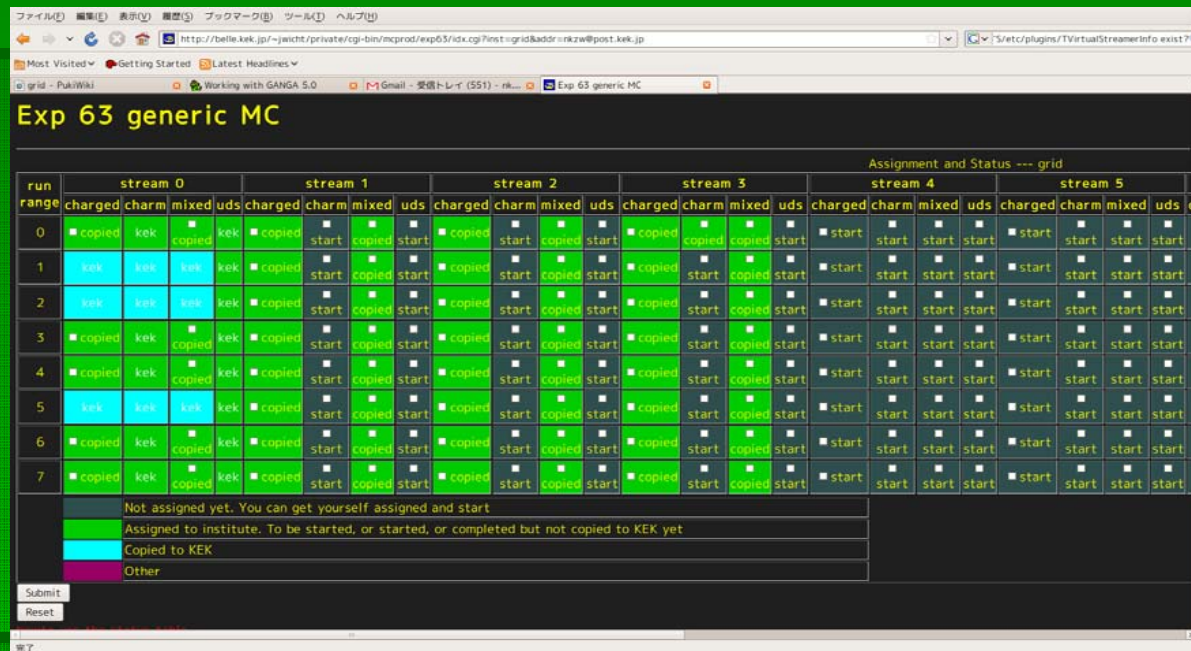
Problems

- Storage, HSM busy
 - Stays inside B system and shared with Belle users
 - Access to HSM sometimes concentrate on one of four server
- Job processing time exceed limits



Belle MC Procedure

1. Get Assignment from Web



- 4 physics modes (charged, mixed, charm, uds)
- 1 slot = 100 run range
 - Same number of events with experiment data
- 10 set (streams)

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Belle MC with Grid

Belle MC Procedure

2. Receive a mail

Gen and Bkg files: copy to HSM (in B computer system) and register to SRB
“Sregister hoge.pgen *srbdir*”

```
Generator file:
ls /bwf/g79home/g0mc/mcprod/hsm_archives/mcgen/b20080331_1823/e000063/mixed
/mixed-e000063r0000*-1-pgen.tgz
ADDBG file:
ls /bhsm/h082/mcprod/dat/e000063/Background/0331/*/*00/*.{bbs,
bbs_info,bbs.index,bbs_info.index}
Job script:
ls /bwf/g79home/g0mc/mcprod/scr/b20090127_0910/e000063/mixed/evtgen-mixed-
01-all-e000063r0000*-b20090127_0910.sh
```

Generator, Bkg, sh script files
are provided by MC manager

SRB
(Storage Resource Broker)
Accessible to/from Grid
UI
(User Interface)
Server you work for Grid

Copy script.tgz to UI

th Grid

Belle MC Procedure

3. Submit jobs

```
ファイル(E) 編集(E) 表示(V) 端末(T) タブ(T) ヘルプ(H)
[nkzw@dg14 ~]$ prepare-job.rb 0 scrtgz/evtgen-charged-04-all-e000063-b20090127_0910.sh.tgz
[nkzw@dg14 ~]$ cd Charged.e63s04r00/
[nkzw@dg14 Charged.e63s04r00]$ basf2grid.sh ce-1
ce-1-fzk.gridka.de
ekpcdf3.physik.uni-karlsruhe.de
[nkzw@dg14 Charged.e63s04r00]$ mksubmit.rb -m 85000
29 jobs found to be submitted.
[nkzw@dg14 Charged.e63s04r00]$ submit
[3] 1260
[nkzw@dg14 Charged.e63s04r00]$
```

JDL

Executable=Job.sh
Stdout=log.out
Stderr=log.err

1. Create a directory for the slot (**prepare-job.rb**)
2. Modify sh script and create JDL files (**basf2grid.sh**)
Add “copy inputs from SRB” and “copy outputs to SRB”
3. Create a sh script to submit (**mksubmit.rb**)
“edg-job-submit ... job.jdl”
4. Submit (**submit**)

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Belle

```
ファイル(E) 編集(E) 表示(V) 端末(T) タブ(T) ヘルプ(H)
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000071-b20090127_0910.jdl
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000083-b20090127_0910.jdl
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000055-b20090127_0910.jdl
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000059-b20090127_0910.jdl
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000075-b20090127_0910.jdl
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000074-b20090127_0910.jdl
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000056-b20090127_0910.jdl
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000069-b20090127_0910.jdl
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000084-b20090127_0910.jdl
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000066-b20090127_0910.jdl
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000093-b20090127_0910.jdl
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000087-b20090127_0910.jdl
edg-job-submit -o j.id jdl/evtgen-charged-04-all-e000063r000060-b20090127_0910.jdl
```

Belle MC Procedure

4. Monitor running jobs

```
ファイル(E) 編集(E) 表示(V) 端末(T) タブ(I) ヘルプ(H)
Every 120.0s: jobstatus.rb Sun Mar 15 23:00:27 2009
agh2.atlas.unimelb.edu.au
  Done(Success) 9
  Running 37
ce-alice.sdfarm.kr
  Done(Success) 1
  Running 23
ce-1-fzk.gridka.de
  Done(Success) 14
  Scheduled 3
  Running 233
lcgce.ijs.si
  Running 45
ce.cyf-kr.edu.pl
  Scheduled 2
  Running 68
```

Summary

```
ファイル(E) 編集(E) 表示(V) 端末(T) タブ(I) ヘルプ(H)
Every 2.0s: lcg-infosites --vo belle ce Mon Mar 16 01:45:29 2009
#CPU Free Total Jobs Running Waiting ComputingElement
-----
80 45 28 28 0 agh2.atlas.unimelb.edu.au:2119/jobmanager-lcgpbs-belle
2584 1980 67 67 0 ce.cyf-kr.edu.pl:2119/jobmanager-pbs-belle
5877 2515 222 222 0 cream-1-fzk.gridka.de:8443/cream-pbs-belleX
5877 2515 222 222 0 ce-1-fzk.gridka.de:2119/jobmanager-pbspro-belleX
5877 2515 0 0 0 cream-1-fzk.gridka.de:8443/cream-pbs-belleS
5877 2515 0 0 0 ce-1-fzk.gridka.de:2119/jobmanager-pbspro-belleS
5877 2515 0 0 0 ce-1-fzk.gridka.de:2119/jobmanager-pbspro-belleL
5877 2514 0 0 0 ce-5-fzk.gridka.de:2119/jobmanager-pbspro-belleL
5877 2515 0 0 0 cream-1-fzk.gridka.de:8443/cream-pbs-belleL
5877 2515 0 0 0 ce-1-fzk.gridka.de:2119/jobmanager-pbspro-belleXS
5877 2516 222 222 0 ce-3-fzk.gridka.de:2119/jobmanager-pbspro-belleXL
5877 2516 0 0 0 ce-3-fzk.gridka.de:2119/jobmanager-pbspro-belleL
5877 2515 0 0 0 ce-2-fzk.gridka.de:2119/jobmanager-pbspro-belleXS
5877 2514 0 0 0 ce-5-fzk.gridka.de:2119/jobmanager-pbspro-belleS
5877 2515 222 222 0 ce-4-fzk.gridka.de:2119/jobmanager-pbspro-belleXL
5877 2515 0 0 0 ce-4-fzk.gridka.de:2119/jobmanager-pbspro-belleXS
5877 2515 0 0 0 ce-4-fzk.gridka.de:2119/jobmanager-pbspro-belleS
5877 2516 0 0 0 ce-3-fzk.gridka.de:2119/jobmanager-pbspro-belleXS
5877 2516 0 0 0 ce-3-fzk.gridka.de:2119/jobmanager-pbspro-belleS
5877 2515 0 0 0 cream-1-fzk.gridka.de:8443/cream-pbs-belleXS
5877 2515 0 0 0 ce-4-fzk.gridka.de:2119/jobmanager-pbspro-belleL
5877 2516 0 0 0 ce-5-fzk.gridka.de:2119/jobmanager-pbspro-belleXS
5877 2516 0 0 0 ce-2-fzk.gridka.de:2119/jobmanager-pbspro-belleL
5877 2515 0 0 0 ce-2-fzk.gridka.de:2119/jobmanager-pbspro-belleS
5877 2516 222 222 0 ce-2-fzk.gridka.de:2119/jobmanager-pbspro-belleXL
5877 2514 222 222 0 ce-5-fzk.gridka.de:2119/jobmanager-pbspro-belleXL
12 12 0 0 0 dg10.cc.kek.jp:2119/jobmanager-lcgpbs-belle
98 80 0 0 0 kek2-c081.cc.kek.jp:2119/jobmanager-lcgpbs-belle
20 20 0 0 lcgce01.hepl.phys.nagoya-u.ac.jp:2119/jobmanager-lcgpbs-belle
96 0 24 24 0 ce-alice.sdfarm.kr:2119/jobmanager-lcgpbs-belle
542 418 43 43 0 lcgce.ijs.si:2119/jobmanager-pbs-belle
5 5 0 0 ce.cc.ncu.edu.tw:2119/jobmanager-lcgpbs-belle
```

CPU

```
ファイル(E) 編集(E) 表示(V) 端末(T) タブ(I) ヘルプ(H)
Every 120.0s: globus-job-run ce.cyf-kr.edu.pl /usr/bin/qstat -a -n | grep ... Tue Mar 17 05:52:05 2009
888662.batch.gri bellesgm belle STDIN 4609 1 -- -- 336:0 R 54:33
888664.batch.gri bellesgm belle STDIN 20027 1 -- -- 336:0 R 52:45
888665.batch.gri bellesgm belle STDIN 29479 1 -- -- 336:0 R 54:49
888672.batch.gri bellesgm belle STDIN 20401 1 -- -- 336:0 R 55:14
888673.batch.gri bellesgm belle STDIN 11355 1 -- -- 336:0 R 54:58
888675.batch.gri bellesgm belle STDIN 5217 1 -- -- 336:0 R 54:56
888680.batch.gri bellesgm belle STDIN 28221 1 -- -- 336:0 R 54:46
888688.batch.gri bellesgm belle STDIN 7829 1 -- -- 336:0 R 53:43
888699.batch.gri bellesgm belle STDIN 25068 1 -- -- 336:0 R 55:21
888703.batch.gri bellesgm belle STDIN 10287 1 -- -- 336:0 R 54:46
888708.batch.gri bellesgm belle STDIN 7774 1 -- -- 336:0 R 55:12
888726.batch.gri bellesgm belle STDIN 5035 1 -- -- 336:0 R 54:22
888727.batch.gri bellesgm belle STDIN 9657 1 -- -- 336:0 R 54:52
888729.batch.gri bellesgm belle STDIN 16695 1 -- -- 336:0 R 54:45
888730.batch.gri bellesgm belle STDIN 4892 1 -- -- 336:0 R 54:43
888731.batch.gri bellesgm belle STDIN 16448 1 -- -- 336:0 R 54:56
```

Elapse time

Belle MC Procedure

5. Retrieve finished job

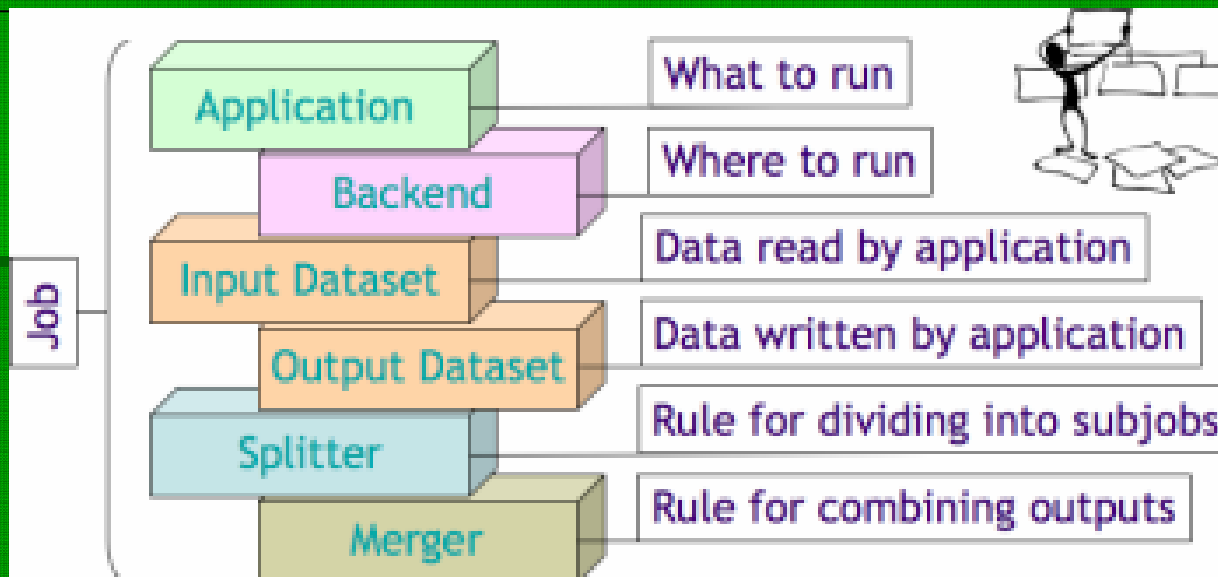
```
ファイル(E) 編集(E) 表示(V) 端末(T) タブ(I) ヘルプ(H)
[nkzw@dg14 ~]$ jsall.sh -M
cd /home/nkzw/Charged.e63s00r03
cd /home/nkzw/Charged.e63s00r04
Abort:evtgen-charged-00-all-e000063r000471-b20090127_0910 ce-1-fzk.gridka.de
Abort:evtgen-charged-00-all-e000063r000414-b20090127_0910 ce-1-fzk.gridka.de
Abort:evtgen-charged-00-all-e000063r000440-b20090127_0910 ce-1-fzk.gridka.de
Abort:evtgen-charged-00-all-e000063r000422-b20090127_0910 ce-1-fzk.gridka.de
cd /home/nkzw/Charged.e63s00r06
cd /home/nkzw/Charged.e63s00r07
cd /home/nkzw/Charged.e63s01r00
cd /home/nkzw/Charged.e63s01r01
cd /home/nkzw/Charged.e63s01r02
Success:charged.63.01.0246 ce.cyf-kr.edu.pl
Success:charged.63.01.0290 ce.cyf-kr.edu.pl
cd /home/nkzw/Charged.e63s01r03
cd /home/nkzw/Charged.e63s01r04
Success:charged.63.01.0422 ce.cyf-kr.edu.pl
Success:charged.63.01.0414 ce.cyf-kr.edu.pl
cd /home/nkzw/Charged.e63s01r05
Success:charged.63.01.0577 ce.cyf-kr.edu.pl
cd /home/nkzw/Charged.e63s01r06
Success:charged.63.01.0610 ce.cyf-kr.edu.pl
cd /home/nkzw/Charged.e63s01r07
Success:charged.63.01.0722 ce.cyf-kr.edu.pl
cd /home/nkzw/Charged.e63s02r00
cd /home/nkzw/Charged.e63s02r01
cd /home/nkzw/Charged.e63s02r02
Success:charged.63.02.0290 ce.cyf-kr.edu.pl
Success:charged.63.02.0246 ce.cyf-kr.edu.pl
cd /home/nkzw/Charged.e63s02r03
cd /home/nkzw/Charged.e63s02r04
Success:charged.63.02.0422 ce.cyf-kr.edu.pl
cd /home/nkzw/Charged.e63s02r05
cd /home/nkzw/Charged.e63s02r06
cd /home/nkzw/Charged.e63s02r07
Success:charged.63.02.0765 agh2.atlas.unimelb.edu.au
cd /home/nkzw/Charged.e63s03r00
cd /home/nkzw/Charged.e63s03r01
```

- Retrieve log files of finished jobs
- Checking the job is correctly completed

Ganga

<http://ganga.web.cern.ch/ganga/index.php>

- Ganga is an easy-to-use **frontend for job definition and management**, implemented in Python. It has been developed to meet the needs of the ATLAS and LHCb for a Grid user interface, and includes built-in **support for configuring and running applications based on the Gaudi / Athena framework** common to the two experiments. Ganga allows trivial switching between testing on a local batch system and large-scale processing on Grid resources.



Ganga “Hello World”

```
ファイル(F) 編集(E) 表示(V) 端末(T) ラブ(L) ヘルプ(H)
In [1]: j = Job(application=Executable(exe='/bin/echo',args=['Hello World']))
In [2]: j
Out[2]: Job (
  status = 'new' ,
  name = '' ,
  inputdir = '/home/nkzw/gangadir/workspace/nkzw/LocalAMGA/29/input/' ,
  outputdir = '/home/nkzw/gangadir/workspace/nkzw/LocalAMGA/29/output/' ,
  outputsandbox = [] ,
  id = 29 ,
  info = JobInfo (
    submit_counter = 0
  ) ,
  inputdata = None ,
  merger = None ,
  inputsandbox = [] ,
  application = Executable (
    exe = '/bin/echo' ,
    env = {} ,
    args = ['Hello World']
  ) ,
  outputdata = None ,
  splitter = None ,
  subjobs = 'Job slice: jobs(29).subjobs (0 jobs)
  backend = Local (
    actualCE = '' ,
    workdir = '' ,
    nice = 0 ,
    id = -1 ,
    exitcode = None
  )
)

In [3]: j.submit()
Ganga.GPIDev.Lib.Job      : INFO    submitting job 29
Ganga.GPIDev.Adapters     : INFO    submitting job 29 to Local backend
Ganga.GPIDev.Lib.Job      : INFO    job 29 status changed to "submitted"
Out[3]: 1

In [4]: j.status
Out[4]: completed
Ganga.GPIDev.Lib.Job      : INFO    job 29 status changed to "running"
Ganga.GPIDev.Lib.Job      : INFO    job 29 status changed to "completed"

In [5]: !ls $j.outputdir
__jobstatus__ stderr stdout __syslog__

In [6]: !cat $j.outputdir/stdout
Hello World
```

- Configure with Job()
 - Directories
 - JDL file
- Backend = local

Submit

Status

Ganga MC Production

```
ファイル(E) 編集(E) 表示(V) 端末(T) タブ(T) ヘルプ(H)
[nkzw@dg14 work]$ ganga

*** Welcome to Ganga ***
Version: Ganga-5-1-8
Documentation and support: http://cern.ch/ganga
Type help() or help('index') for online help.

This is free software (GPL), and you are welcome to redistribute it
under certain conditions; type license() for details.

Ganga.GPIDev.Lib.JobRegistry      : INFO      Found 26 jobs in "jobs", completed in 0 seconds
Ganga.GPIDev.Lib.JobRegistry      : INFO      Found 0 jobs in "templates", completed in 0 seconds

In [1]: j=Job(backend=LCG(), application=Executable(exe='/bin/sh', args=['evtgen-mixed-04-all-e000063r000056-b20090127_0910.sh']))
In [2]: j.inputsandbox = ['/home/nkzw/Mixed.e63s04r00/script/evtgen-mixed-04-all-e000063r000056-b20090127_0910.sh']
In [3]: j.backend.CE = 'ce-1-fzk.gridka.de:2119/jobmanager-pbspro-belleXL'

In [4]: j.submit() → edg-job-submit
Ganga.GPIDev.Lib.Job              : INFO      submitting job 27
Ganga.GPIDev.Adapters              : INFO      submitting job 27 to LCG backend
Ganga.GPIDev.Lib.Job              : INFO      job 27 status changed to "submitted"
Out[4]: 1

In [5]: j.status
Out[5]: submitted

In [6]:
```


Summary

- MC Production resumed !!
- New sites working correctly with large resouces
- Configuration and Job submission tool “Ganga” tried.
 - Easy to see what we’re doing
 - Good to unified interface
 - No convenience about functionality

We must write script for scripts, anyway.