

## **Wikiprint Book**

**Title: 1. Job Header for MPI - MPI/OMP with libGCM**

**Subject: Igcmg\_doc - DocBenvAidrisAada**

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## Working on Ada

### 1. IDRIS users' manual

- See: <http://www.idris.fr/ada/> for ada : computing server
- See: <http://www.idris.fr/adapp> for adapp : pre-post-treatment
- See: <http://www.idris.fr/ergon/> for ergon : file server

### 2. Commands to manage jobs on ada

- The job's time limit is measured in real time, for example 1 hour on 32 procs accounts for 32 hours. Be careful not to have too much time on 1 processor.
- `llsubmit -->` submit a job
- `llicancel -->` cancel a job
- `llq -u login -->` indicates all jobs in the queue or running for the login *login*
- Trick: parameterize the `llq` display to see the job names

```
llq -u $(whoami) -f %jn %id %st %c %dq %h -W
```

- Post-mortem : `idrjar` , `idrjar -l -j #jobid#`, to obtain detailed information: memory, real time, efficiency,...
- Example of `idrjar` output :

```
ada > idrjar
|-----|
|--- IDRIS/CNRS. Version du 18 février 2013 ---|
|-----|

Sorties concernant l'identifiant rpslxxx pour la période du
==> 01 juin 2013 au 19 juin 2013
```

Owner	Job Name	JobId	Queue	tEse	tCpu	#T	(%)	S
rpslxxx	ADA337	ada338.290170.0	c32t2	133	1232	32	28.95	C
rpslxxx	ADA337	ada338.290333.0	c32t2	5425	165141	32	95.13	C
rpslxxx	PACKDEBUG	ada338.290610.0	t2	11	2	1	18.18	C
rpslxxx	ADA337	ada338.290438.0	c32t2	5471	166878	32	95.32	C
rpslxxx	PACKRESTART	ada338.290611.0	t2	182	25	1	13.74	C
rpslxxx	REBUILDWRK	ada338.290612.0	t2	1577	503	1	31.90	C
rpslxxx	PACKOUTPUT	ada338.290730.0	t2	114	43	1	37.72	C

### 3. Example of a job to start an executable in MPI

Here is an example of a simple job to start an executable `orchidee_ol` (or `gcm.e` commented). The input files and the executable must be in the directory before starting the executable.

```
#!/bin/ksh
# #####
# ##   ADA IDRIS   ##
# #####
# Query's name
# @ job_name = test
# Job type
# @ job_type = parallel
# Standard output file
# @ output = Script_Output_test.%(jobid)
```

```
# Error output file (the same)
# @ error = Script_Output_test.%(jobid)
# Number of requested processes
# @ total_tasks = 8
# max. CPU time per MPI process hh:mm:ss
# @ wall_clock_limit = 1:00:00
# Number of task OpenMP/threads per MPI process
### @ parallel_threads = 4
# End of header
# @ queue

poe ./orchidee_ol
#poe ./gcm.e
```

#### 4. Information on Ergon files from Ada

The `mfls` command on Ada provides information on the Ergon files.

#### 5. Information on Ergon files from Adapp

The `mfls` command on Adapp provides information on the Ergon files.

Ergon files are visible from Adapp. Use `$ARCHIVE` to reach Ergon files.

### 1. Job Header for MPI - MPI/OMP with libGCM

#### 1.1. Forced model

##### 1.1.1. MPI

To launch a job on XXX MPI tasks

```
#!/bin/ksh
# #####
# ##   ADA IDRIS   ##
# #####
# Job name
# @ job_name = MyJob
# Job type
# @ job_type = parallel
# Standard output file name
# @ output = Script_Output_MyJob.000001
# Error output file name
# @ error = Script_Output_MyJob.000001
# Total number of tasks
# @ total_tasks = XXX
# @ environment = "BATCH_NUM_PROC_TOT=XXX"
# Maximum CPU time per task hh:mm:ss
# @ wall_clock_limit = 1:00:00
# End of the header options
# @ queue
```

##### 1.1.2. hybrid MPI-OMP

Hybrid version are only available with `_v6` configurations

To launch a job on XXX MPI tasks and YYY threads OMP on each task

- first you need to modify your `config.card`

```
ATM= (gcm.e, lmdz.x, XXXMPI, YYYOMP)
```

- second you need to modify your job header

```
#!/bin/ksh
# #####
# ##   ADA IDRIS   ##
# #####
# Job name
# @ job_name = MyJob
# Job type
# @ job_type = parallel
# Standard output file name
# @ output = Script_Output_MyJob.000001
# Error output file name
# @ error = Script_Output_MyJob.000001
# Total number of tasks
# @ total_tasks = XXX
# @ environment = "BATCH_NUM_PROC_TOT=XXX*YYY"
# Maximum CPU time per task hh:mm:ss
# @ wall_clock_limit = 1:00:00
# Specific option for OpenMP parallelization: Number of OpenMP threads per MPI task
# @ parallel_threads = YYY
# End of the header options
# @ queue
```

## 1.2. Coupled model

### 1.2.1. MPI

To launch a job on XXX (32) MPI tasks. 5 for NEMO, 1 for oasis and 26 MPI tasks for LMDZ by default for IPSLCM5A.

```
#!/bin/ksh
# #####
# ##   ADA       IDRIS   ##
# #####
# Job name
# @ job_name = MyCoupledJob
# Job type
# @ job_type = parallel
# Standard output file name
# @ output = Script_Output_MyCoupledJob.000001
# Error output file name
# @ error = Script_Output_MyCoupledJob.000001
# Total number of tasks
# @ total_tasks = 32
# @ environment = "BATCH_NUM_PROC_TOT=32"
# Maximum CPU time per task hh:mm:ss
# @ wall_clock_limit = 1:00:00
# End of the header options
# @ queue
```

### 1.2.2. hybrid MPI-OMP

Hybrid version are only available with \_v6 configurations

To launch a job on XXX (24) MPI tasks and YYY (2) threads OMP for LMDZ, ZZZ (7) MPI tasks for NEMO and SSS (1) XIOS servers :

- first you need to modify your config.card. On ada, this is working for IPSLCM6\_rc0 (IPSLCM6A\_VLR) :

```

ATM= (gcm.e, lmdz.x, 24MPI, 2OMP)
SRF= ("" ,"" )
SBG= ("" ,"" )
OCE= (opa, opa.xx , 7MPI)
ICE= ("" ,"" )
MBG= ("" ,"" )
CPL= ("" ,"" )
IOS= (xios_server.exe, xios.x, 1MPI)

```

- second you need to modify your job header

```

#!/bin/ksh
# #####
# ##   ADA IDRIS   ##
# #####
# Job name
# @ job_name = MyCoupledJob
# Job type
# @ job_type = parallel
# Standard output file name
# @ output = Script_Output_MyCoupledJob.000001
# Error output file name
# @ error = Script_Output_MyCoupledJob.000001
# Total number of tasks
# @ total_tasks = 32
# @ environment = "BATCH_NUM_PROC_TOT=56"
# Maximum CPU time per task hh:mm:ss
# @ wall_clock_limit = 1:00:00
# Specific option for OpenMP parallelization: Number of OpenMP threads per MPI task
# @ parallel_threads = 2
# End of the header options
# @ queue

```

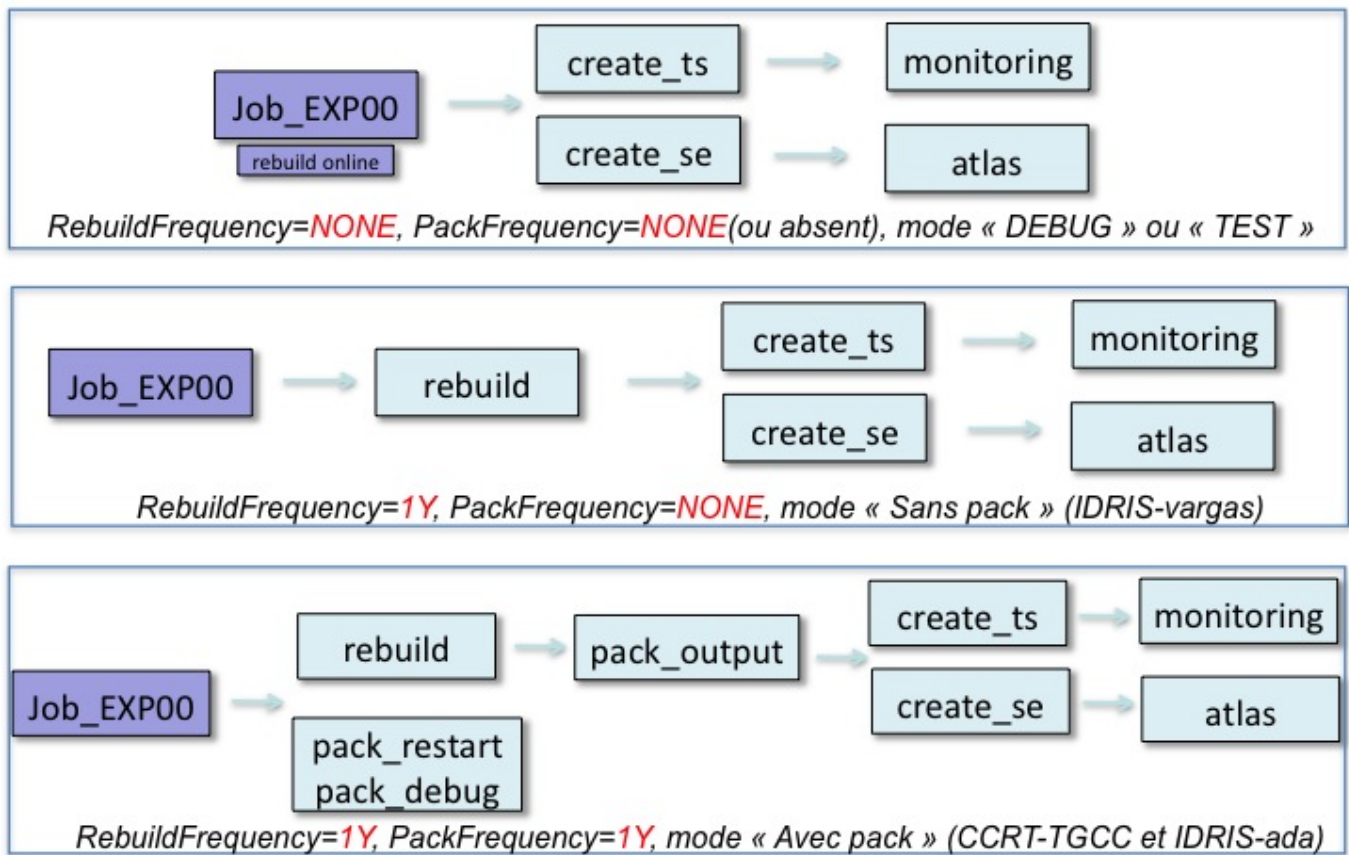
### 1.3. Specificities libGCM on Ada

At IDRIS and for Ada, output files are 'packed' using libGCM\_v2, i.e. they are grouped by periods (in general 1 year) using the command `tar` or `ncrcat` for NetCDF output files.

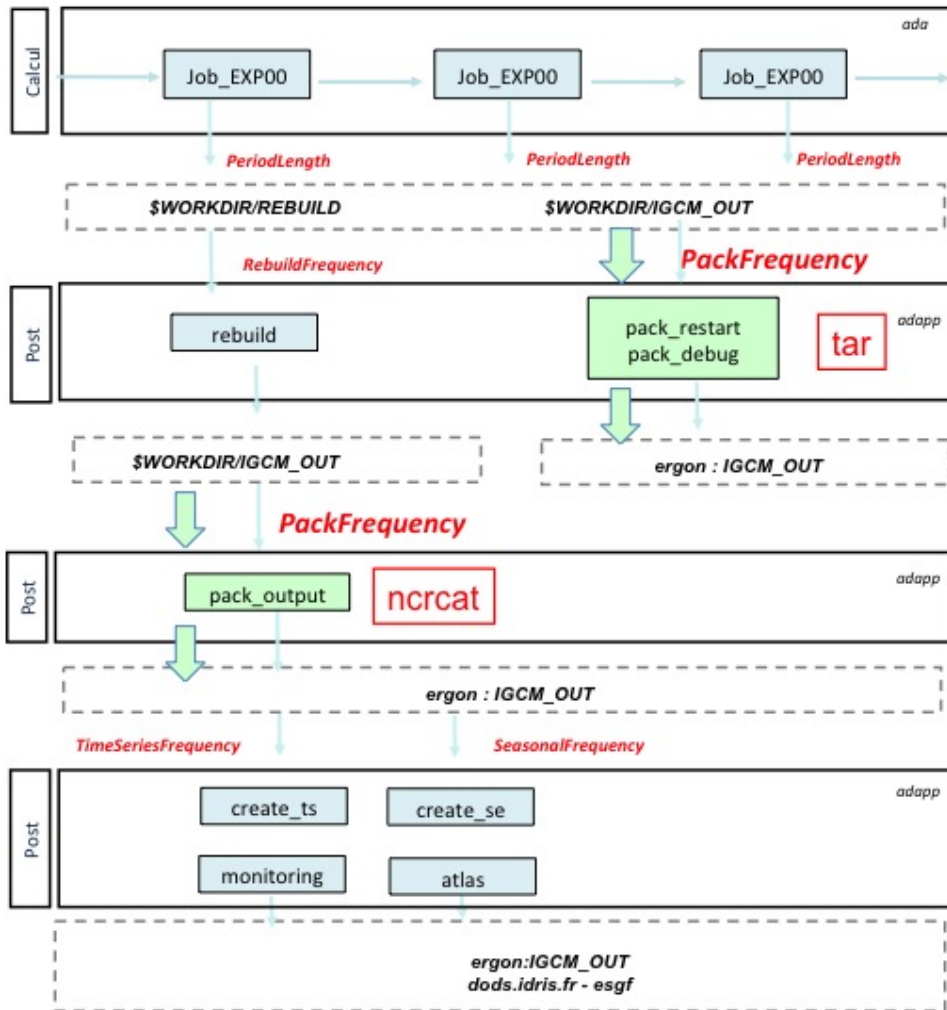
This has been a default setup at TGCC for a few months. It is a new feature since February 2013 for IDRIS.

The diagram below shows the different options offered by libGCM. The 3rd option is currently activated by default at IDRIS. This option implies that files must be temporarily stored on the \$WORKDIR space, which means that a large storage is needed (at least 20 To).

## Simulations avec libIGCM : les options



The diagram below details the added jobs `pack_debug`, `pack_restart` and `pack_output` as well as the directories those jobs are using. Note that the files are temporarily stored in the `$WORKDIR/IGCM_OUT` directories before being grouped and sent on Ergon in the `IGCM_OUT` directories.



You will obtain annual output files with 12 monthly values in the Output/MO directory if you put `PackFrequency=1Y` in `config.card`. This is the default grouping period of most configurations but you can of course change it.

What you must remember:

- The tool [RunChecker.job](#) is meant to help you monitoring your simulations. It offers a synthetic view of the different post processing jobs' status.
- The tool [clean\\_year.job](#) is meant to help you clean until the last successfully computed pack period.
- If you detect anomalies and must rerun part of the simulation, you will have to make new complete pack periods (e.g. filling a gap by running 1 month of simulation is out of the question).
- The restart files are stored and grouped on Ergon in the directory `IGCM_OUT/.../RESTART`
- The different output text-files are stored and grouped on Ergon in the directory `IGCM_OUT/.../DEBUG`
- The listings for pack-jobs outputs stay on Ada in the directory `$WORKDIR/IGCM_OUT/.../Out`
- If you put the `SpaceName=TEST` parameter in `config.card` the pack jobs will not be started and your simulation will be stored as before in the `WORKDIR/IGCM_OUT` directory. This can be very useful for short tests.

To learn more about this Section, you can read the documentation on [Simulation and post-processing](#) and on [Monitor, debug and relaunching](#).

Finally, in case of panic, visit us or send your questions to the list platform-users.

#### 1.4. Specificities for Adapp

- Adapp is dedicated to pre and post-treatment.
- Note that Ergon files are visible in read only mode through `$ARCHIVE`.
- Use largely Adapp for analyses and interactive work
- Adapp is free of charge



#### 1.4.1. IDRIS users' manual for adapp

- See: <http://www.idris.fr/adapp> for adapp : pre-post-treatment

#### 1.4.2. Header for adapp job

A post-treatment jobs includes these header lines :

```
# @ job_type = serial
# @ requirements = (Feature == "prepost")
```