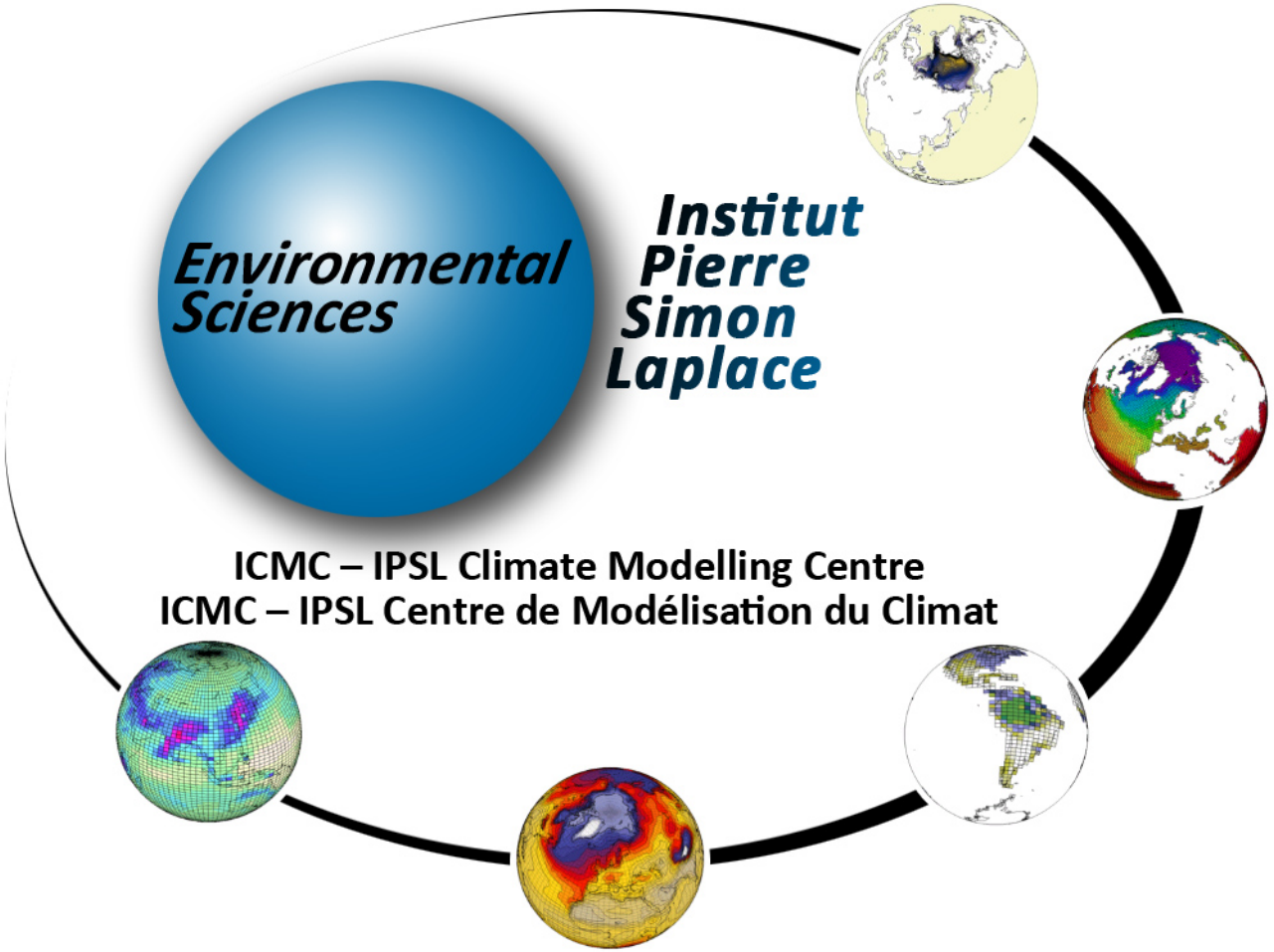


Training session day 2

Advanced training course on IPSL running environment

November 28th 2018, IDRIS

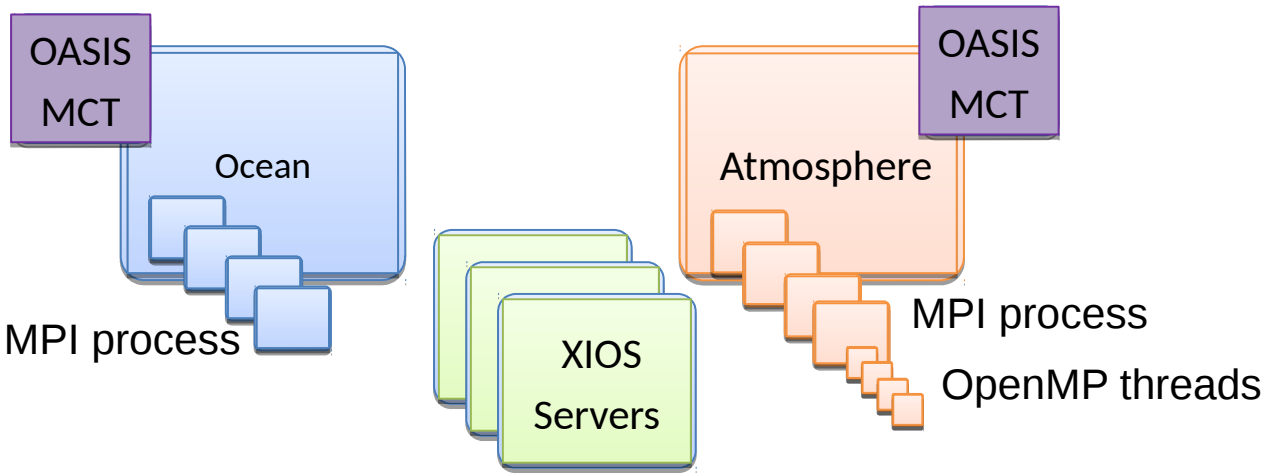
IPSL « Plate-forme » group – Lola Falletti & Nicolas Lebas

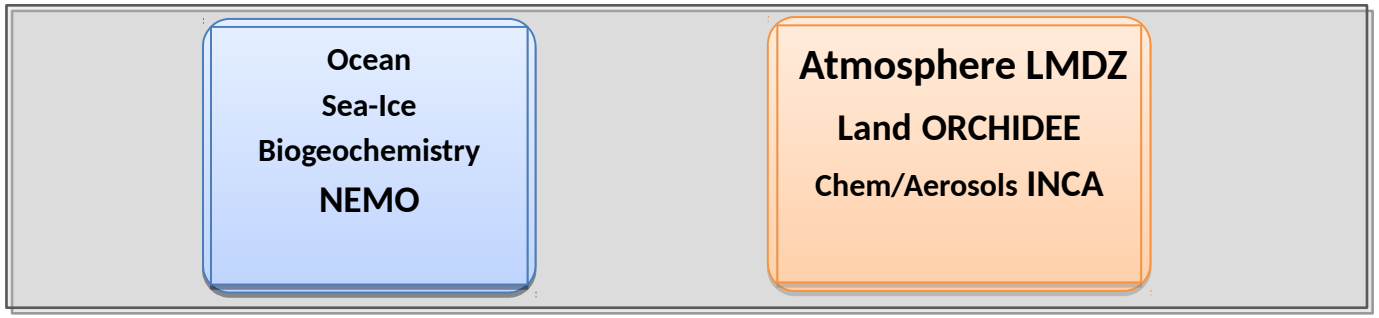
Outline

1. **IPSL Earth System model within HPC context**
2. I/O with libIGCM
3. Post-processing with libIGCM : Pack
4. Post-processing with libIGCM : Time series
5. Monitoring a simulation

From IPSL-CM5 (v5) to IPSL-CM6 (v6) Technical challenges : HPC

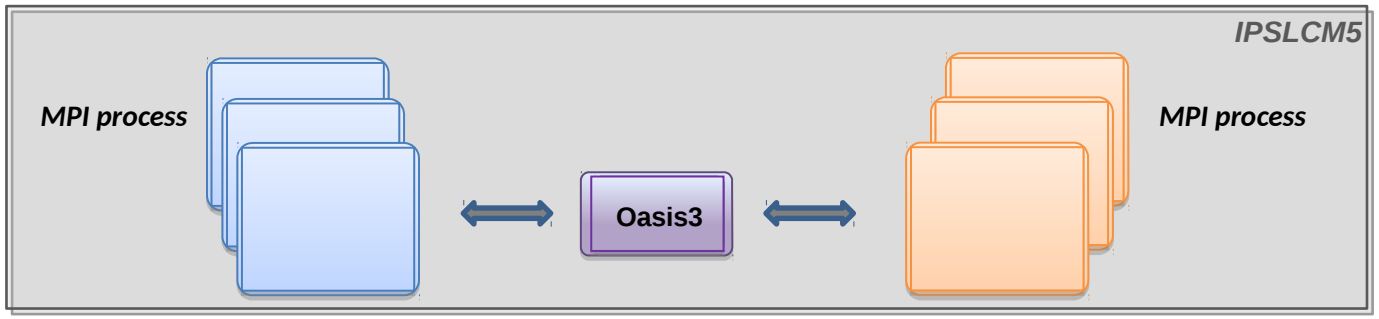
- More parallelism in component and coupled model :
  - *MPI : messages programming (already in IPSL-CM5)*
  - OpenMP : directives and shared memory
  - hybrid ie MPI/OpenMP to use efficiently resources
  - XIOS servers : performance and flexibility of IOs
  - Parallel coupler OASIS3-MCT



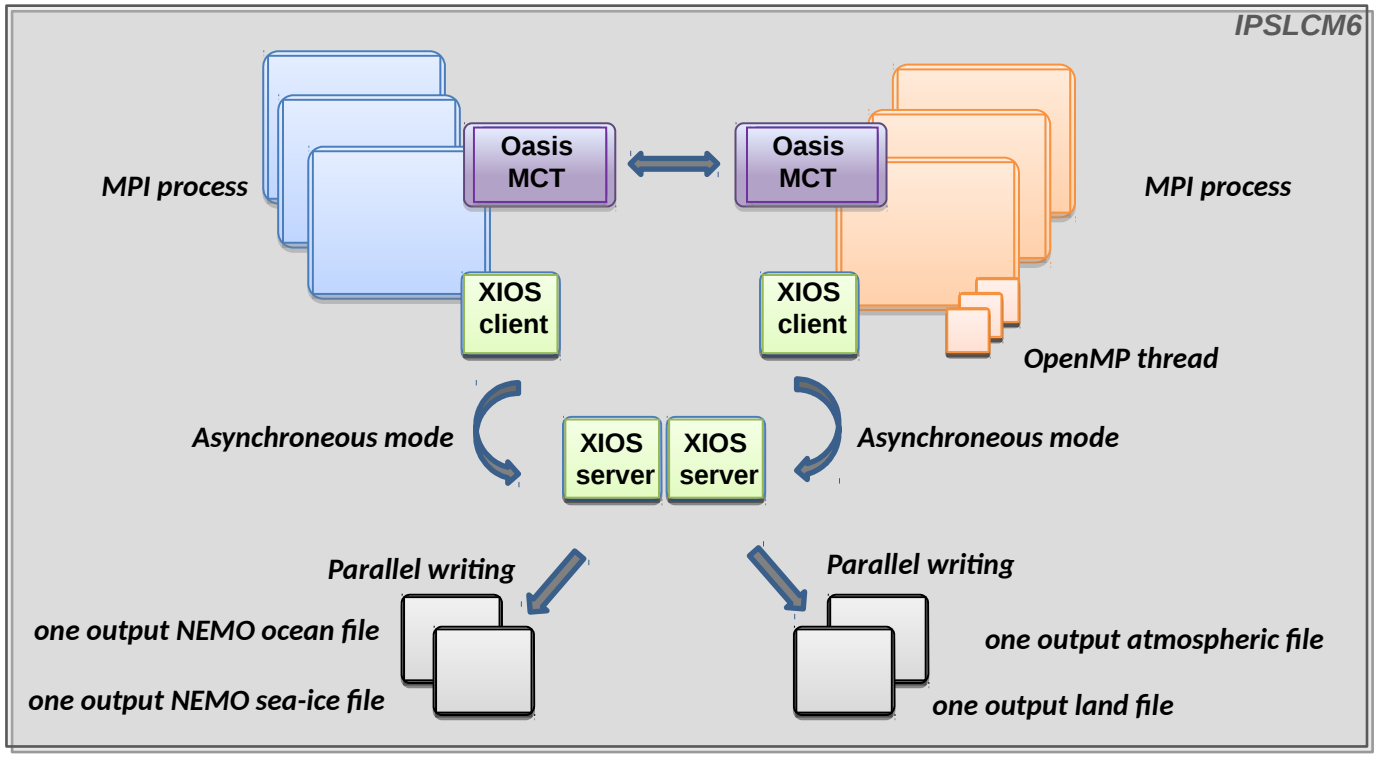


IPSL Earth System Model

From CMIP5 to CMIP6



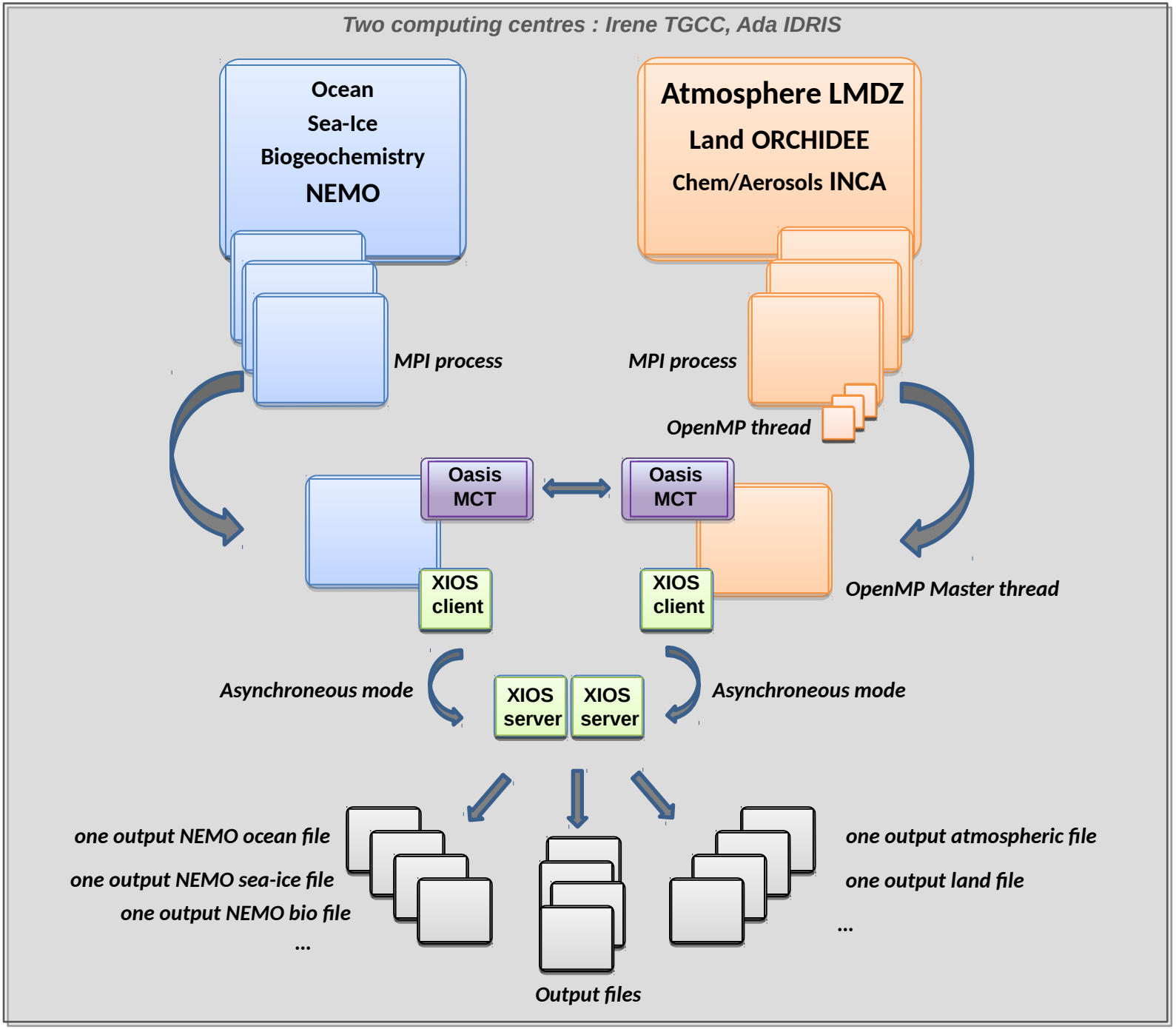
CMIP5



CMIP6

Technical developments

- *Hybrid MPI-OpenMP*
- *OASIS3-MCT (coupleur //)*
- *XIOS (serveur IO)*


Two computing centres : Irene TGCC, Ada IDRIS
Ocean
Sea-Ice
Biogeochemistry
NEMO
Atmosphere LMDZ
Land ORCHIDEE
Chem/Aerosols INCA
MPI process
MPI process
OpenMP thread
Oasis MCT
Oasis MCT
XIOS client
XIOS client
OpenMP Master thread
Asynchroneous mode
XIOS server
XIOS server
Asynchroneous mode
one output NEMO ocean file
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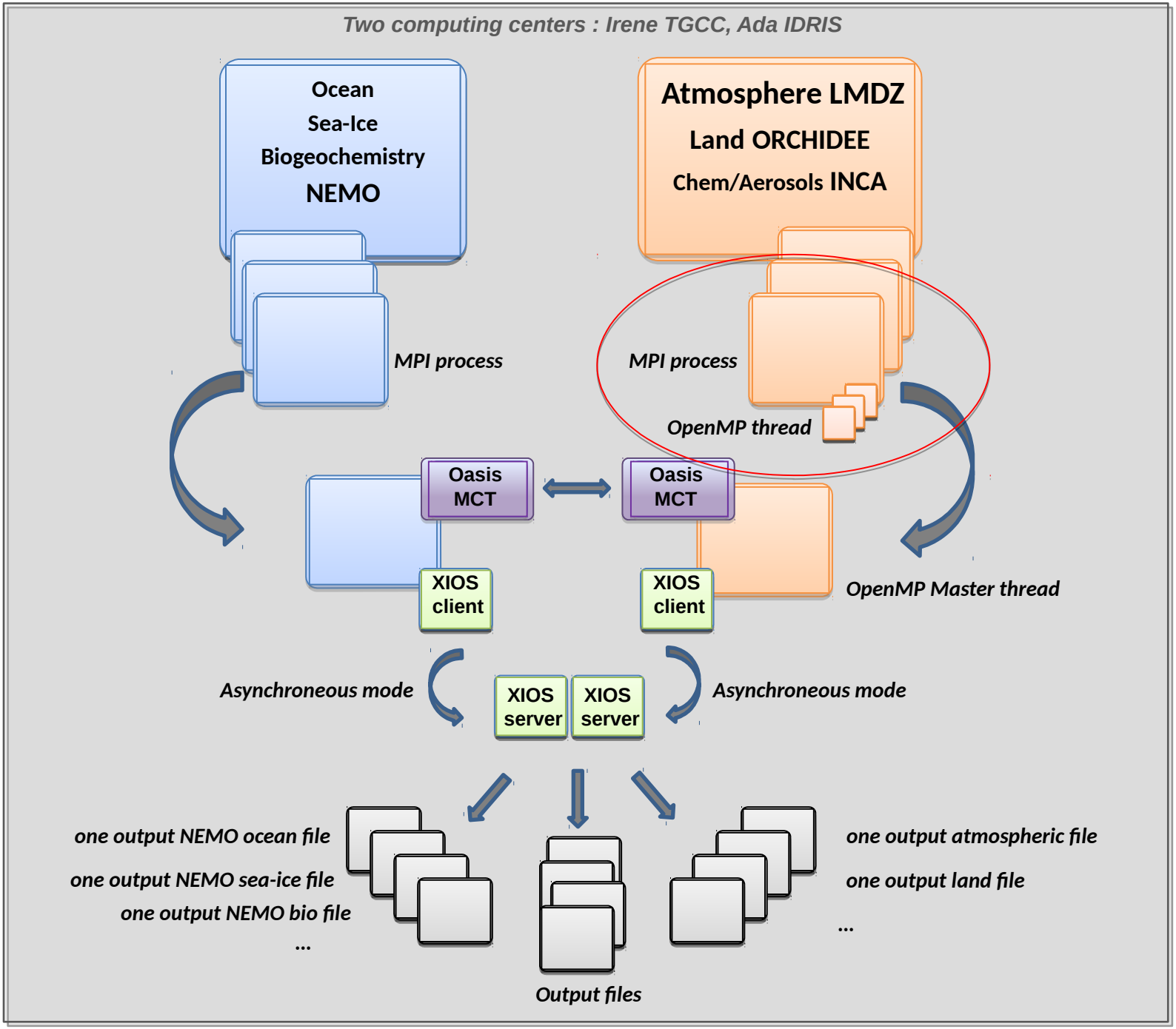
one output NEMO bio file
...
one output atmospheric file
one output land file
...
Output files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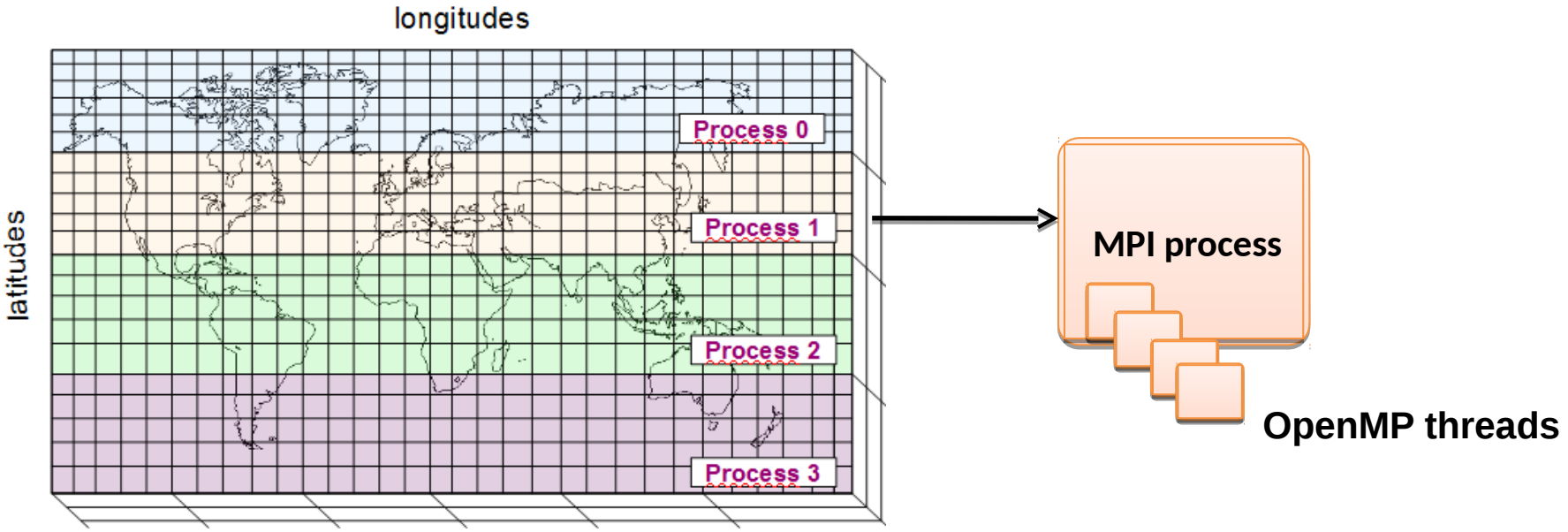
Output files

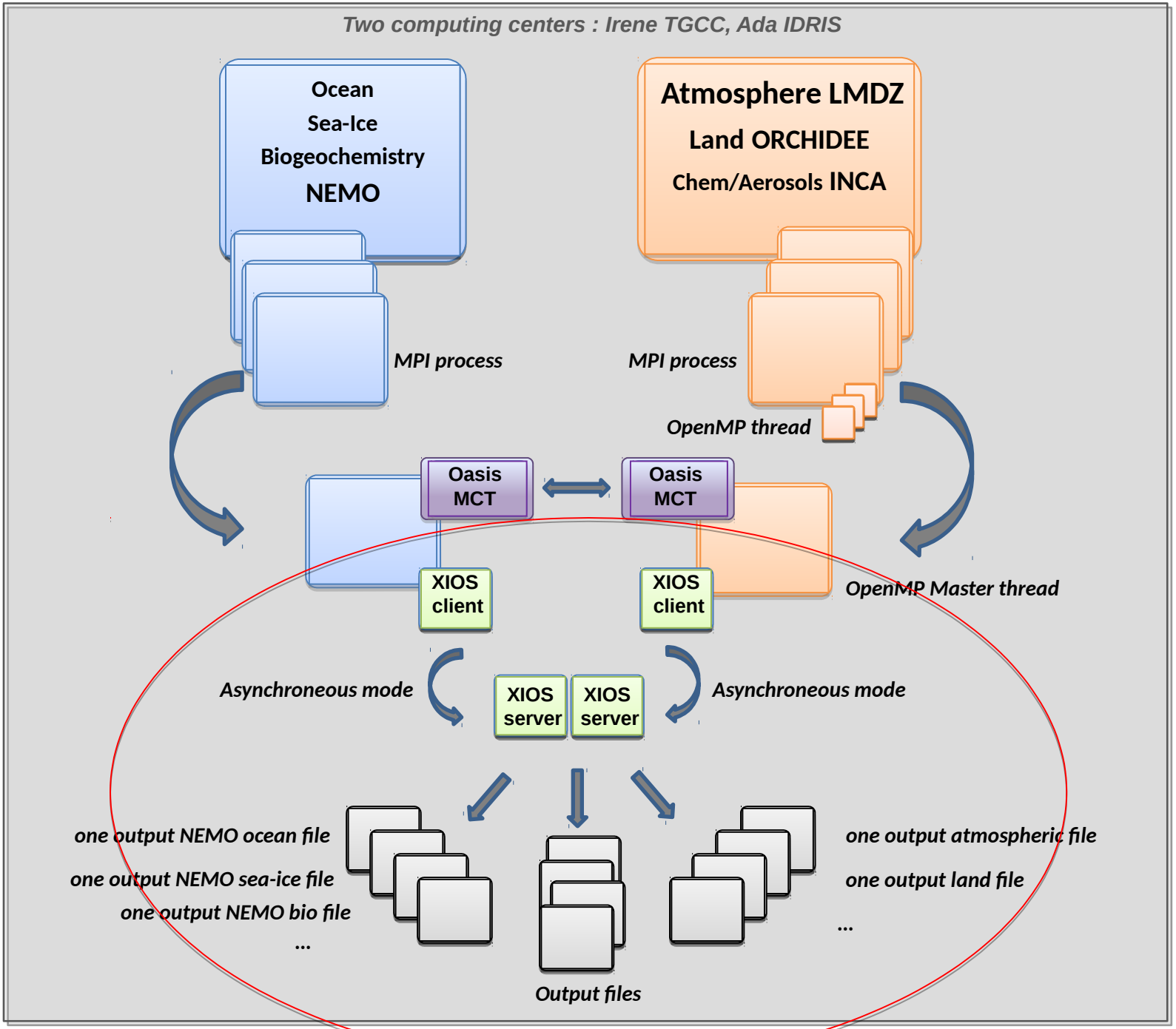
From IPSL-CM5 (v5) to IPSL-CM6 (v6)

– **MPI-OpenMP hybrid parallelization** for atmospheric /land /atmospheric chemistry component



- **MPI parallelisation (distributed memory)** : the global domain is divided into sub-domains, each MPI process treats one sub-domain on one computing core.

- **MPI + OpenMP (shared memory)** : each MPI process treats one sub-domain, each MPI process run OMP threads, each OMP threads treats a new subdivision of the sub-domain.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...
Output files
one output atmospheric file
one output land file
...

XIOS

- **XIOS** (XML-IO-Server) as input/output library for all IPSL components
  - library dedicated to IO management of climate code, developped at IPSL by Y. Meurdesoif and XIOS team
  - replaces IOIPSL for output of IPSL components
  - **Flexibilty** : XML configuration file
  - **Performance** : parallel asynchronous writing and reading
  - **Post-treatment :** integrate internal parallel workflow and dataflow
    - Time-series, interpolations, zonal means, operations,…
- **XIOS** used by :
  - **IPSL models : NEMO, LMDZ, ORCHIDEE, INCA, REPROBUS, DYNAMICO**
  - NEMO as european consortium
  - LGGE (MAR), Ifremer (ROMS, MARS)
  - MétéoFrance / CNRM : Gelato, Surfec, Arpège climat
  - Other european models (under development) : MetOffice (Hadgem, MONC, Gung-Ho), ECMWF (IFS, EC-EARTH)

XIOS documentation : https://forge.ipsl.jussieu.fr/ioserver/raw-attachment/wiki/WikiStart/XIOS-tutorial.pdf
XIOS practical : https://forge.ipsl.jussieu.fr/ioserver/raw-attachment/wiki/WikiStart/XIOS-practical_english.pd

XIOS : how does it work ?

- **Simplification** of the IO management into the code

```
CALL xios_initialize("nemo", return_comm=comm)
CALL xios_context_initialize("nemo_context",comm)
! Grid  definition
…
CALL xios_send_field("sst", sst)
…
CALL xios_context_finalize()
CALL xios_finalize()
```

nemo source code

- **Outsourcing** the output definition in **XML configuration file** with possible splitting.

```
…
<context id="nemo_context"  src="nemo.xml">
…
```

iodef.xml configuration file

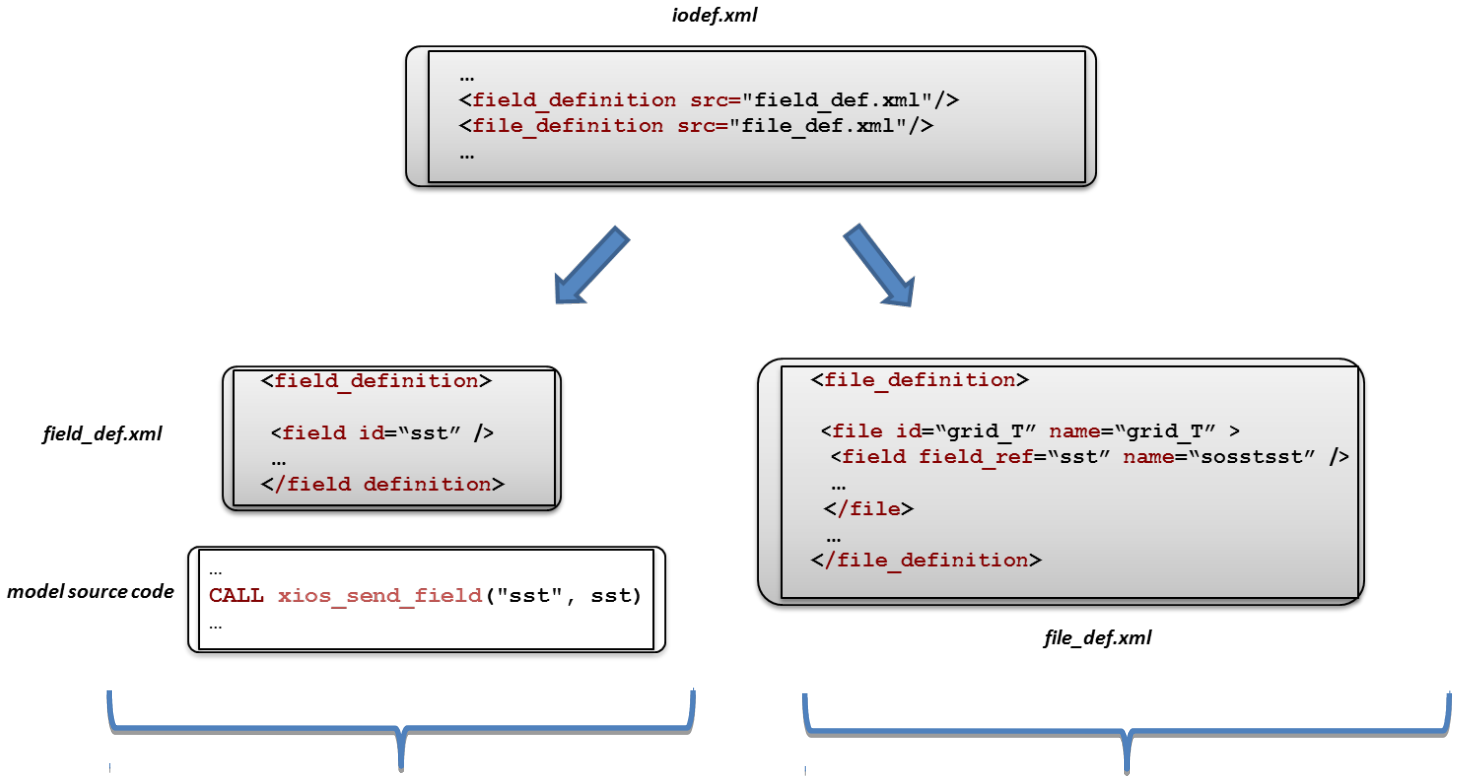
```
<context id="nemo_context">
<field definition src="field_definition_nemo.xml">
…
<\context>
```

nemo.xml configuration file

```
<field definition>
<field id="sst" operation="average" />
…
</field definition>
```

field_definition.xml configuration file

XIOS in IPSL configurations



Model developper

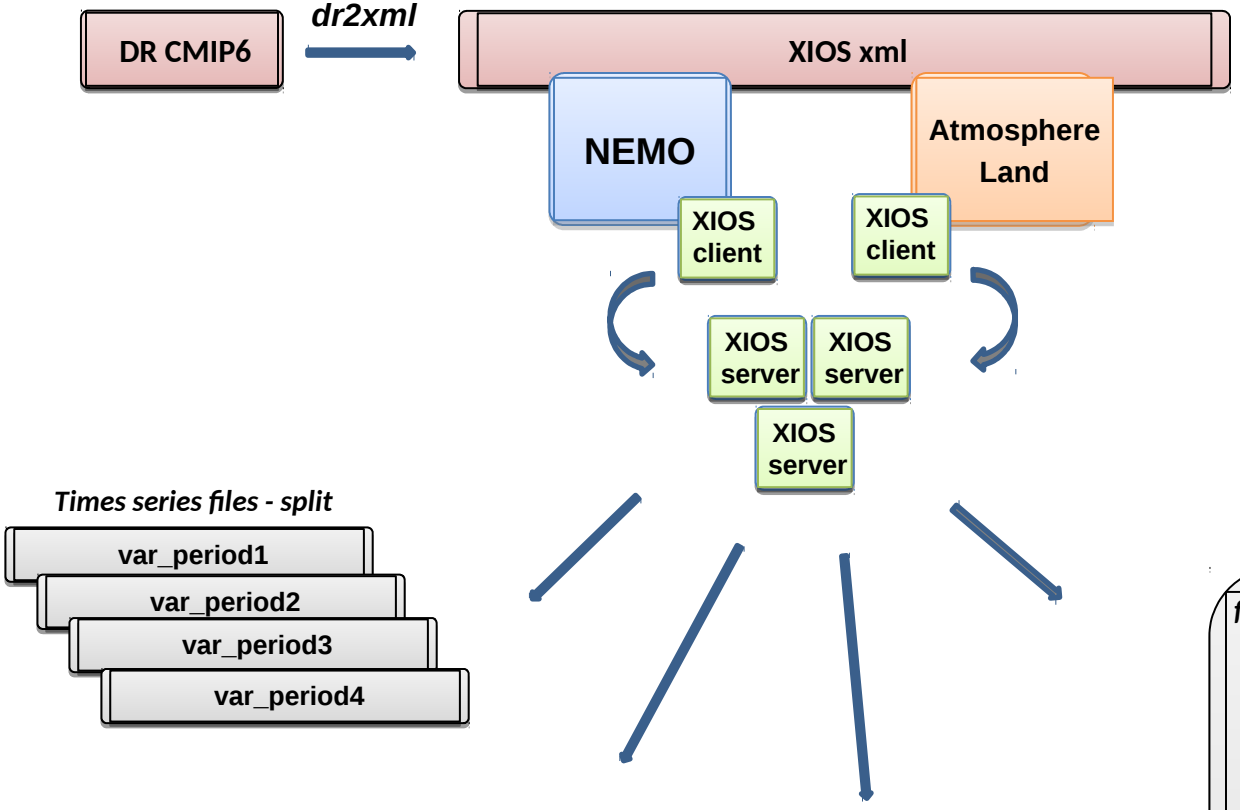
XIOS field attributes : name, long name, description, units, prec,…

Configuration user

XIOS file attribute : name, output_freq,

- **« field_def.xml » :** définition of variables available in the model to be written out (or read)
- **« file_def.xml » :** use of fields (defined in field_def) to be written (read).

CMIP6 data workflow (work in progress)

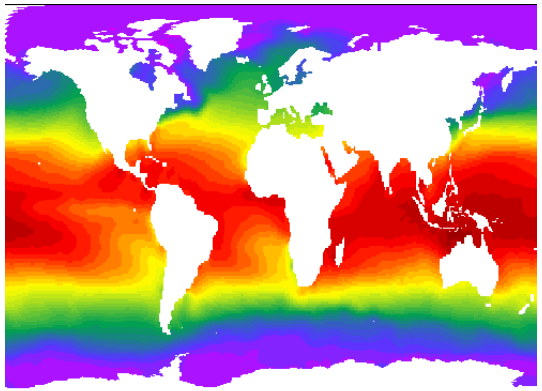


CF compliant

```
float tos(time_counter, y, x) ;
  tos:standard_name = "sea_surface_temperature" ;
  tos:long_name = "sea_surface_temperature" ;
  tos:units = "degC" ;
  tos:online_operation = "average" ;
  tos:interval_operation = "3600 s" ;
  tos:interval_write = "1 d" ;
  tos:cell_methods = "time: mean (interval: 3600 s)" ;
  tos:_FillValue = 1.e+20f ;
  tos:missing_value = 1.e+20f ;
  tos:coordinates = "time_centered nav_lat nav_lon" ;
...
// global attributes:
  :name = "eOR1L3P_1d_00010101_00010101" ;
  :description = "ocean T grid variables" ;
  :title = "ocean T grid variables" ;
  :Conventions = "CF-1.5" ;
  :production = "An IPSL model" ;
  :timeStamp = "2016-Jun-06 17:16:17 CEST" ;
```

grille native

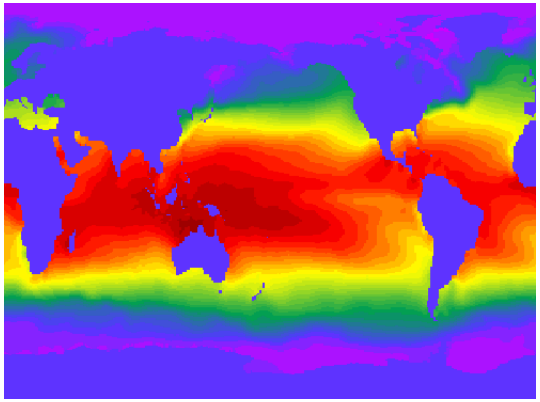
var



sst : grille eORCA1

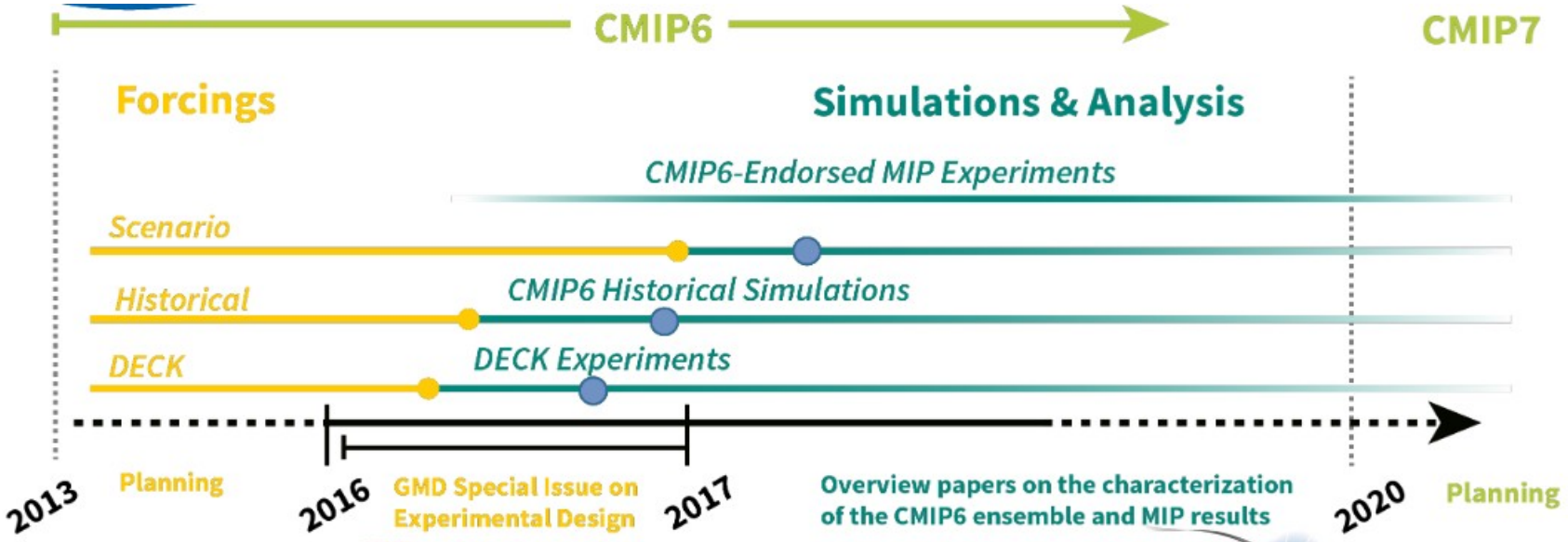
grille régulière

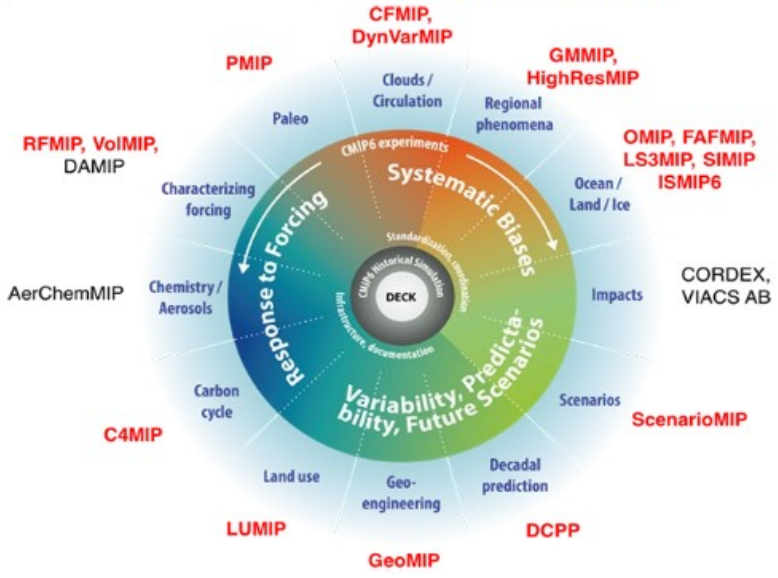
var (interpolée)

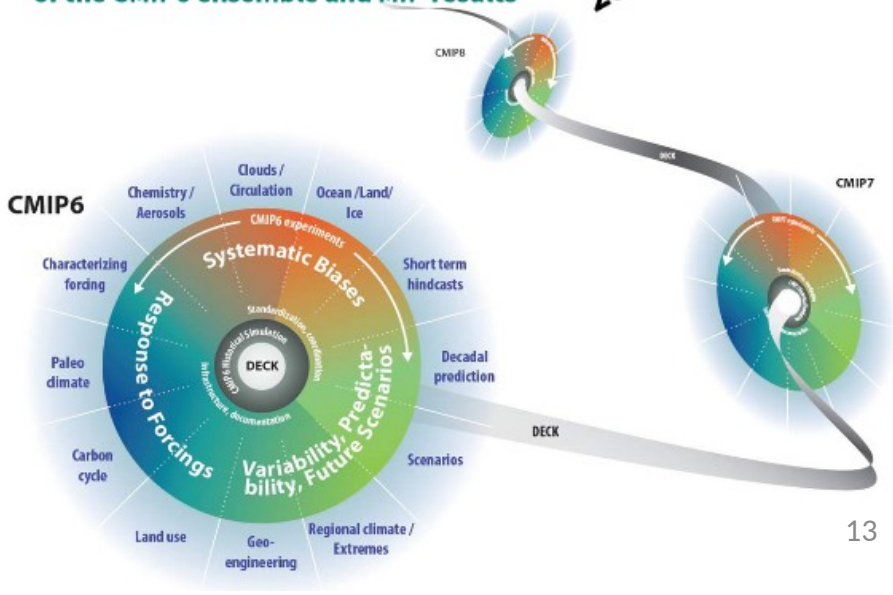


sst : grille régulière 300x300
Interpolation conservative ordre 1

CMIP6 organisation







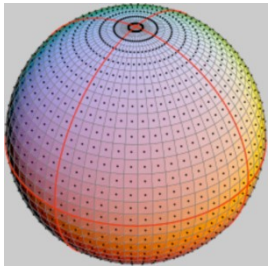
IPSL-CM (and LMDZOR) Performances

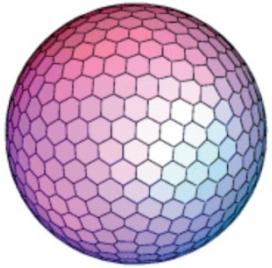
Model	Number of cores (Curie)	SYPD (Simulated Year Per Day)
IPSLCM5A-LR *96x95x39 ATM (AP)* *ORCA2 OCE*	32	10
IPSLCM5A2-VLR *96x95x39 ATM (AP)* *ORCA2 OCE*	**301**	**56**
IPSLCM5A-MR *144x142x79 ATM (AP)* *ORCA2 OCE*	220	1
IPSLCM6-LR *144x142x79 ATM (NP)* *ORCA1 OCE*	**560**	**6**

IPSL ESM : HPC perspectives

- **CMIP6 simulations** : intensive production mode with specific workflow
- **Next developments**
  - **XIOS 3.0**
    - XIOS multithreaded (OpenMP) to target « many cores » architectures
    - Coupling functionalities
  - **Atmospheric component : new dynamical core DYNAMICO** (2017-2018 for HighRes MIP ?)
    - better performances/scalability
    - MPPs, MICs, GPUs architectures.

Lon-lat grid





Icosahedral grid

Outline

1. IPSL Earth System model within HPC context
2. **I/O with libIGCM**
3. Post-processing with libIGCM : Pack
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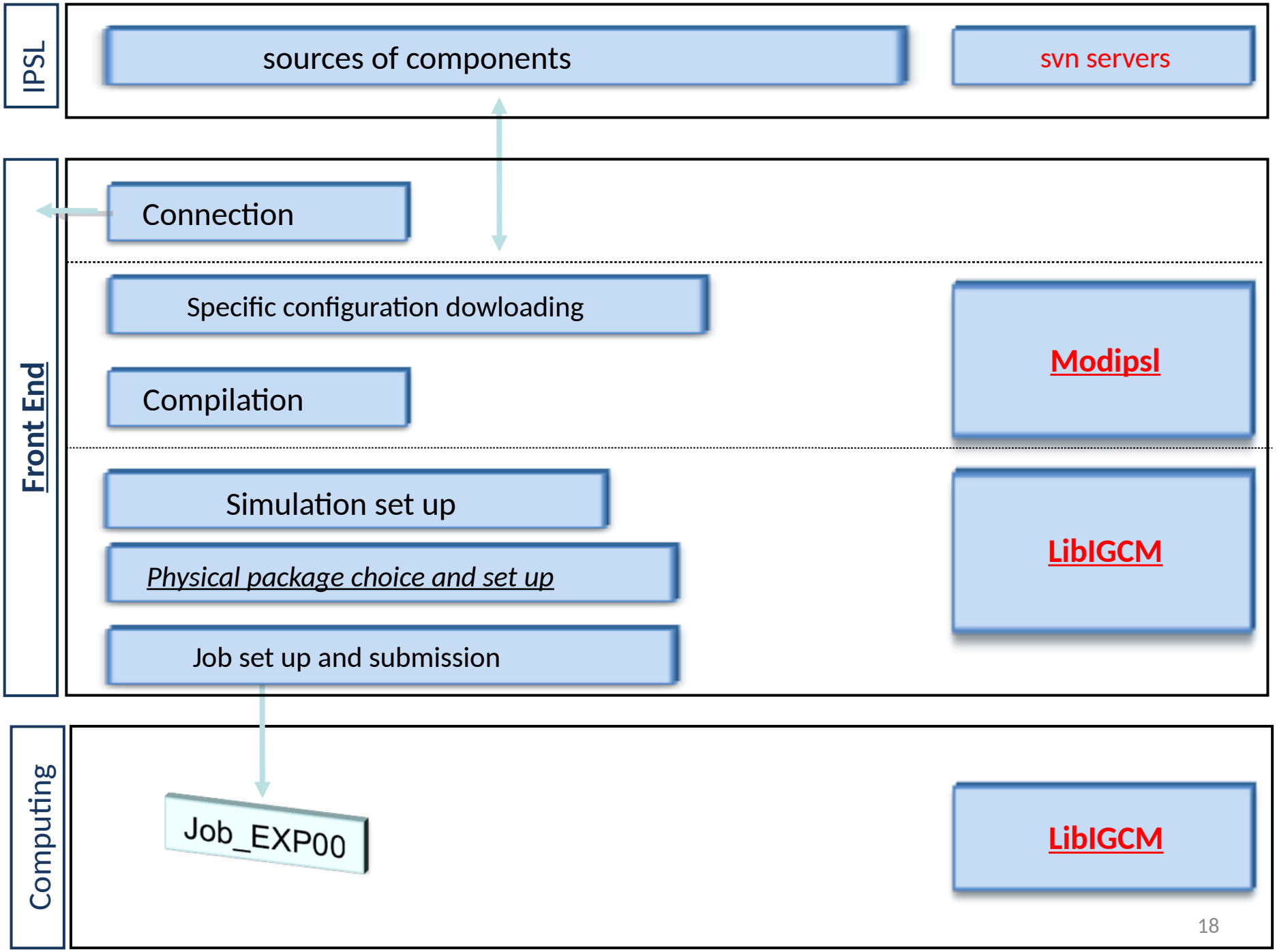
Summary : Extract, compile and launch a simulation of v6 configuration

1. **Download MODIPSL**
   ```
   svn co http://forge.ipsl.jussieu.fr/igcmg/svn/modipsl/trunk modipsl
   ```
2. **Extract a configuration (ex: IPSLCM5A2)**
   ```
   cd modipsl/util ; ./model IPSLCM5A2
   ```
3. **Compilation**
   ```
   cd modipsl/config/IPSLCM5A2 ; gmake [resol]
   ```
4. **Create submission directory**
   ```
   cp EXPERIMENT/IPSLCM/piControl/config.card .
   vi config.card   ### Modify at least JobName=MYEXP and // options
   ../../libIGCM/ins_job   ### copy of piControl directory in MYEXP
                               with COMP, DRIVER, PARAM
   ```
5. **Launch simulation**
   ```
   cd modipsl/config/IPSLCM5A2/MYEXP;
   ccc_msub Job_MYEXP / llsubmit Job_MYEXP
   ```


IPSL
sources of components
svn servers
Front End
Connection
Specific configuration dowloading
Compilation
Modipsl
Simulation set up
Physical package choice and set up
Job set up and submission
LibIGCM
Computing
Job_EXP00
LibIGCM

Set a simulation : initial state (1/2)

You need one *initial state* for all components.

There are several ways to start a simulation – the both common are :
1- All components start from a special state of another(s) simulation(s)
2- Each component create its initial state files (→ all components are differents, you need to read their documentation)

1

[Restarts]
#D- If you want a GENERAL RULE ....
OverRule=y
#D- Last day of the experience used as restart
RestartDate=**1999-12-31**
#D- Define restart simulation name
RestartJobName=**EXP00**
#D- Path Server Group Login
RestartPath=**${ARCHIVE}/IGCM_OUT/IPSLCM5A/DEVT/pdControl**

config.card

Set a simulation : initial state (2/2)

2

```
[Restart]
OverRule=n
[Comp]
Restart=n
```

config.card

```
[InitialStateFiles]
List=   (${R_IN}/…./file.nc,    file.nc),\
        (${R_IN}/…./file2.nc, file2.nc)
```

COMP/<model.card>
Ex : COMP/lmdz.card, COMP/orchidee.card

- If « method 1 » is activated it's overrule « methods 2 »

Set a simulation : boundary

[BoundaryFiles]
List= ($path_file1.nc, name_wait_by_model_file1.nc)

ListNonDel= ($path_file2.nc, name_wait_by_model_file2.nc)**, **
($path_file3.nc, name_wait_by_model_file3.nc)

Ex : Ozone, land use, solar...

COMP/<model>.card
Ex : COMP/lmdz.card, COMP/orchidee.card

[BoundaryFiles] has two parts :

- List → files that will change during the simulation (depends on ${year} ${month})
- ListNonDel → files that never change during the simulation (NonDel = Non Delete)

(...., ...) ,\ = the list continue to next line

Warning : never add « space » at the end of a line → libIGCM will interpreted this like the end of the list, even if you put « \ » to indicate a return to the line.

Set a simulation : parameters

[ParametersFiles]
List=($path_parameter_file1.txt, name_parameter_file1_wait_by_model.txt),\
($path_parameter_file2.def, name_parameter_file2_wait_by_model.def), \
($path_parameter_file3.def, name_parameter_file3_wait_by_model.xml)

Ex : astronomical params, GHG

COMP/<model>.card
Ex : COMP/lmdz.card, COMP/orchidee.card

You can modify values in PARAM files, BUT :

- Variables marked as ***_AUTO_*** in the parameter files can be changed by the users.

They can not be changed again by the scripts (the drivers). If you don't change them, they will take a default value

- Variables marked as ***_AUTOBLOCKER_*** must not be changed.

If still they are changed, the simulation will stop with error message because the drivers are not allowed to make hidden modifications.

Set a simulation : outputs

At the end of each periodLength of simulation you will have for your configuration 2 types of files :

- Restart → state files that will be use to start the next period of simulation (*[RestartFile]* in COMP/model.card, you never change this part)
- Output → output files for this period.

```
[OutputFiles]
List= (file1.nc, ${R_OUT_SRF_O_M}/${PREFIX}_1M_file1.nc, Post_1M_file1), \
      (file2.nc, ${R_OUT_SRF_O_H}/${PREFIX}_HF_file2.nc, Post_HF_file2), \
      (file3.nc, ${R_OUT_SRF_O_M}/${PREFIX}_1M_file3.nc, NONE)

[Post_1M_file1]
Patches= ()
GatherWithInternal= (lon, lat, veget, time_counter, time_counter_bnds, Areas, Contfrac)
TimeSeriesVars2D= (var2D1, var2D2, var2D3)
ChunckJob2D= NONE
TimeSeriesVars3D= (var3D1, var3D2, var3D3)
ChunckJob3D= NONE
Seasonal= ON
```

Syntaxe :
[OutputFiles]
List = (name_in_ouput, path_to_store, post_to_applied)

COMP/<model>.card
Ex : COMP/lmdz.card, COMP/orchidee.card

COMP/*.card files

Variables that can be use in « card » files :

TGCC/Irene : ${R_IN} = /ccc/work/cont003/igcmg/igcmg/IGCM/

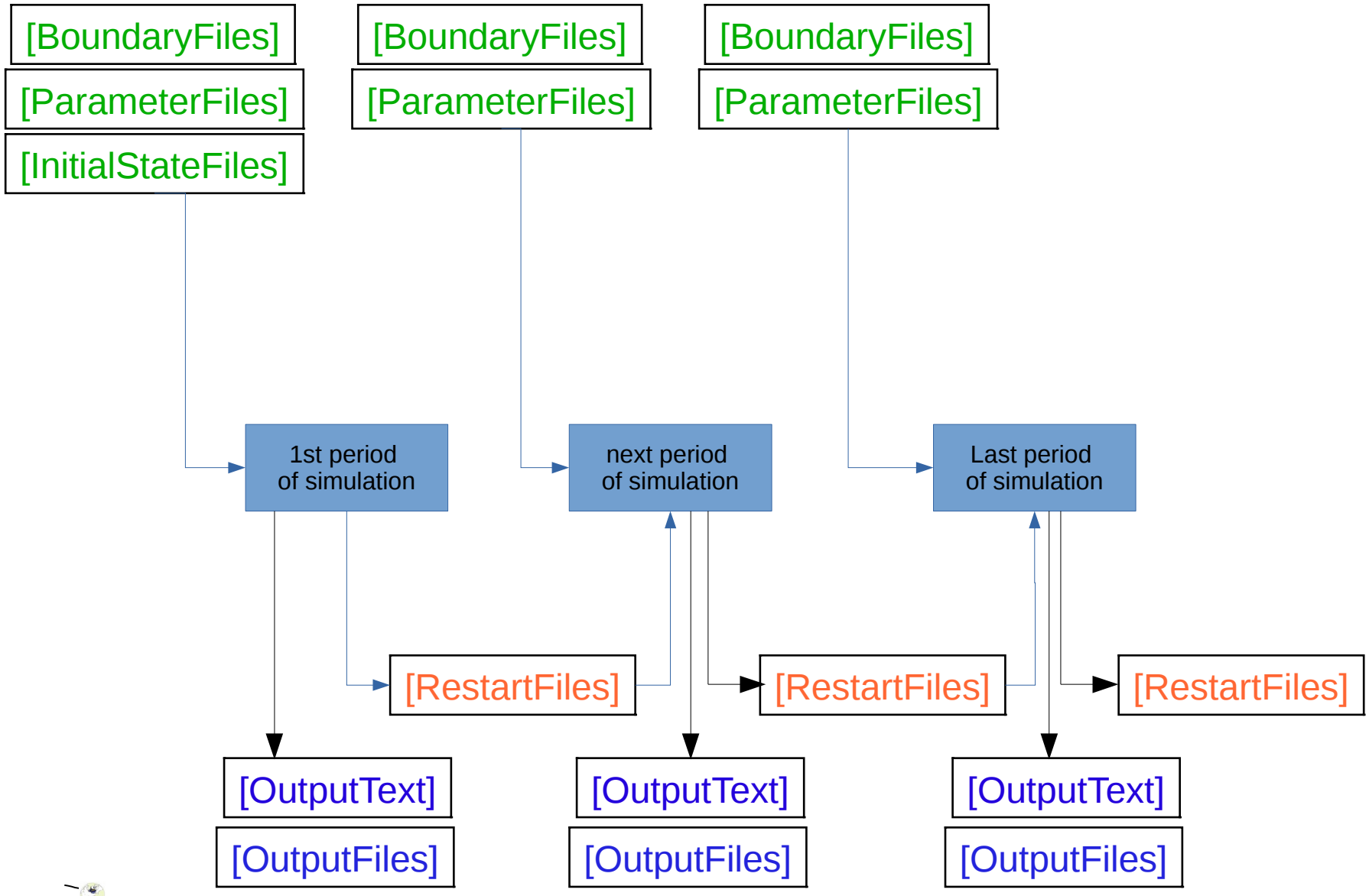
IDRIS/Ada : ${R_IN} = /workgpfs/rech/psl/rpsl035/IGCM/

On all computers :

${SUBMIT_DIR} = submission directory

${year} = current year

${month} = current month


[BoundaryFiles]
[ParameterFiles]
[InitialStateFiles]
[BoundaryFiles]
[ParameterFiles]
[BoundaryFiles]
[ParameterFiles]
1st period of simulation
next period of simulation
Last period of simulation
[RestartFiles]
[RestartFiles]
[RestartFiles]
[OutputText]
[OutputFiles]
[OutputText]
[OutputFiles]
[OutputText]
[OutputFiles]

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Work on a computing center

When you are working on a computing center there are several rules to follow

1) Quota !!! (remember the beginning of this training)

→ You cannot write what you want where you want.

2) Priority and stability of your job. *«If you launch a lot of jobs your priority will decrease, and your simulation will become instable»*

→ you need to launch few jobs and big jobs.

Work on a computing center / Quota

In order to reduce the number of inodes, and to increase the file size stored, we create severals « **pack** »

→ 3 differents sequential pack jobs exist

- **pack_restart.job** : restart files are archived in tar files
- **pack_debug.job** : debug text files are archive in tar files
- **pack_output.job** : NetCFD output is concatenate with ncrcat

WARNING : by default in PROD mod, if a pack failed, the simulation will be stopped.

Work on a computing center / Number of Jobs

If we summarise all we have seen until now : at the end of each period of simulation we need to :

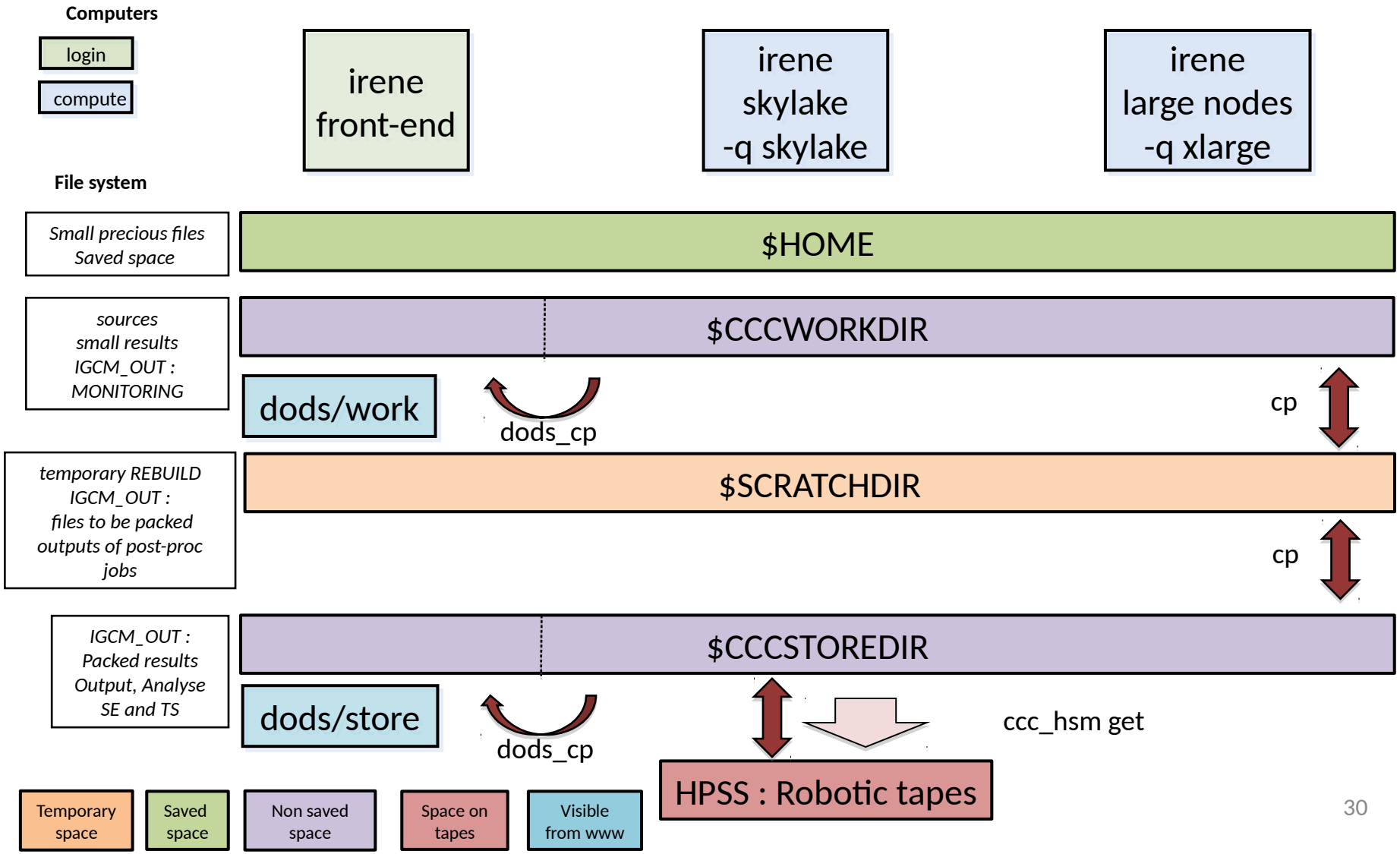
1) Pack output / pack restart / pack debug
2) Launch post-treatment TS / SE / Monitoring

→ 7 jobs for each period !!!!

Our solution : create a notion of « **Frequency** » for each previous step

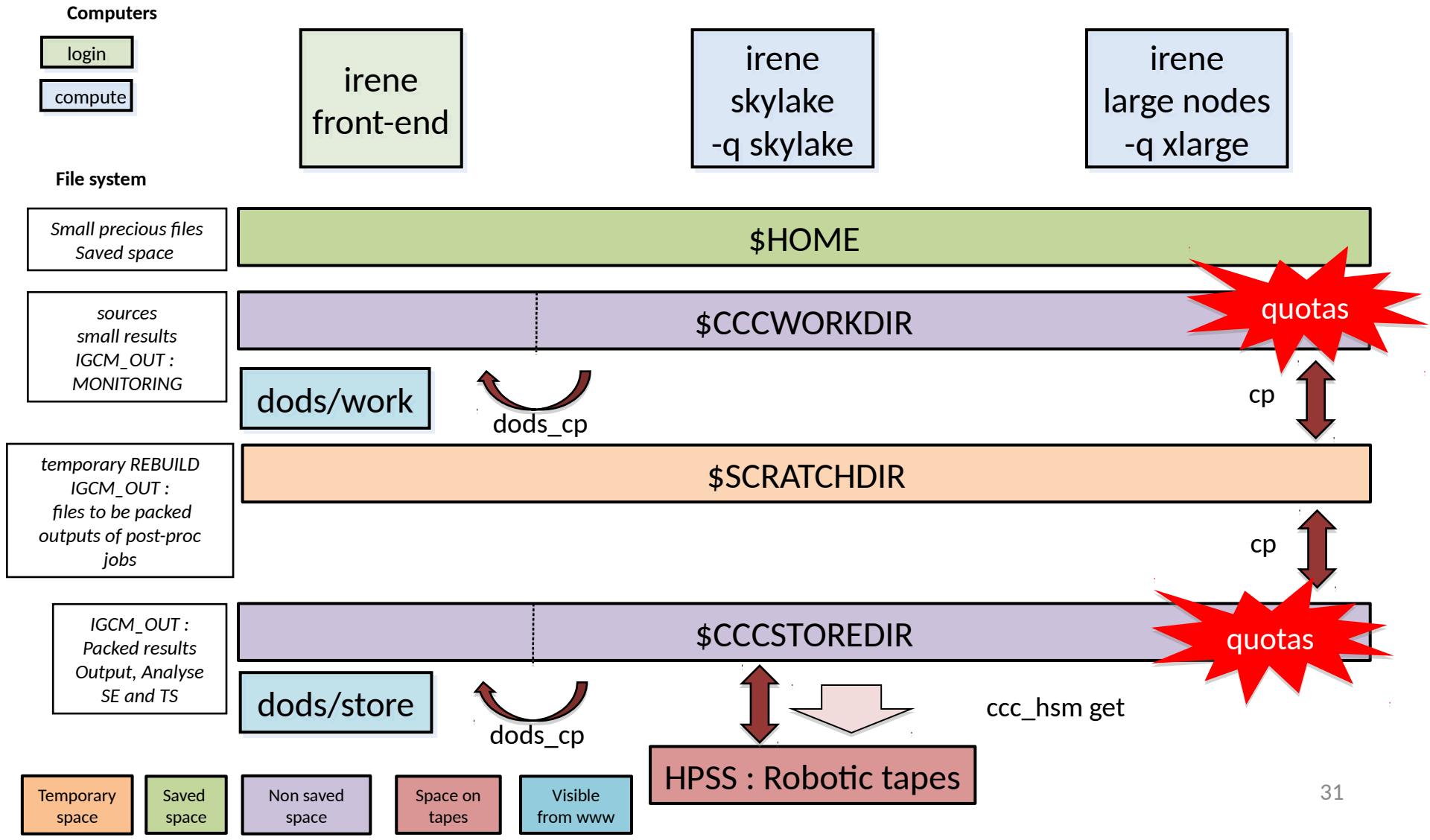
TGCC computers and file system in a nutshell

irene.info



TGCC computers and file system in a nutshell

irene.info



TGCC computers and file system : quotas

irene.info

- CCCWORKDIR
  - **1TB and 500 000 files per user (not saved !)**
- SCRATCHDIR
  - **20 TB and 2 000 000 files per user (purged filesystem !)**
- CCCSTOREDIR
  - target size between 1GB and TB per file
  - **max 100 000 files per user, no limitation in terms of amount of data**

ccc_quota :

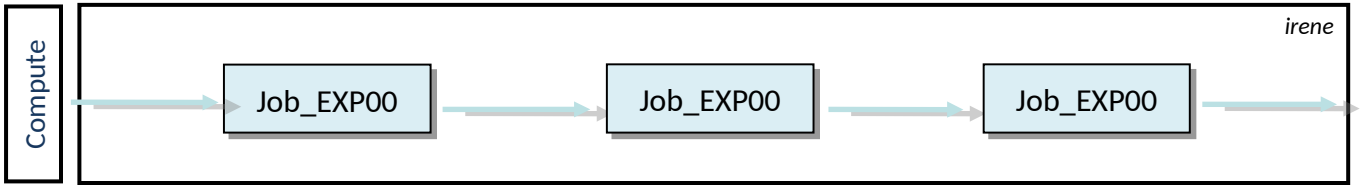
Disk quotas for user <login> (uid <uid>):

	SPACE				INODE			
Filesystem	usage	soft	hard	grace	entries	soft	hard	grace
home	253.01M	3G	3G	-	-	-	-	-
scratch	244.22G	20T	20T	-	291	2M	2M	-
store	-	-	-	-	1	100k	101k	-
work	8k	1T	1.1T	-	2	500k	501k	-

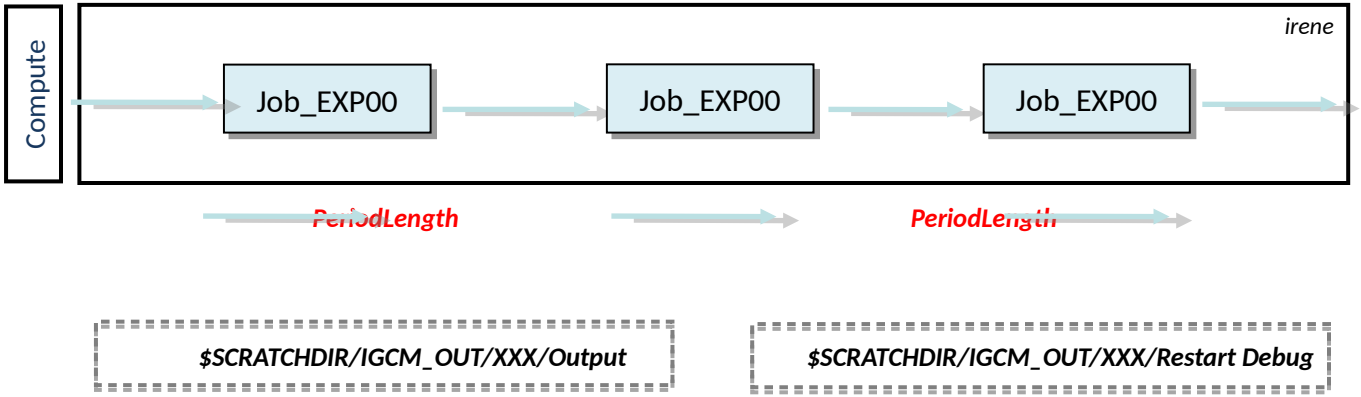
Account scoring:

Filesystem	volume(TB)	inodes	non_files	files<32M	files<1G	avg_fsize(MB)	score	score_detail
store	1.681	113	6.96%	1.85%	1.85%	22237	19/20	5/6, 7/7, 3/3, 4/4

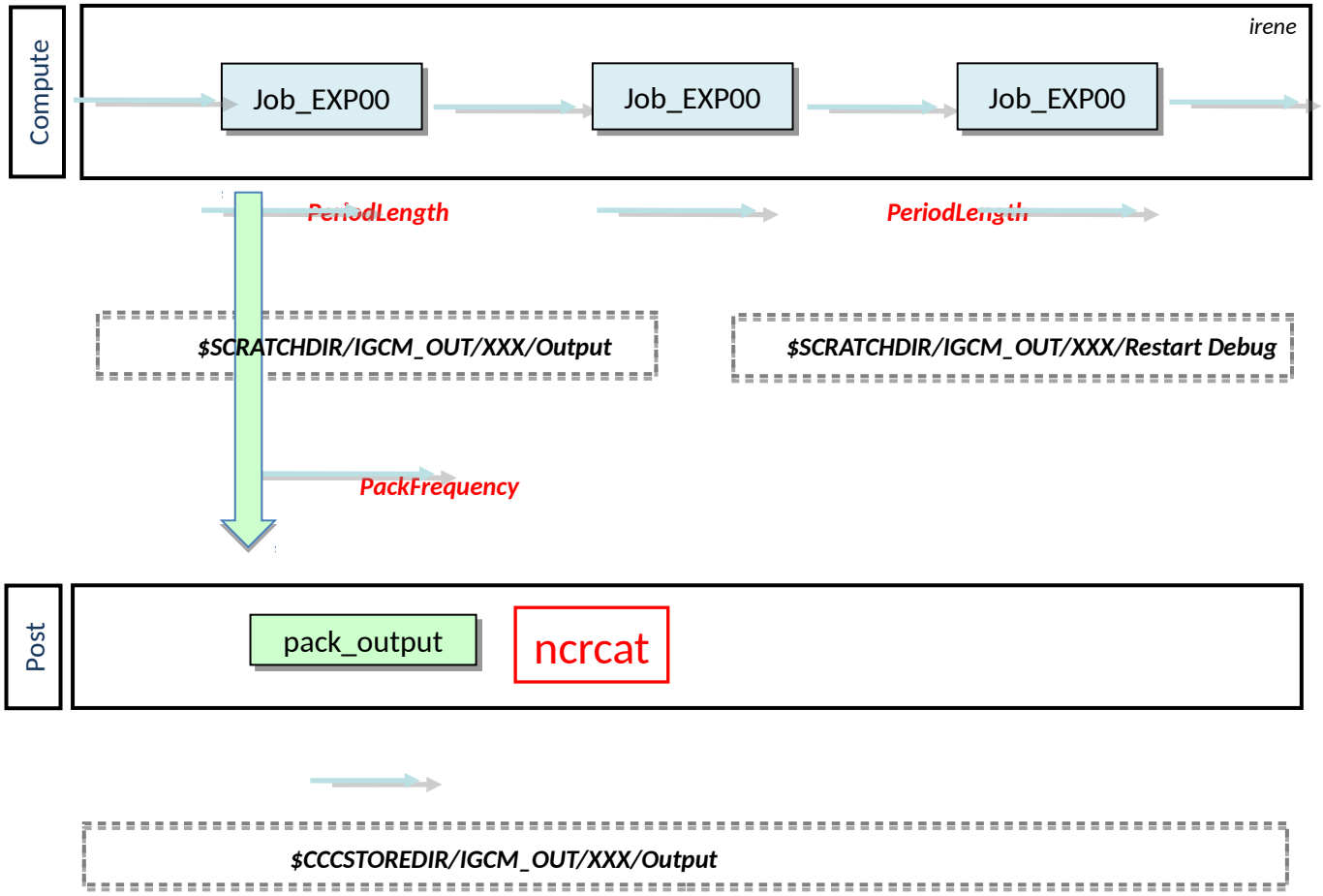
TGCC Production mode (PROD)



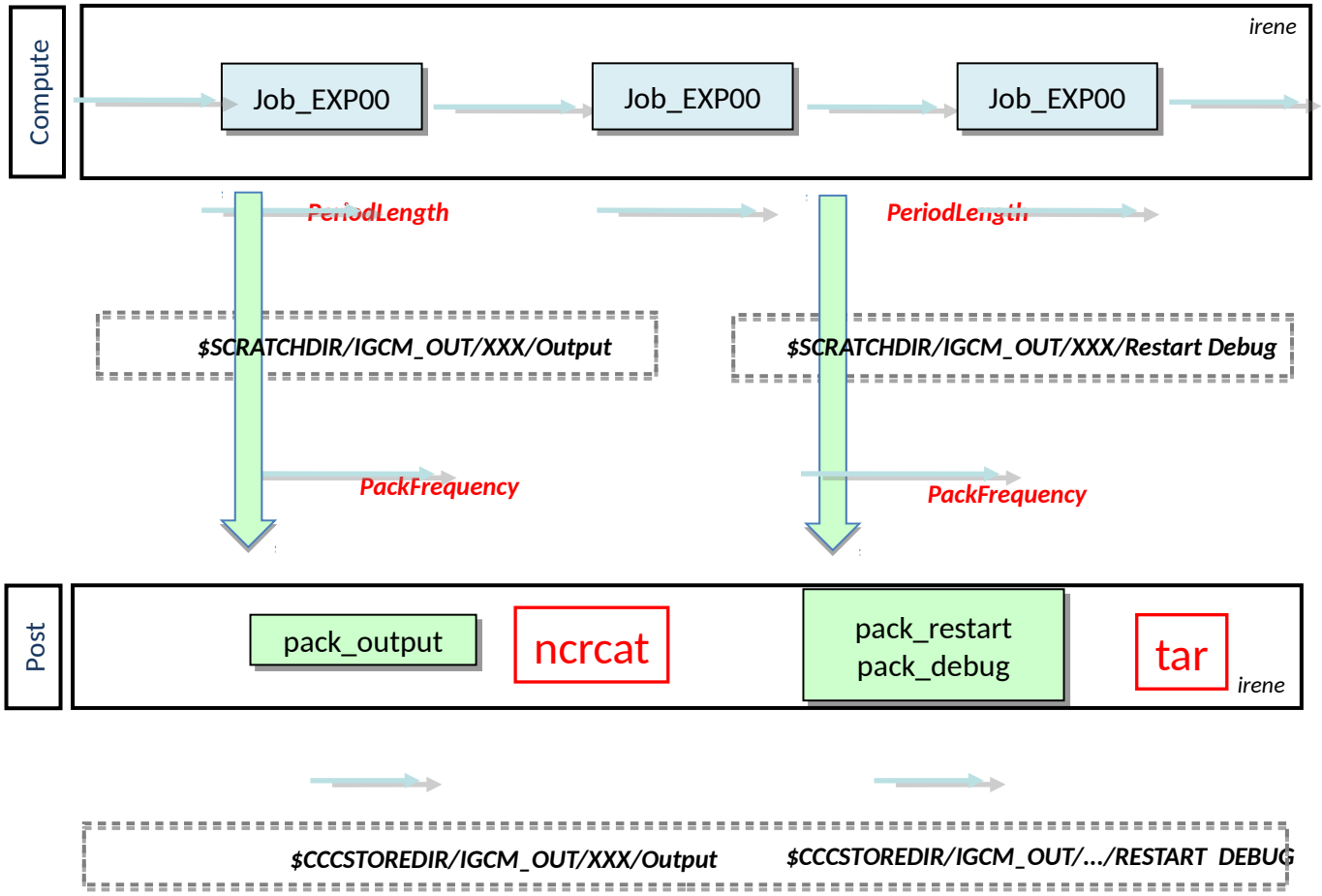
TGCC Production mode (PROD)



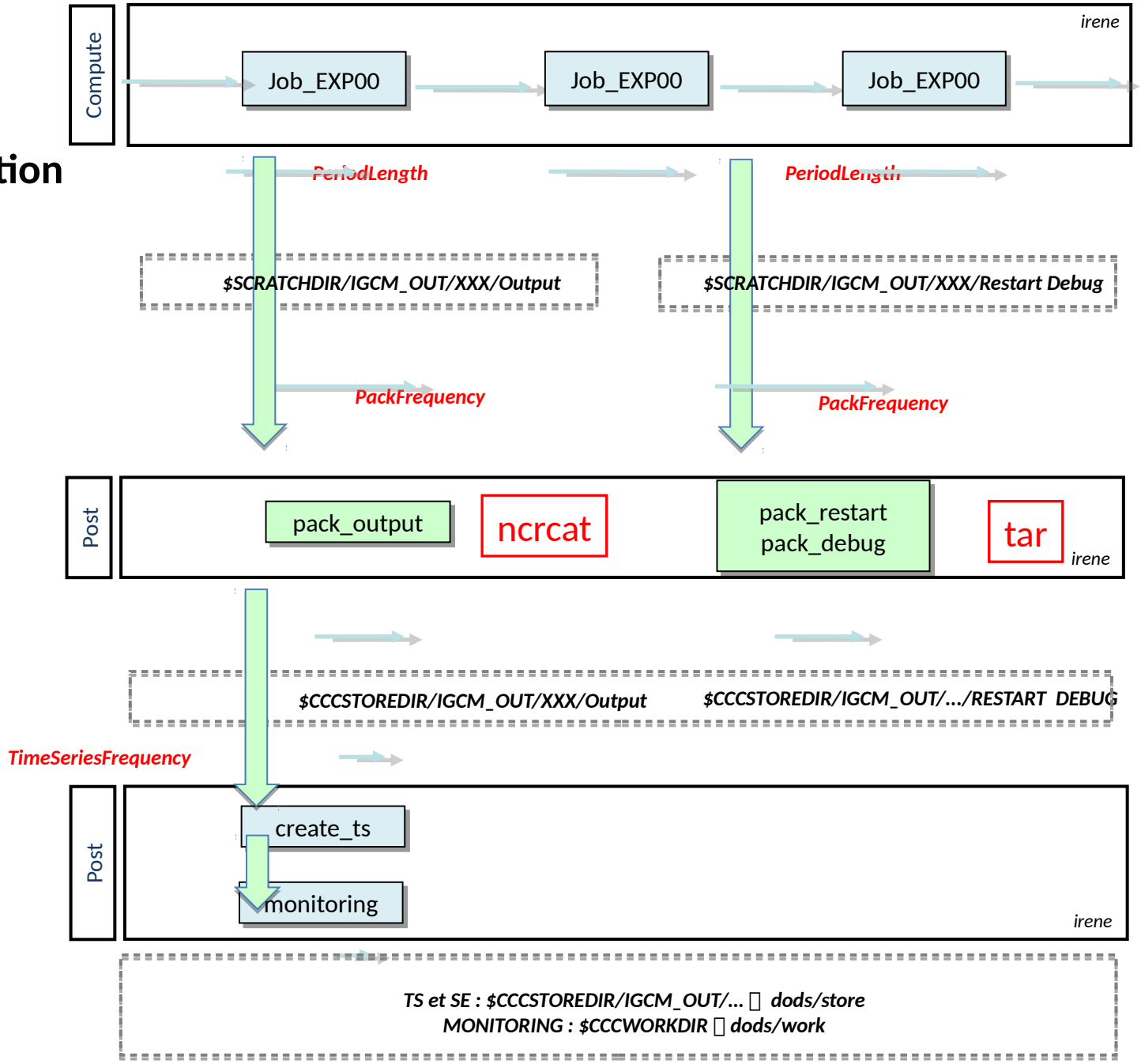
TGCC Production mode (PROD)



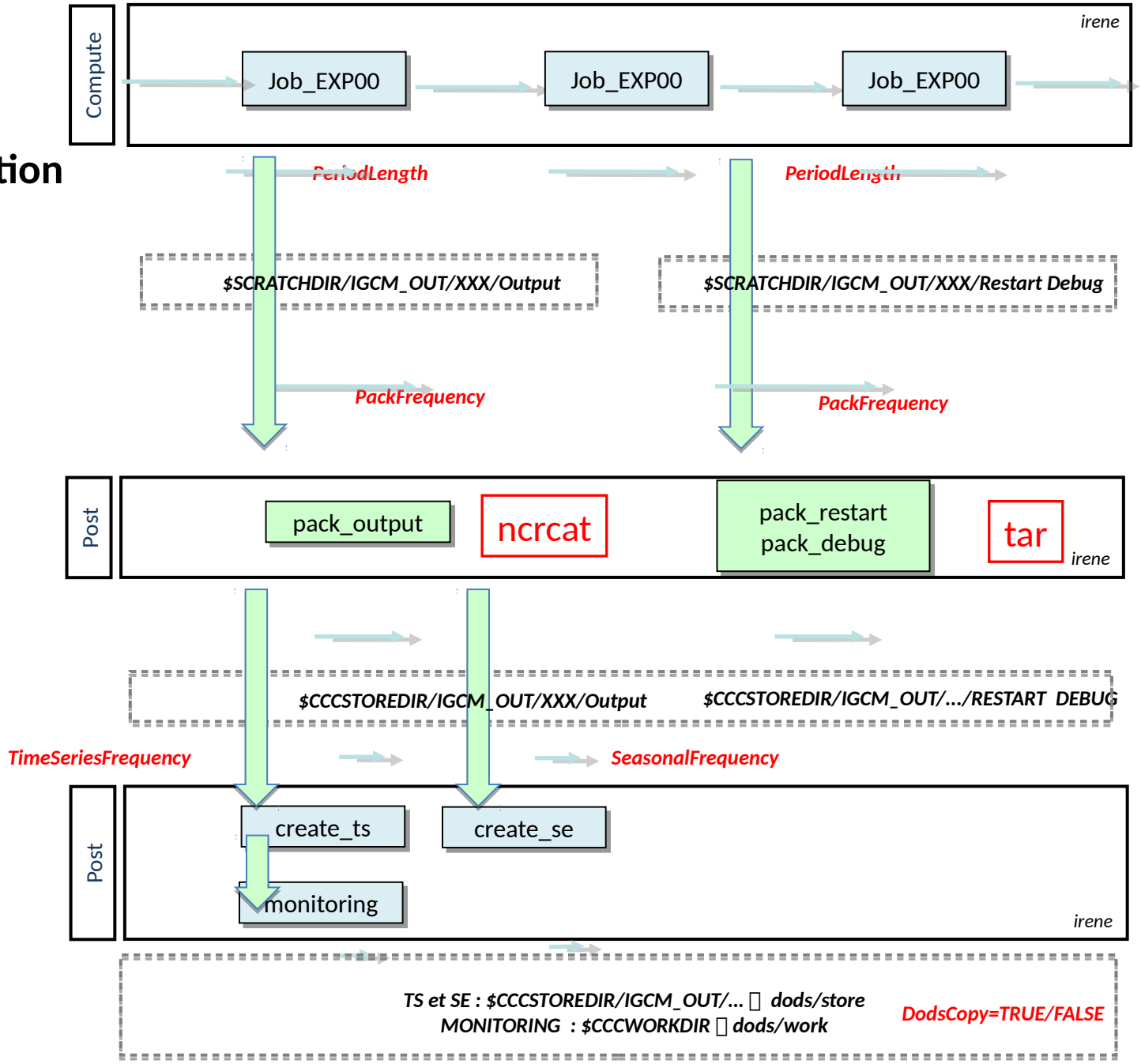
TGCC Production mode (PROD)



TGCC Production mode (PROD)

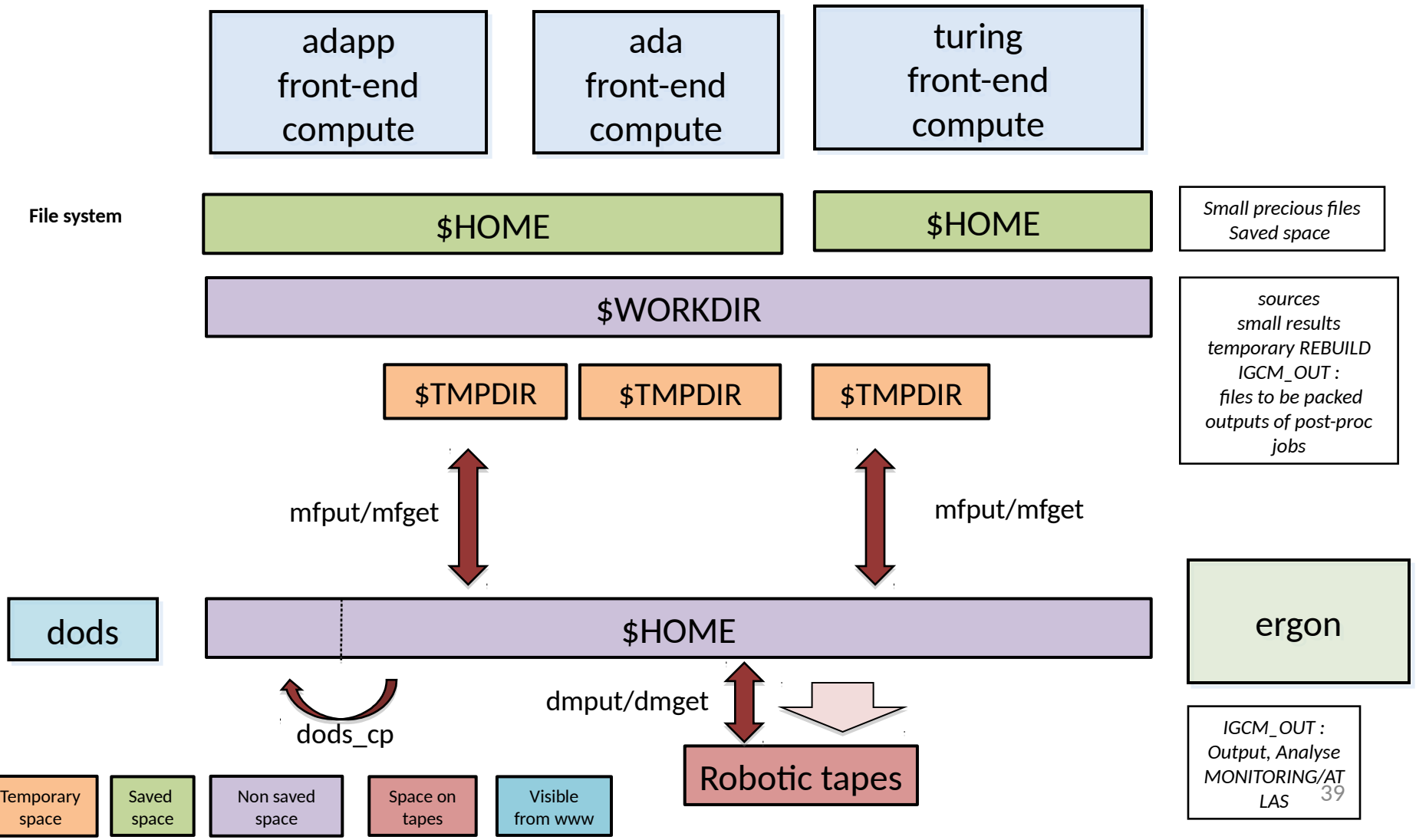


TGCC Production mode (PROD)



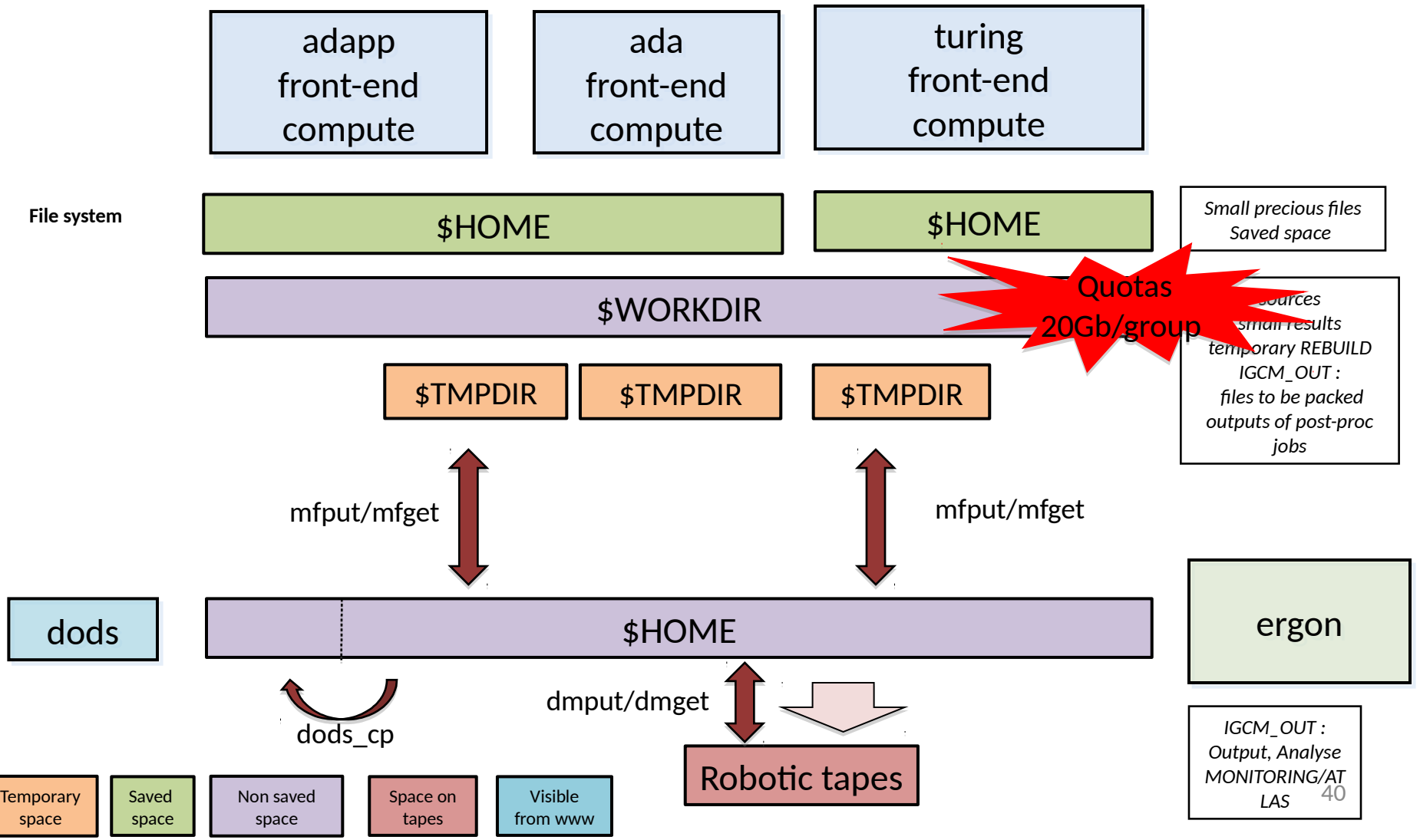
IDRIS computers and file system in a nutshell

http://www.idris.fr

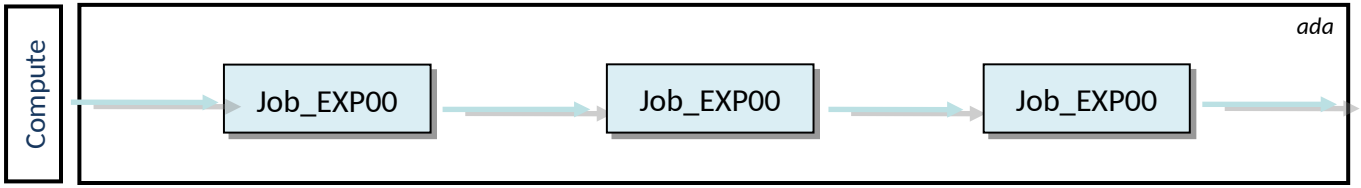


IDRIS computers and file system in a nutshell

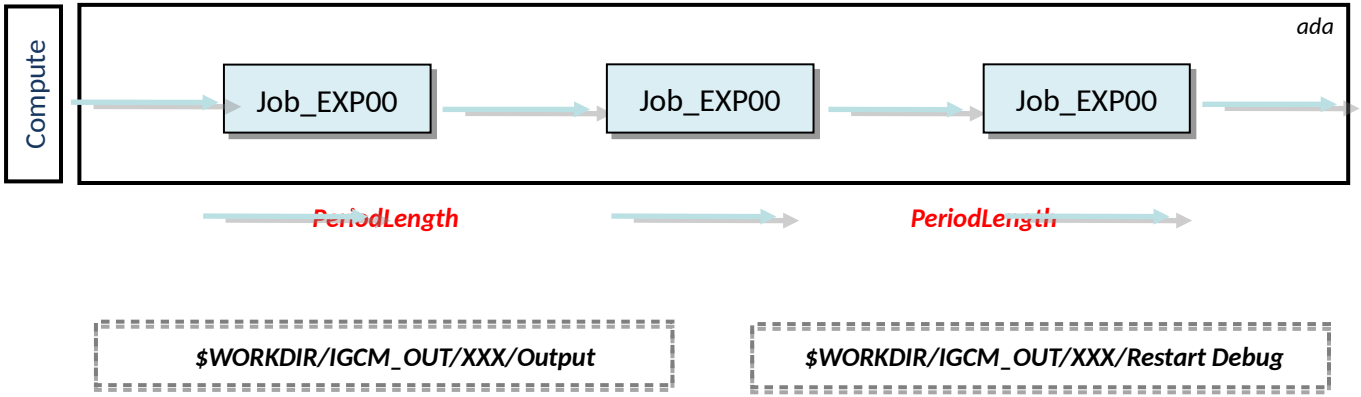
http://www.idris.fr



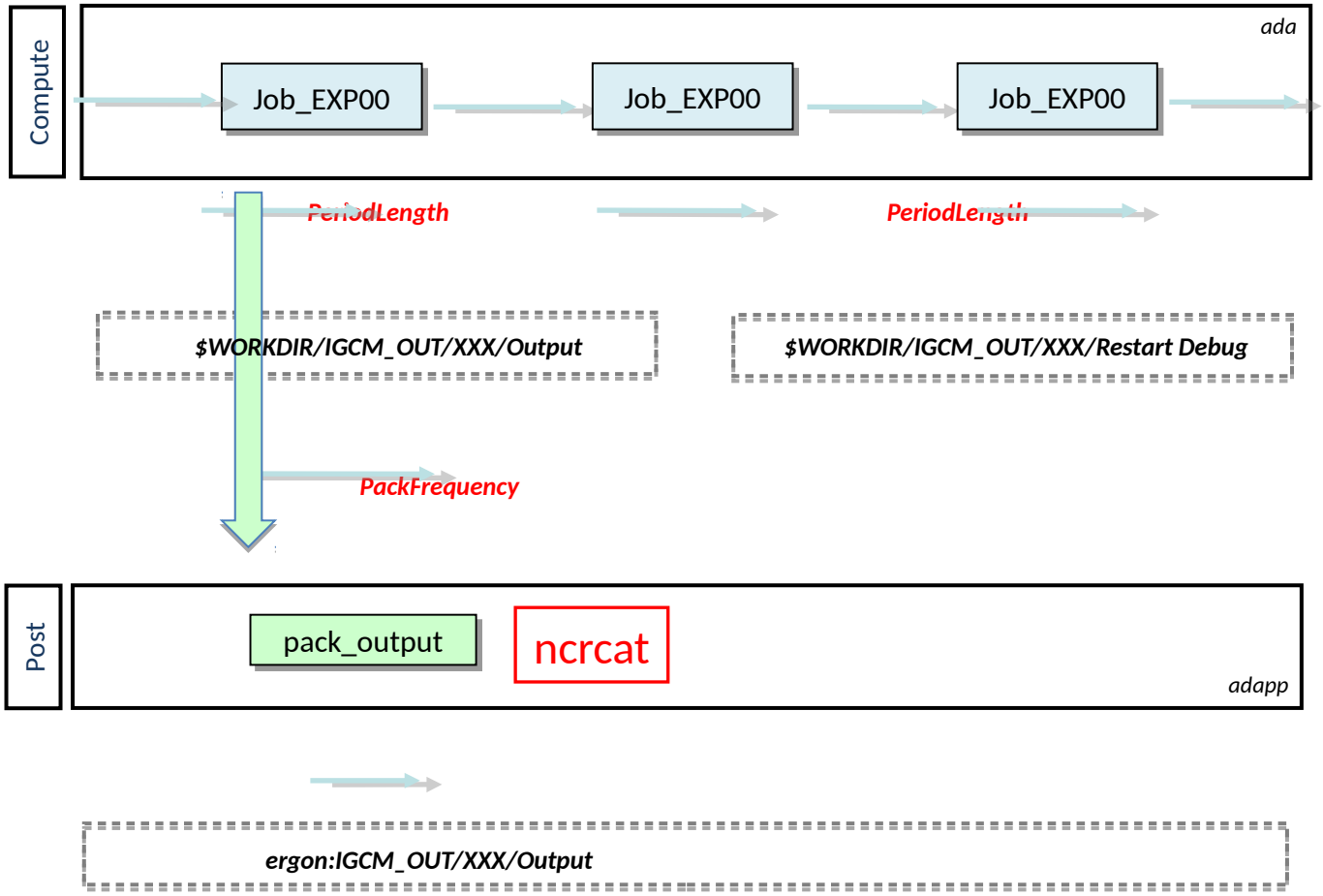
IDRIS Production mode (PROD)



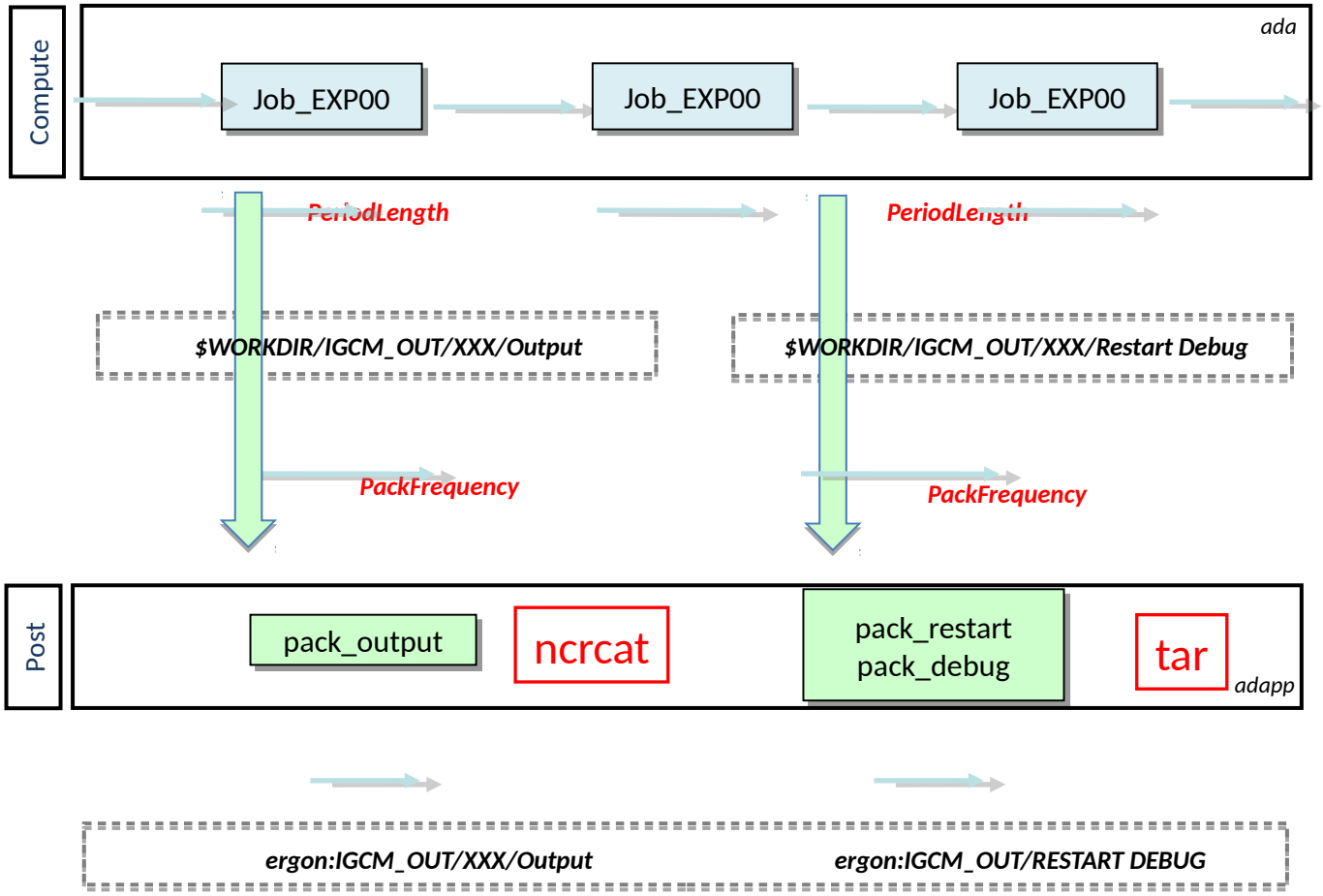
IDRIS Production mode (PROD)



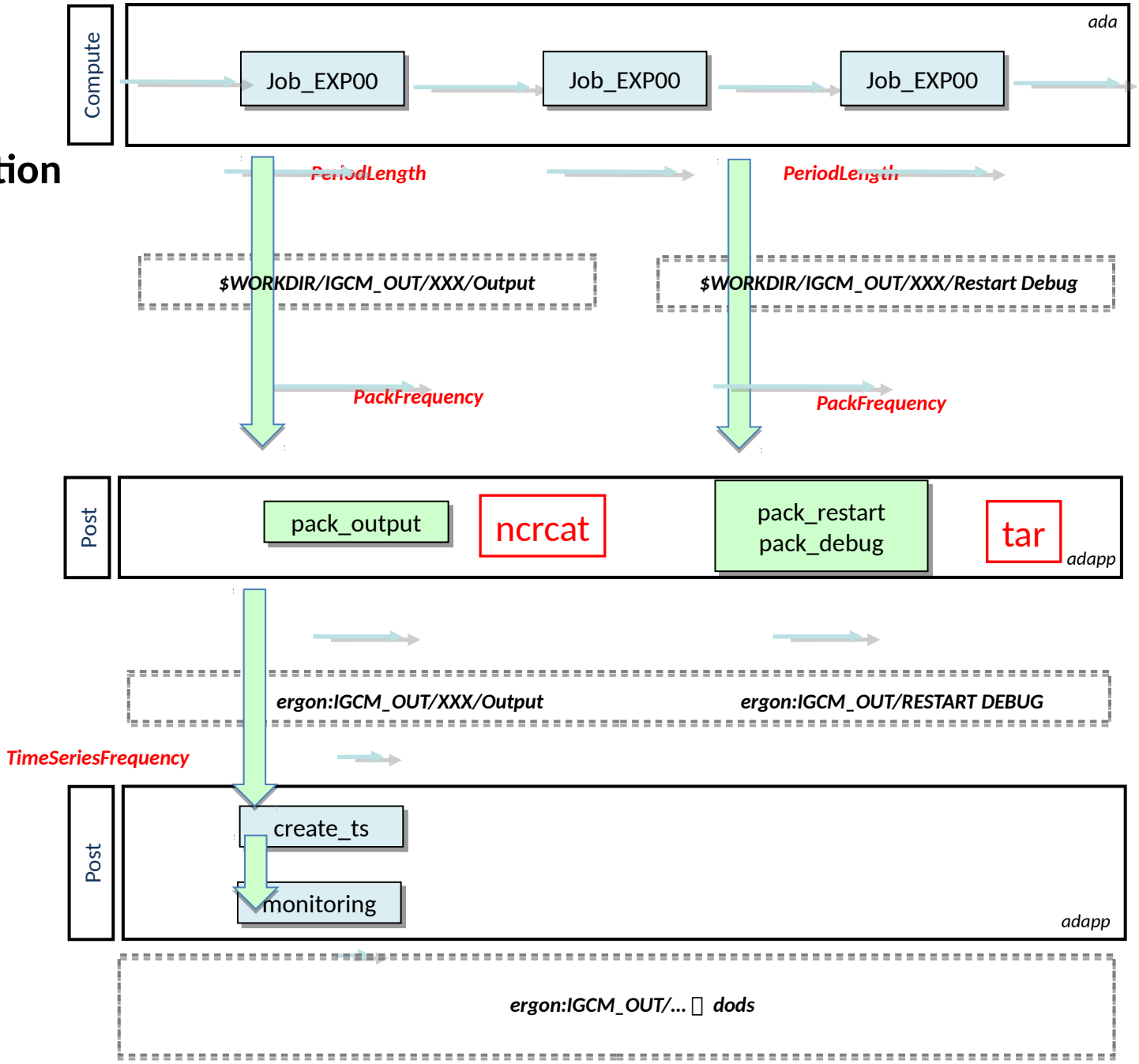
IDRIS Production mode (PROD)



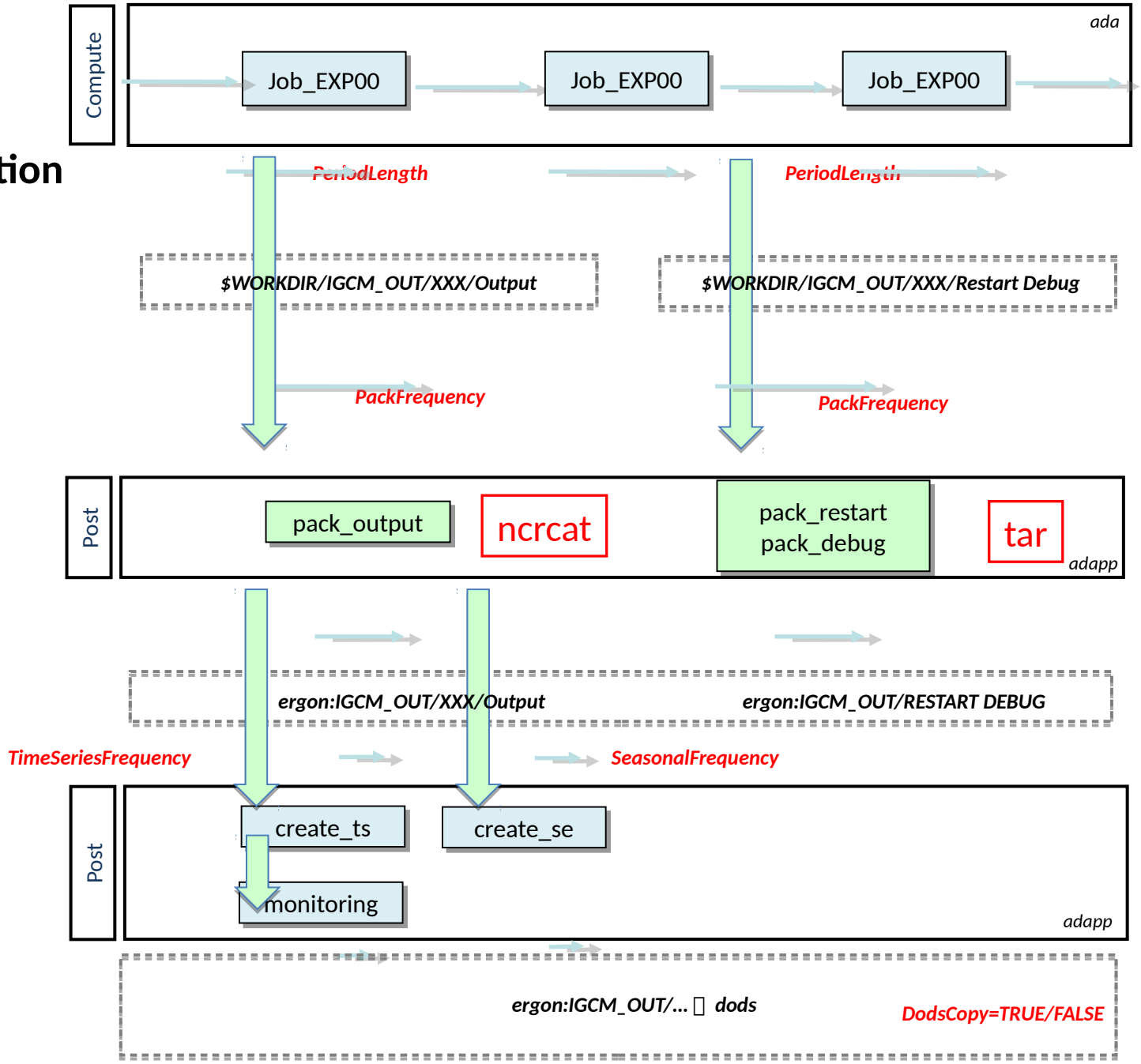
IDRIS Production mode (PROD)



IDRIS Production mode (PROD)



IDRIS Production mode (PROD)



Set pack frequencies

#D-- Post -
[**Post**]
(...)
#D- Do we pack restart and debug txt files, this flag determines
#D- frequency of pack submission (NONE if you are in TEST)
PackFrequency=10Y
#D- If you want to produce time series, this flag determines
#D- frequency of post-processing submission (NONE if you don't want)
TimeSeriesFrequency=10Y
#D- If you want to produce seasonal average, this flag determines
#D- the period of this average (NONE if you don't want)
SeasonalFrequency=10Y
#D- Offset for seasonal average first start dates ; same unit as SeasonalFrequency
#D- Usefull if you do not want to consider the first X simulation's years
SeasonalFrequencyOffset=0

Config.card

Outline

1. IPSL Earth System model within HPC context
2. I/O with libIGCM
3. Post-processing with libIGCM : Pack
4. **Post-processing with libIGCM : Time series**
5. Monitoring a simulation

Which post-processing could be done ?

There are several types of post-treatment managed by libIGCM :

TS (Time Series) → one file with one variable for all the simulation (list of variables is defined in COMP/model.card)

Monitoring → web-interface tool that visualizes the global mean over time for a set up of key variables

SE (Seasonal average) → files with monthly average over a period (typically 10 years) for all variables of the original output file

Atlas → collection of diagnostic plots (done with CliMAF).

Computing job

Post-processing jobs

PeriodLength , PeriodNb

Job_EXP00 → Job_EXP00 → Job_EXP00 → Job_EXP00

PackFrequency

pack_debug

PackFrequency

pack_restart

PackFrequency

pack_output

SeasonalFrequency

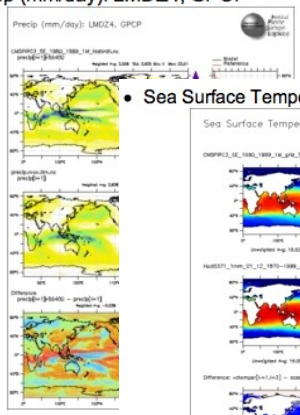
create_se

TimeSeriesFrequency

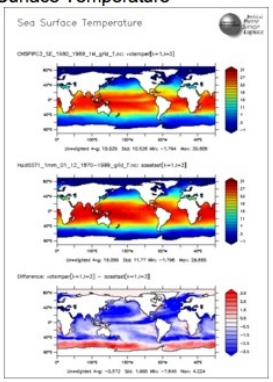
create_ts

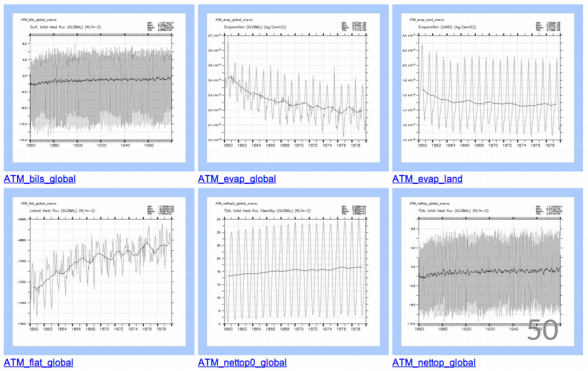
monitoring

- Precip (mm/day): LMDZ4, GPCP



- Sea Surface Temperature





Computing job

Post-processing jobs

PeriodLength , PeriodNb

Job_EXP00 → Job_EXP00 → Job_EXP00 → Job_EXP00

PackFrequency

pack_debug

PackFrequency

pack_restart

PackFrequency

pack_output

SeasonalFrequency

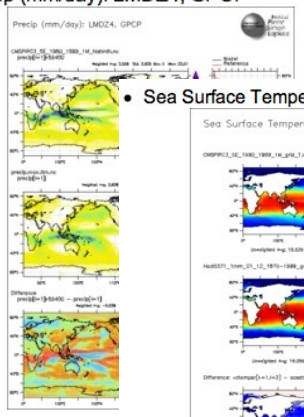
create_se

TimeSeriesFrequency

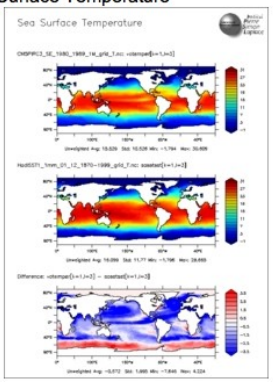
create_ts

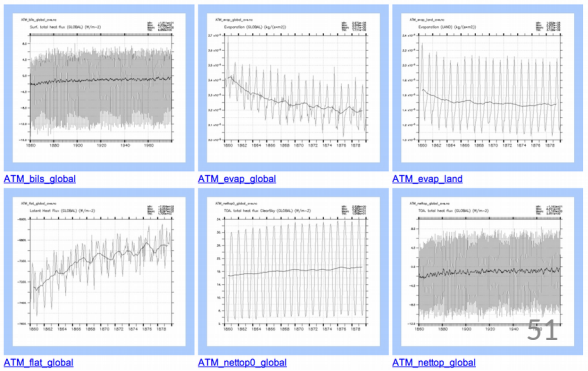
monitoring

- Precip (mm/day): LMDZ4, GPCP

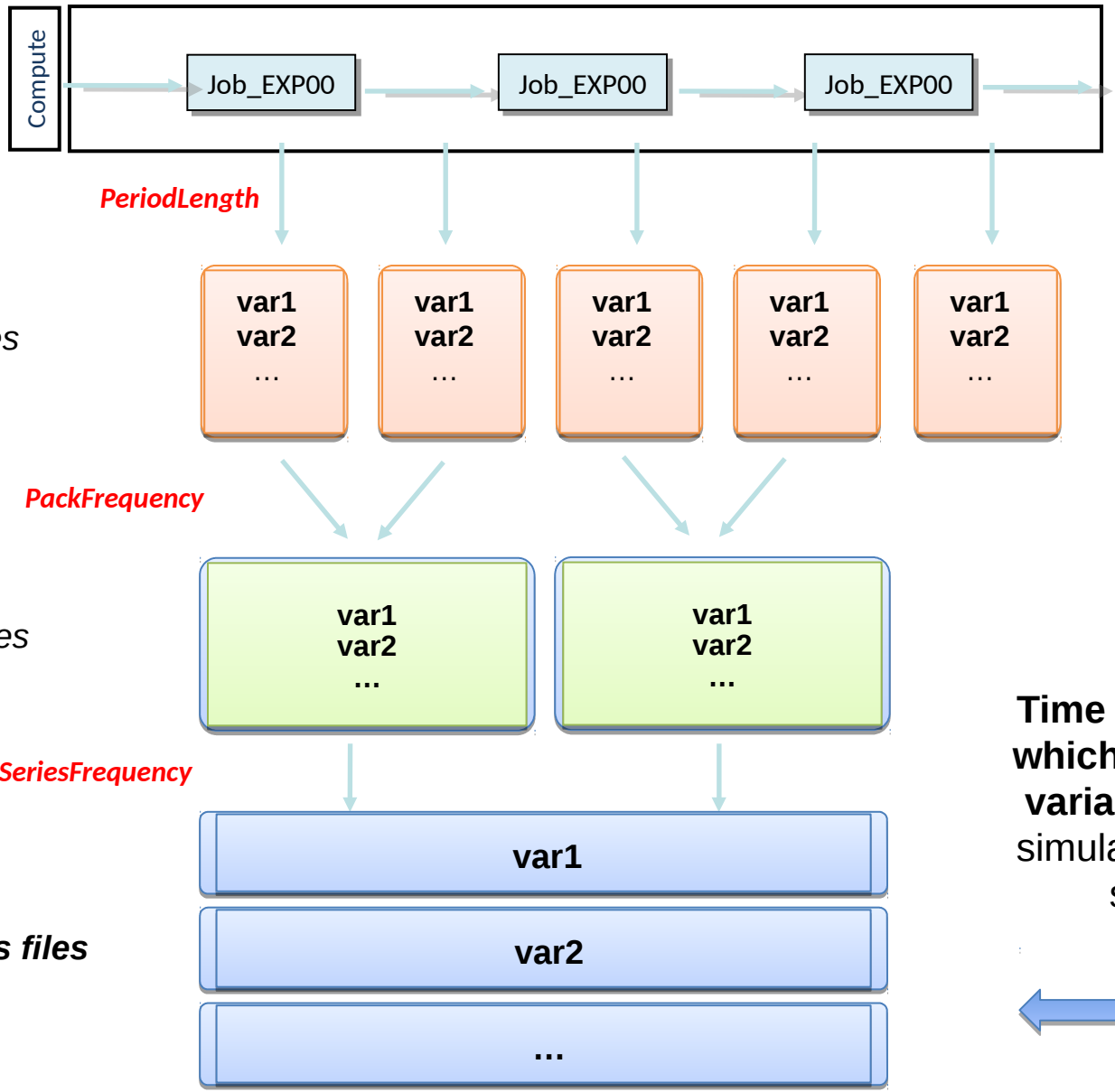


- Sea Surface Temperature





Time Series



Time Series file is a file which contains a single variable over the whole simulation period or for a shorter period

Time Series : create_ts.job

- A **Time Series is a file which contains a single variable** over the whole simulation period (**ChunckJob2D** = NONE) or for a shorter period for 2D (**ChunckJob2D** = 100Y) or 3D (**ChunckJob3D** = 50Y) variables.
- The write frequency is defined in the **config.card** file: **TimeSeriesFrequency=10Y** indicates that the time series will be written every 10 years and for 10-year periods.
- Lists of Time Series are set in the **COMP/*.card** files by the **TimeSeriesVars2D** and **TimeSeriesVars3D** options.
- The Time Series coming from monthly (or daily) output files are stored on the file server in the IGCM_OUT/TagName/[SpaceName]/[ExperimentName]/JobName/Composante/**Analyse/TS_MO** and **TS_DA** directories.
- **Bonus : TS_MO_YE** (for annual mean time series) are produced for all **TS_MO** variables
- **More information : http://forge.ipsl.jussieu.fr/igcmg_doc/wiki/DocFsimu#TimeSeries**

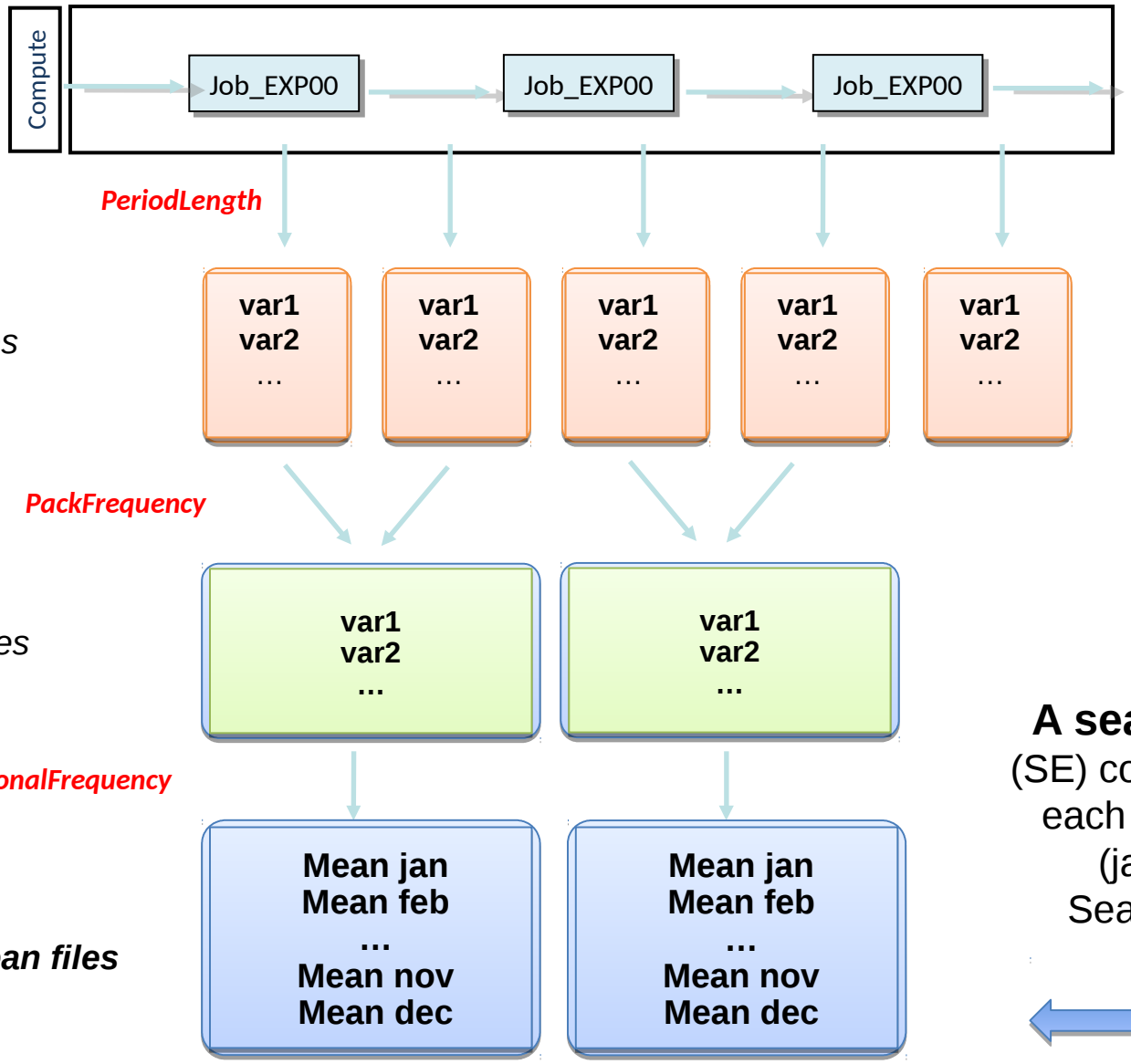
config.card

```
[Post]
...
#D- If you want to produce time series, this flag determines
#D- frequency of post-processing submission (NONE if you don't want)
TimeSeriesFrequency=10Y
```

COMP/lmdz.card

```
[OutputFiles]
List=   (histmth.nc,       ${R_OUT_ATM_O_M}/${PREFIX}_1M_histmth.nc,       Post_1M_histmth),\
...
[Post_1M_histmth]
Patches= ()
GatherWithInternal = (lon, lat, presnivs, time_counter, time_counter_bnds, aire)
TimeSeriesVars2D = (bils, cldh, ...
...
ChunckJob2D = NONE
TimeSeriesVars3D = (upwd, lwcon, ...
...
ChunckJob3D = 50Y
```

Seasonal mean



A seasonal mean file (SE) contains averages for each month of the year (jan, feb,...) for a SeasonalFrequency

Seasonal mean : create_se.job

- A seasonal means files (SE) contain averages for each month of the year (jan, feb,…) for a frequency defined in the **config.card** files
- **SeasonalFrequency=10Y** The seasonal means will be computed every 10 years.
- **SeasonalFrequencyOffset=0** The number of years to be skipped for calculating seasonal means.
- All files with a requested Post (**Seasonal=ON** in **COMP/*card**) are then averaged within the **ncra** script before being stored in the directory:
- **IGCM_OUT/IPSLCM5A/DEVT/pdControl/MyExp/ATM/Analyse/SE**. There is one file per SeasonalFrequency
- **More information: http://forge.ipsl.jussieu.fr/igcmg_doc/wiki/DocFsimu#Seasonalmeans**

config.card

```
#====================================================================
#D-- Post -
[Post]
...
#D- If you want to produce seasonal average, this flag determines
#D- the period of this average (NONE if you don't want)
SeasonalFrequency=10Y
#D- Offset for seasonal average first start dates ; same unit as SeasonalFrequency
#D- Usefull if you do not want to consider the first X simulation's years
SeasonalFrequencyOffset=0
```

COMP/lmdz.card

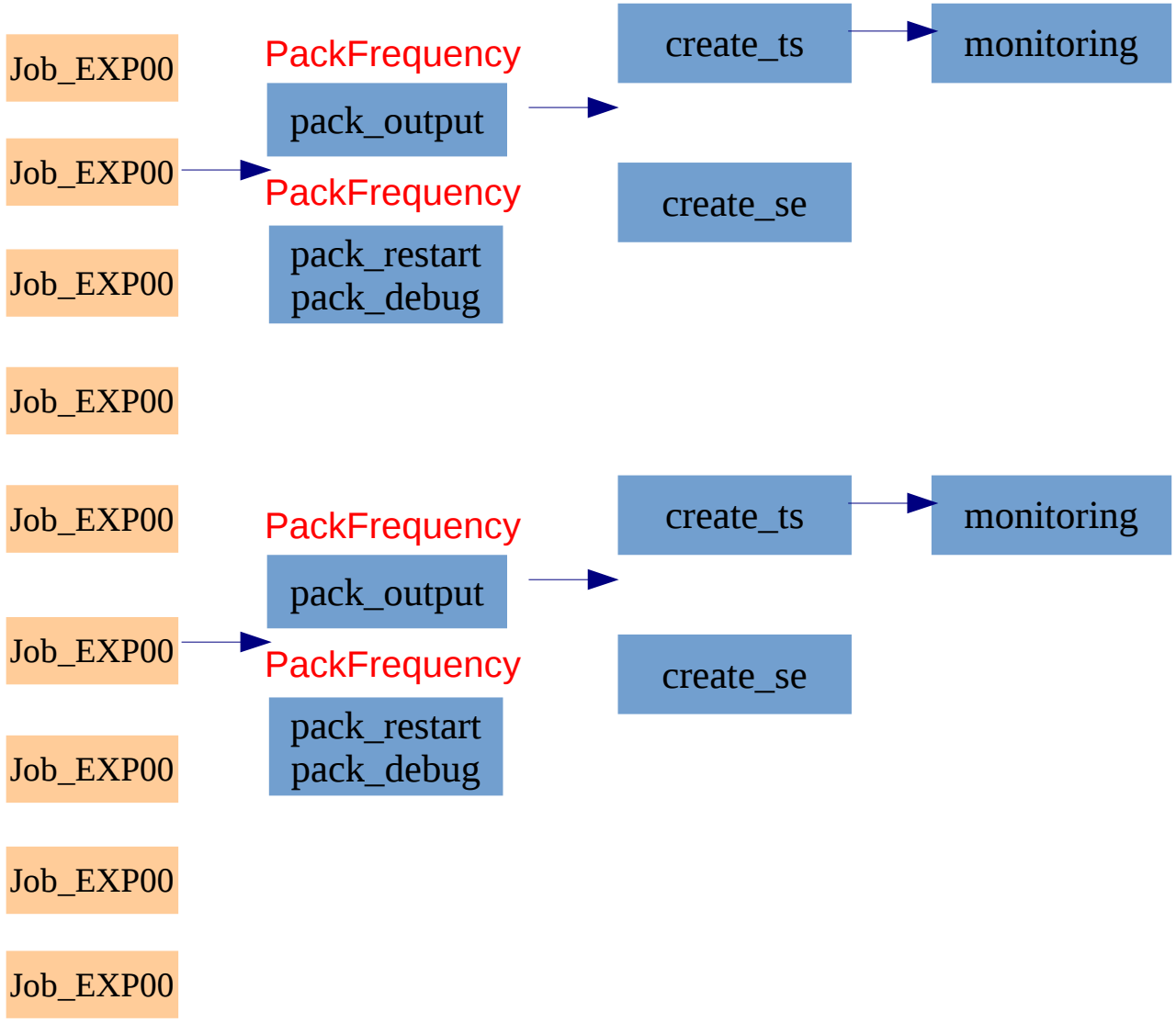
```
[OutputFiles]
List=(histmth.nc, ${R_OUT_ATM_O_M}/${PREFIX}_1M_histmth.nc, Post_1M_histmth),\
...
[Post_1M_histmth]
...
Seasonal=ON
```

Reminder : post-processing frequencies

```
#D-- Post -
[Post]
(...)
#D- Do we pack restart and debug txt files, this flag determines
#D- frequency of pack submission (NONE if you are in TEST)
PackFrequency=10Y
#D- If you want to produce time series, this flag determines
#D- frequency of post-processing submission (NONE if you don't want)
TimeSeriesFrequency=10Y
#D- If you want to produce seasonal average, this flag determines
#D- the period of this average (NONE if you don't want)
SeasonalFrequency=10Y
#D- Offset for seasonal average first start dates ; same unit as SeasonalFrequency
#D- Usefull if you do not want to consider the first X simulation's years
SeasonalFrequencyOffset=0
```

Config.card

Jobs succession during a simulation



Outline

1. IPSL Earth System model within HPC context
2. I/O with libIGCM
3. Post-processing with libIGCM : Pack
4. Post-processing with libIGCM : Time series
5. **Monitoring a simulation**

https://hermes.ipsl.upmc.fr

2016-11-22T13:43:09 :: POST PROCESSING JOB COMPLETED :: RUNSTan is RUNNING Simulations: Total = 9863; Filtered = 10.

Start Date: < 2 months | Acc. Project: * | Machine: * | Login: p86denv
Tag / Model: * | Experiment: * | Space: * | State: *

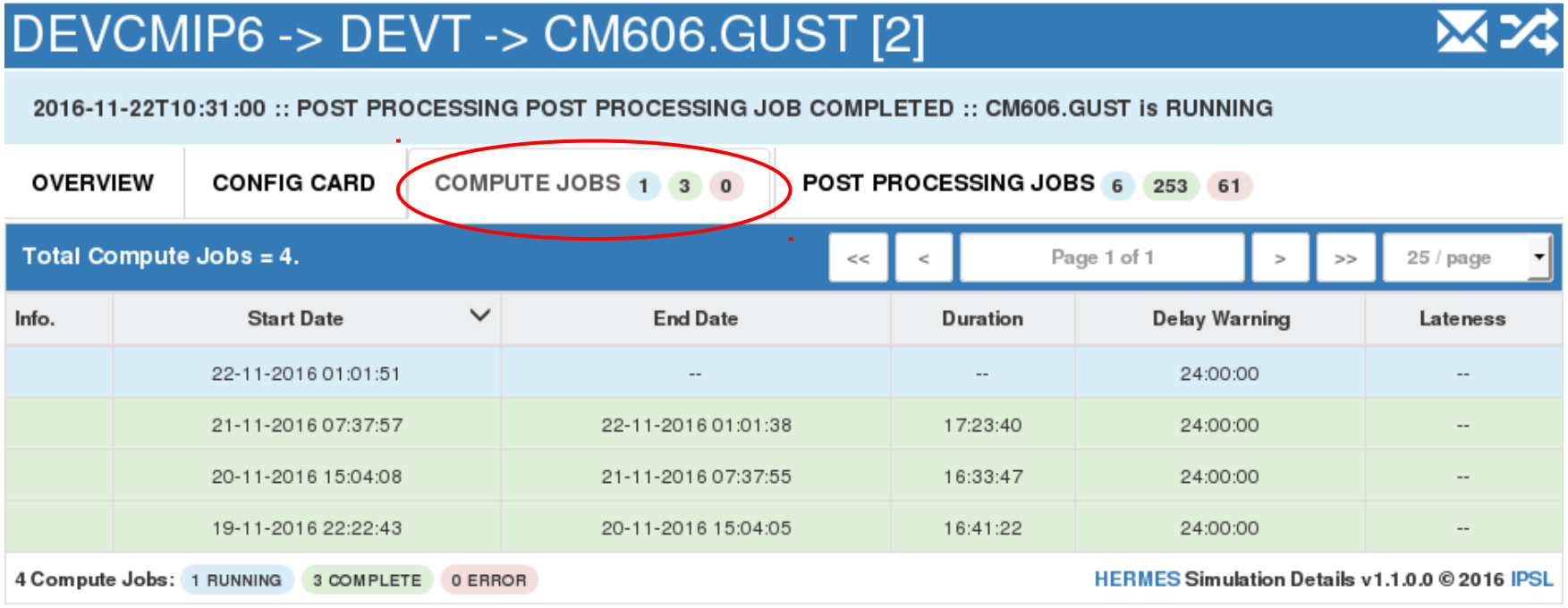
Filter by name: | << | < | Page 1 of 1 | > | >> | 25 / page | Permalink

Acc. Project	Name	Try	Jobs (C)	Jobs (PP)	Machine	Login	Tag / Model	Experiment	Space	Output Date Range	%	M	IM
devcmip6	CM605-malbice058-pdCtrl	1	0 | 11 | 2	0 | 86 | 3	TGCC-CURIE	p86denv	IPSLCM6	pdControl	PROD	01-01-1950 - 31-12-2149	28	M	☐
devcmip6	CM605-tglacemin253-pdCtrl	1	1 | 10 | 1	0 | 103 | 2	TGCC-CURIE	p86denv	IPSLCM6	pdControl	PROD	01-01-2200 - 31-12-2399	29	M	☐
devcmip6	CM605-pstar10e3-pdCtrl	1	0 | 8 | 4	0 | 103 | 2	TGCC-CURIE	p86denv	IPSLCM6	pdControl	PROD	01-01-1950 - 31-12-2149	26	M	☐
devcmip6	CM606-OZ-LR-sstClim-01	1	0 | 20 | 0	0 | 120 | 49	TGCC-CURIE	p86denv	IPSLCM6	clim	PROD	01-01-1980 - 31-12-2079	100	--	--
devcmip6	CM605.SUN-OZ-LR-amip-05	1	0 | 12 | 0	0 | 78 | 18	TGCC-CURIE	p86denv	IPSLCM6	amip	PROD	01-01-1950 - 31-12-2009	100	M	☐
devcmip6	CM605.SUN-OZ-LR-amip-04	1	0 | 12 | 0	0 | 78 | 18	TGCC-CURIE	p86denv	IPSLCM6	amip	PROD	01-01-1950 - 31-12-2009	100	M	☐
devcmip6	CM605.SUN-OZ-LR-amip-03	1	0 | 12 | 0	0 | 77 | 19	TGCC-CURIE	p86denv	IPSLCM6	amip	PROD	01-01-1950 - 31-12-2009	100	M	☐
devcmip6	CM605.SUN-OZ-LR-amip-02	1	0 | 12 | 0	0 | 77 | 19	TGCC-CURIE	p86denv	IPSLCM6	amip	PROD	01-01-1950 - 31-12-2009	100	M	☐
devcmip6	CM605.SUN-OZ-LR-amip-01	1	0 | 12 | 0	0 | 78 | 18	TGCC-CURIE	p86denv	IPSLCM6	amip	PROD	01-01-1950 - 31-12-2009	100	M	☐
devcmip6	CM605-OZ-LR-sstClim-01	1	0 | 20 | 0	0 | 139 | 31	TGCC-CURIE	p86denv	IPSLCM6	clim	PROD	01-01-1980 - 31-12-2079	100	M	☐

QUEUED | RUNNING | COMPLETE | ERROR | M = Monitoring | IM = Inter-Monitoring

HERMES Simulation Monitoring v1.1.0.0 © 2016 IPSL

https://hermes.ipsl.upmc.fr



https://hermes.ipsl.upmc.fr

DEVCMIP6 -> TEST -> LMDZOR02 [3]

Awaiting simulation events ...

OVERVIEW | CONFIG CARD | COMPUTE JOBS 0 12 0 | POST PROCESSING JOBS 0 4 2

Total Post Processing Jobs = 6. << < Page 1 of 1 > >> 25 / page

Info.	Start Date	End Date	Duration	Delay Warning	Lateness
monitoring.1980-12-30	20-11-2016 17:30:10	20-11-2016 17:30:55	00:00:44	04:00:00	--
monitoring.1980-12-30	20-11-2016 17:27:37	20-11-2016 17:28:09	00:00:32	04:00:00	--
create_ts.1980-12-30.ATM.Post_1M_histmth	20-11-2016 17:26:11	20-11-2016 17:36:50	00:10:39	22:13:20	--
create_ts.1980-12-30.3D	20-11-2016 17:26:05	20-11-2016 17:27:34	00:01:29	22:13:20	--
create_ts.1980-12-30.ATM.Post_1M_histmth	20-11-2016 17:26:01	20-11-2016 17:53:40	00:27:38	22:13:20	--
create_ts.1980-12-30.2D	20-11-2016 17:25:57	20-11-2016 17:30:07	00:04:10	22:13:20	--

6 Post Processing Jobs: 0 RUNNING 4 COMPLETE 2 ERROR

HERMES Simulation Details v1.1.0.0 © 2016 IPSL

If the simulation crash : your best friend

grep ERROR output.file.txt

2016-11-21 19:24:56 --Debug1--> --Error--> IGCM_card_DefineArrayFromOption /ccc/cont003/home/gencmip6/p86denv/IPSLCM6.0.5-LR/config/IPSLCM6/CM605-pstar10e3-pdCtrl/COMP/lmdz.card

2016-11-21 19:24:56 --Debug1--> OutputText

2016-11-21 19:24:56 --Debug1--> List

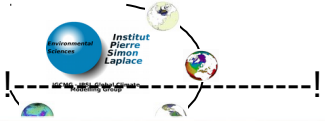
2016-11-21 19:24:56 --Debug1--> /ccc/cont003/home/gencmip6/p86denv/IPSLCM6.0.5-LR/config/IPSLCM6/CM605-pstar10e3-pdCtrl/COMP/lmdz.card is not readable

IGCM_debug_Exit : IGCM_card_DefineArrayFromOption

!!!!!!!!!!!!!!!!!!!!!!!!!!

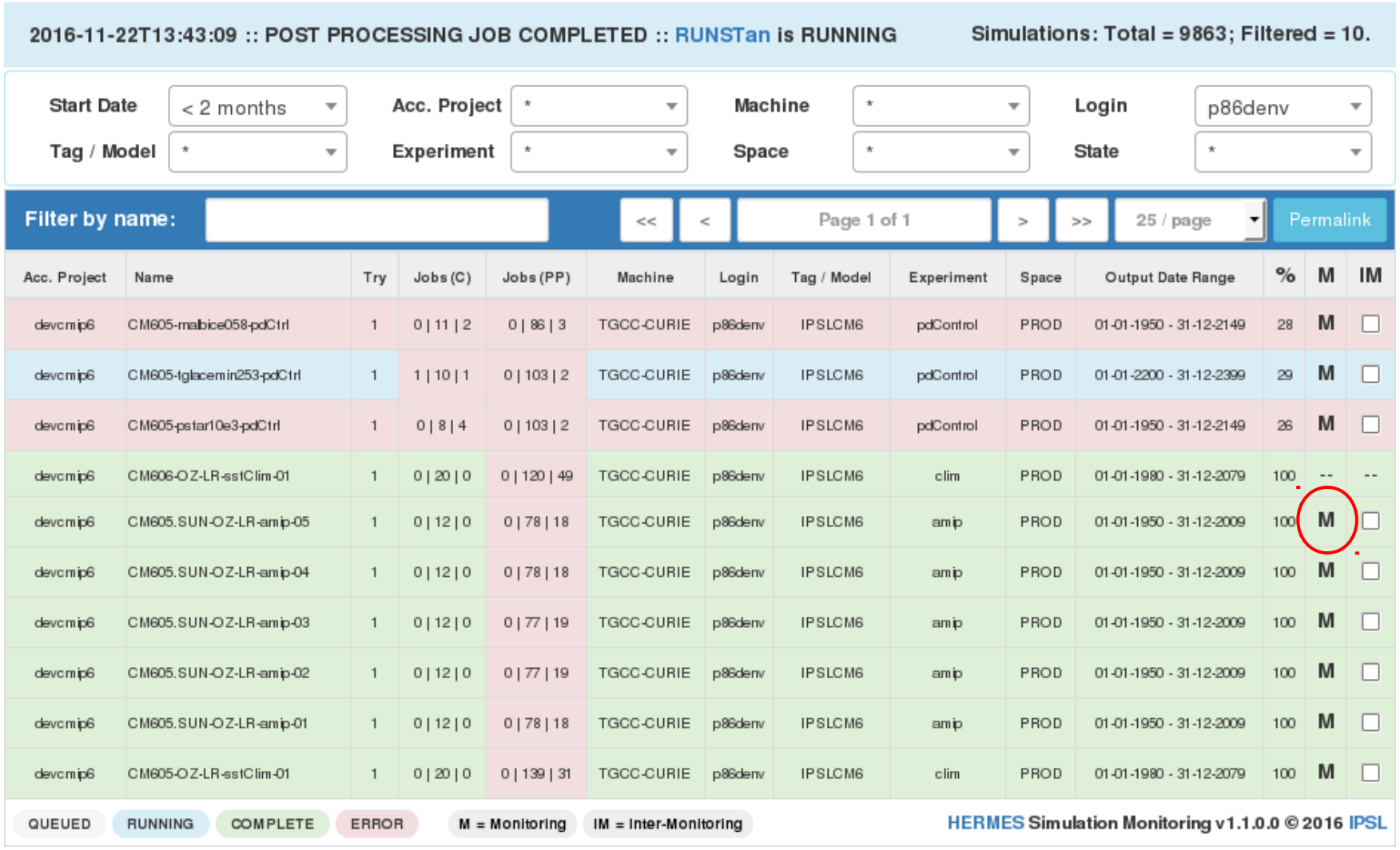
!! ERROR TRIGGERED !!

!! EXIT FLAG SET !!



!----------!

Monitoring



Acc. Project	Name	Try	Jobs (C)	Jobs (PP)	Machine	Login	Tag / Model	Experiment	Space	Output Date Range	%	M	IM
devcmip6	CM605-malbice058-pdCtrl	1	0 | 11 | 2	0 | 86 | 3	TGCC-CURIE	p86denv	IPSLCM6	pdControl	PROD	01-01-1950 - 31-12-2149	28	M	
devcmip6	CM605-tglacemin253-pdCtrl	1	1 | 10 | 1	0 | 103 | 2	TGCC-CURIE	p86denv	IPSLCM6	pdControl	PROD	01-01-2200 - 31-12-2399	29	M	
devcmip6	CM605-pstar10e3-pdCtrl	1	0 | 8 | 4	0 | 103 | 2	TGCC-CURIE	p86denv	IPSLCM6	pdControl	PROD	01-01-1950 - 31-12-2149	26	M	
devcmip6	CM606-OZ-LR-sstClim-01	1	0 | 20 | 0	0 | 120 | 49	TGCC-CURIE	p86denv	IPSLCM6	clim	PROD	01-01-1980 - 31-12-2079	100	--	--
devcmip6	CM605.SUN-OZ-LR-amip-05	1	0 | 12 | 0	0 | 78 | 18	TGCC-CURIE	p86denv	IPSLCM6	amip	PROD	01-01-1950 - 31-12-2009	100	M	
devcmip6	CM605.SUN-OZ-LR-amip-04	1	0 | 12 | 0	0 | 78 | 18	TGCC-CURIE	p86denv	IPSLCM6	amip	PROD	01-01-1950 - 31-12-2009	100	M	
devcmip6	CM605.SUN-OZ-LR-amip-03	1	0 | 12 | 0	0 | 77 | 19	TGCC-CURIE	p86denv	IPSLCM6	amip	PROD	01-01-1950 - 31-12-2009	100	M	
devcmip6	CM605.SUN-OZ-LR-amip-02	1	0 | 12 | 0	0 | 77 | 19	TGCC-CURIE	p86denv	IPSLCM6	amip	PROD	01-01-1950 - 31-12-2009	100	M	
devcmip6	CM605.SUN-OZ-LR-amip-01	1	0 | 12 | 0	0 | 78 | 18	TGCC-CURIE	p86denv	IPSLCM6	amip	PROD	01-01-1950 - 31-12-2009	100	M	
devcmip6	CM605-OZ-LR-sstClim-01	1	0 | 20 | 0	0 | 139 | 31	TGCC-CURIE	p86denv	IPSLCM6	clim	PROD	01-01-1980 - 31-12-2079	100	M	

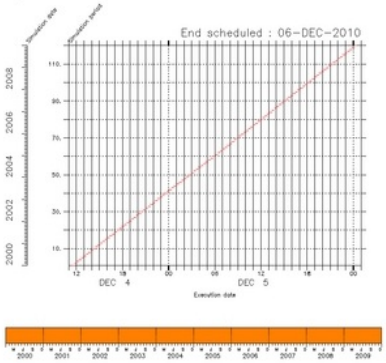
Monitoring

BAL1210 monitoring

at 2010-12-06 05:38:15

Cards Analysis | Monitoring Board | About

- Progress of the simulation



- Simulation date summary

CalendarType	DateBegin	DateEnd
noleap	2000-01-01	2009-12-31

- Real Cpu time summary

min	max	average
967.67	1086.38	1050.64

- User Cpu time summary

min	max	average
0.94	3.28	1.20

BAL1210 monitoring

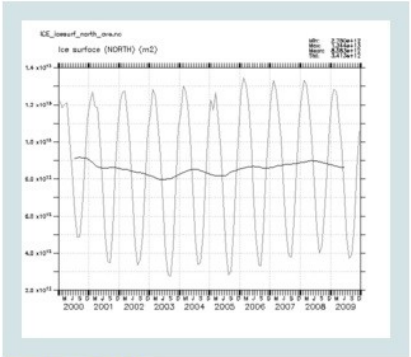
at 2010-12-06 05:38:15

Cards Analysis | Monitoring Board | About

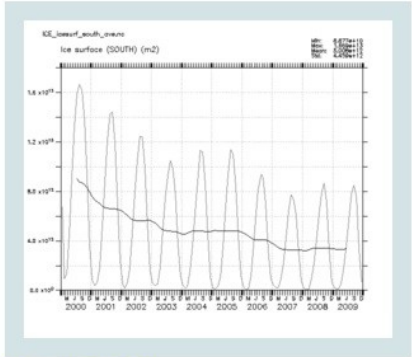
ALL | **Filter :** ICE | **Images :** 010 / 067

ATM | CHM | ICE | MBG | OCE | SBG | SRF | XOR | CLR

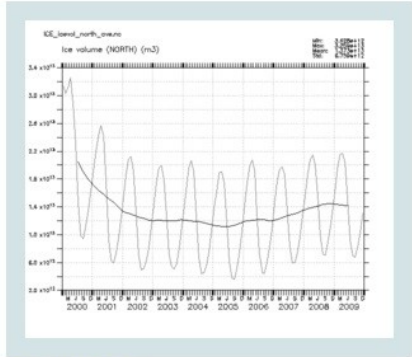
land | ocean | north | south | global



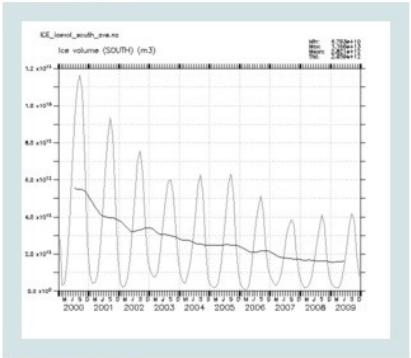
ICE_icesurf_north



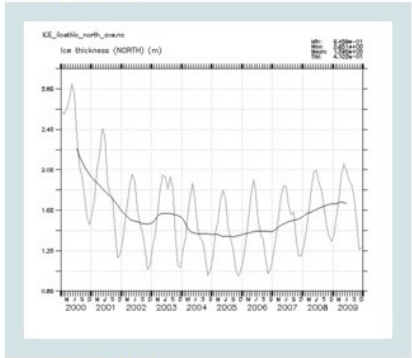
ICE_icesurf_south



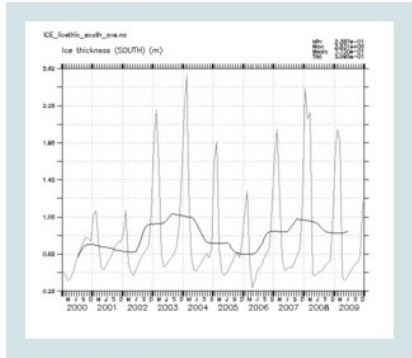
ICE_icevol_north



ICE_icevol_south



ICE_iicethic_north



ICE_iicethic_south

How to add a new variable in MONITORING

- Default monitoring configuration file for each component :

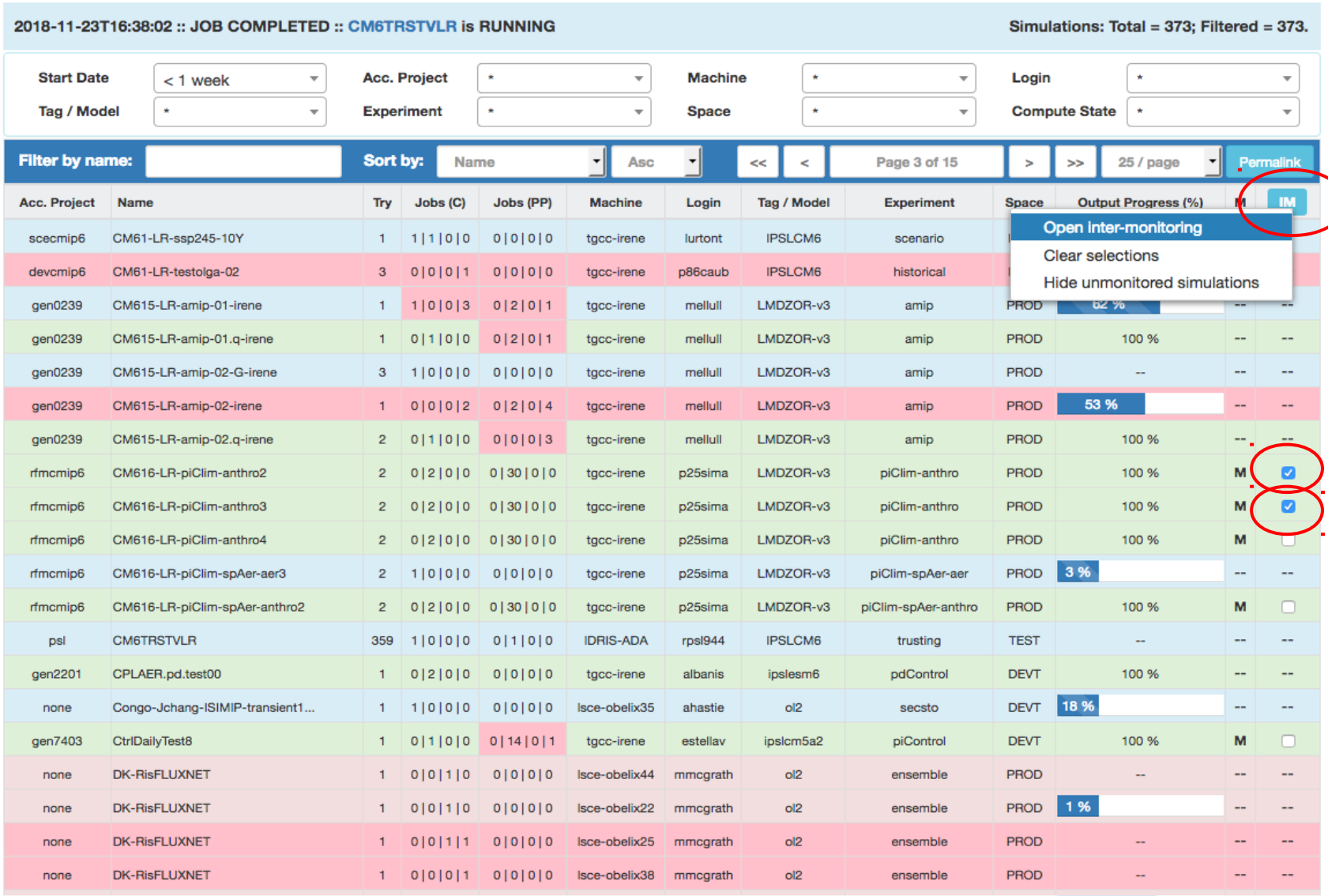
*For example for LMDZ on **irene** : <sim_path>/POST/monitoring01_lmdz_LMD9695.cfg*
*For example for LMDZ on **adapp** : ~rpsl035/atlas/monitoring01_lmdz_LMD9695.cfg*

- You can change the monitoring by creating/modifying a POST directory which is part of your configuration. Copy a .cfg file and change it the way you want (add or modify a variable)
- use ferret language
- You can monitor variables produced in time series and stored in TS_MO
- **More information : http://forge.ipsl.jussieu.fr/igcmg_doc/wiki/DocFsimu#Monitoring**

POST/monitoring01_lmdz_LMD9695.cfg

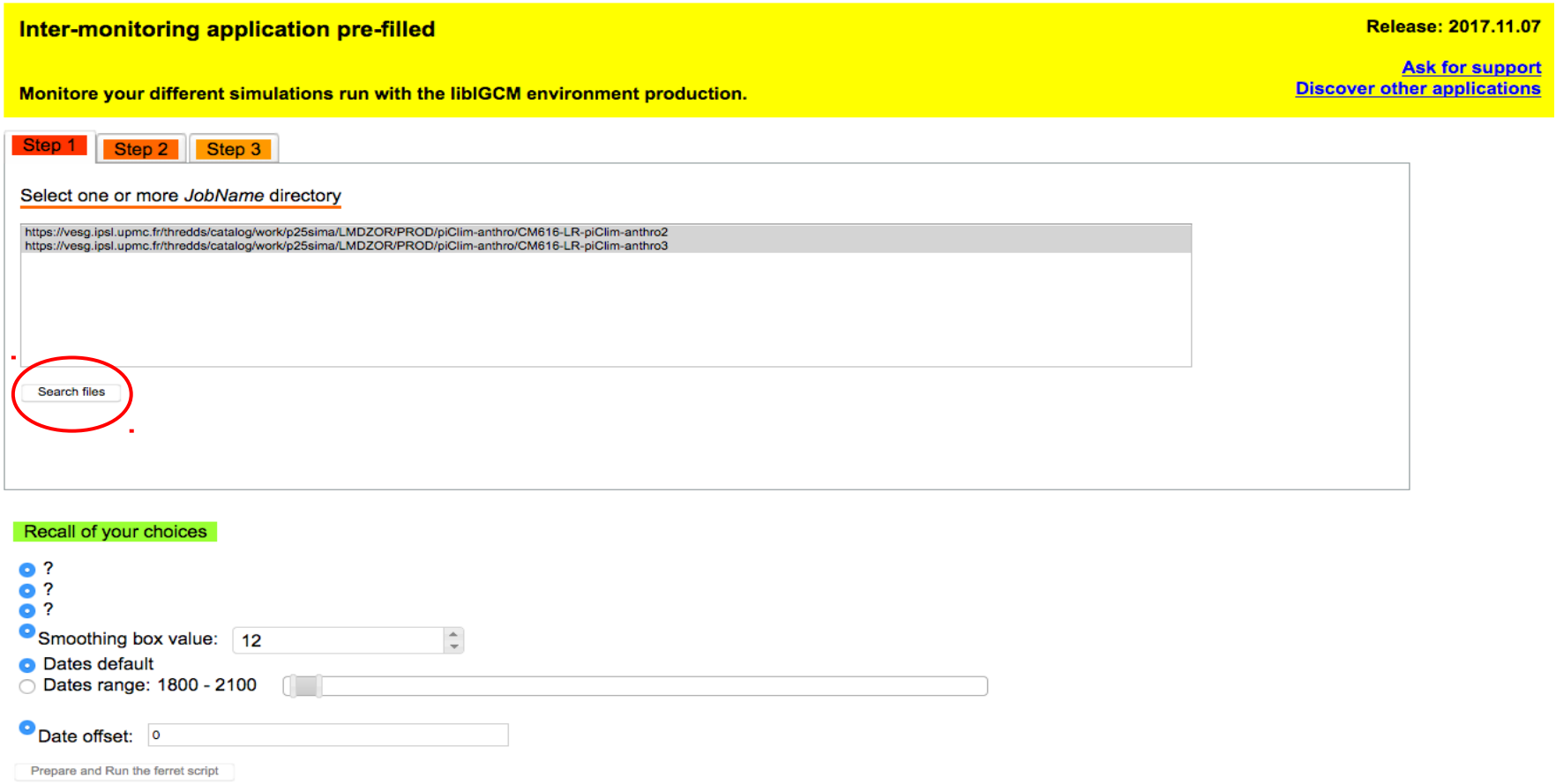
```
#-------------------------------------------------------------------------------------------------------
#  field | files patterns | files additionnal | operations | title | units | calcul of area
#-------------------------------------------------------------------------------------------------------
 nettop_global | "tops topl"                    | LMDZ4.0_9695_grid.nc | "(tops[d=1]-topl[d=2])" | "TOA.
    total heat flux (GLOBAL)"         | "W/m^2"      | "aire[d=3]"
```

Intermonitoring

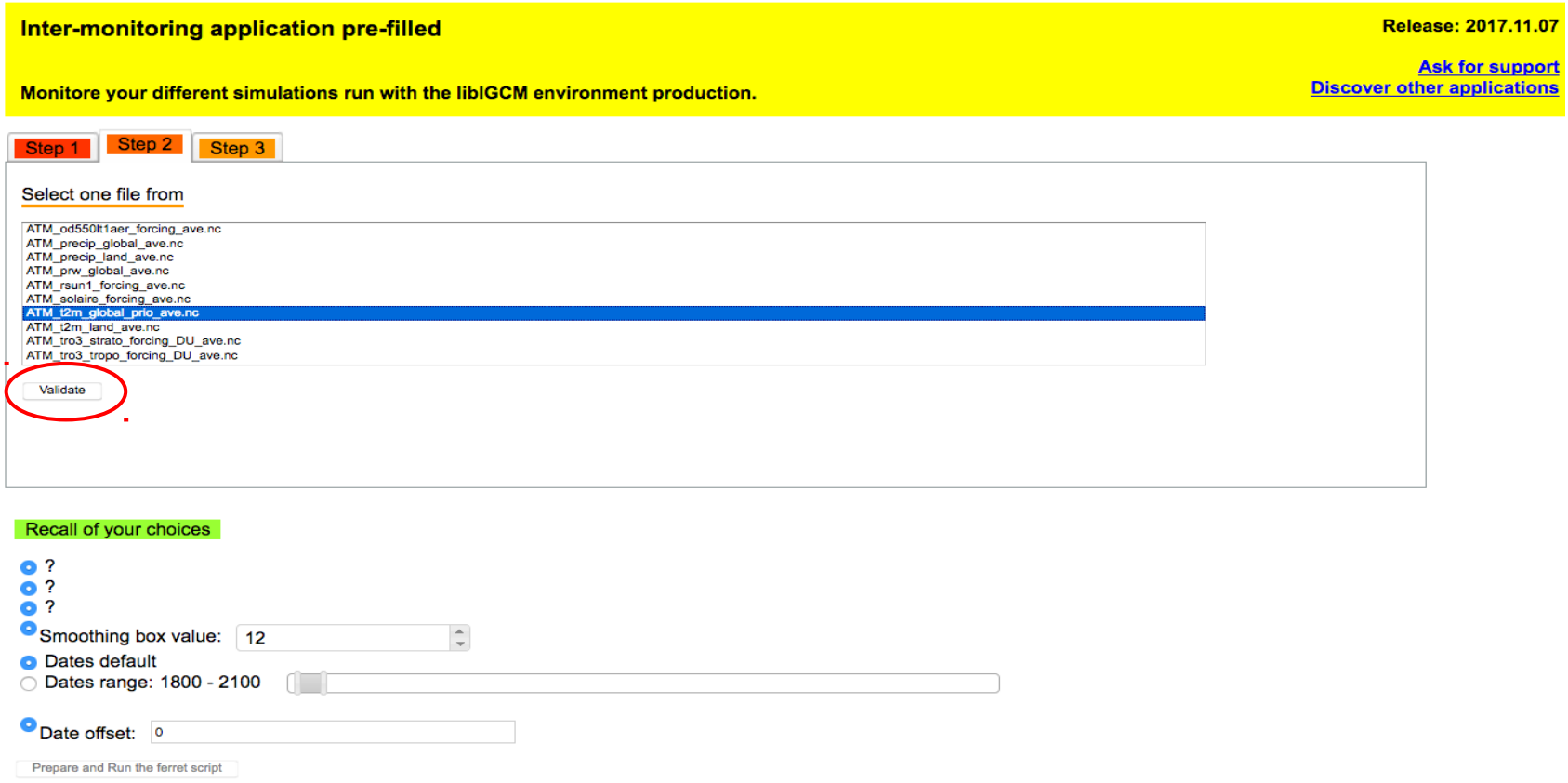


Acc. Project	Name	Try	Jobs (C)	Jobs (PP)	Machine	Login	Tag / Model	Experiment	Space	Output Progress (%)	M	IM
scecmip6	CM61-LR-ssp245-10Y	1	1 | 1 | 0 | 0	0 | 0 | 0 | 0	tgcc-irene	lurtont	IPSLCM6	scenario				
devcmip6	CM61-LR-testolga-02	3	0 | 0 | 0 | 1	0 | 0 | 0 | 0	tgcc-irene	p86caub	IPSLCM6	historical				
gen0239	CM615-LR-amip-01-irene	1	1 | 0 | 0 | 3	0 | 2 | 0 | 1	tgcc-irene	mellull	LMDZOR-v3	amip	PROD	62 %	--	--
gen0239	CM615-LR-amip-01.q-irene	1	0 | 1 | 0 | 0	0 | 2 | 0 | 1	tgcc-irene	mellull	LMDZOR-v3	amip	PROD	100 %	--	--
gen0239	CM615-LR-amip-02-G-irene	3	1 | 0 | 0 | 0	0 | 0 | 0 | 0	tgcc-irene	mellull	LMDZOR-v3	amip	PROD	--	--	--
gen0239	CM615-LR-amip-02-irene	1	0 | 0 | 0 | 2	0 | 2 | 0 | 4	tgcc-irene	mellull	LMDZOR-v3	amip	PROD	53 %	--	--
gen0239	CM615-LR-amip-02.q-irene	2	0 | 1 | 0 | 0	0 | 0 | 0 | 3	tgcc-irene	mellull	LMDZOR-v3	amip	PROD	100 %	--	--
rfmcmip6	CM616-LR-piClim-anthro2	2	0 | 2 | 0 | 0	0 | 30 | 0 | 0	tgcc-irene	p25sima	LMDZOR-v3	piClim-anthro	PROD	100 %	M	☑
rfmcmip6	CM616-LR-piClim-anthro3	2	0 | 2 | 0 | 0	0 | 30 | 0 | 0	tgcc-irene	p25sima	LMDZOR-v3	piClim-anthro	PROD	100 %	M	☑
rfmcmip6	CM616-LR-piClim-anthro4	2	0 | 2 | 0 | 0	0 | 30 | 0 | 0	tgcc-irene	p25sima	LMDZOR-v3	piClim-anthro	PROD	100 %	M	☐
rfmcmip6	CM616-LR-piClim-spAer-aer3	2	1 | 0 | 0 | 0	0 | 0 | 0 | 0	tgcc-irene	p25sima	LMDZOR-v3	piClim-spAer-aer	PROD	3 %	--	--
rfmcmip6	CM616-LR-piClim-spAer-anthro2	2	0 | 2 | 0 | 0	0 | 30 | 0 | 0	tgcc-irene	p25sima	LMDZOR-v3	piClim-spAer-anthro	PROD	100 %	M	☐
psl	CM6TRSTVLR	359	1 | 0 | 0 | 0	0 | 1 | 0 | 0	IDRIS-ADA	rpsl944	IPSLCM6	trusting	TEST	--	--	--
gen2201	CPLAER.pd.test00	1	0 | 2 | 0 | 0	0 | 0 | 0 | 0	tgcc-irene	albanis	ipslesm6	pdControl	DEVT	100 %	--	--
none	Congo-Jchang-ISIMIP-transient1...	1	1 | 0 | 0 | 0	0 | 0 | 0 | 0	lsce-obelix35	ahastie	ol2	secsto	DEVT	18 %	--	--
gen7403	CtrlDailyTest8	1	0 | 1 | 0 | 0	0 | 14 | 0 | 1	tgcc-irene	estellav	ipslcm5a2	piControl	DEVT	100 %	M	☐
none	DK-RisFLUXNET	1	0 | 0 | 1 | 0	0 | 0 | 0 | 0	lsce-obelix44	mmcgrath	ol2	ensemble	PROD	--	--	--
none	DK-RisFLUXNET	1	0 | 0 | 1 | 0	0 | 0 | 0 | 0	lsce-obelix22	mmcgrath	ol2	ensemble	PROD	1 %	--	--
none	DK-RisFLUXNET	1	0 | 0 | 1 | 1	0 | 0 | 0 | 0	lsce-obelix25	mmcgrath	ol2	ensemble	PROD	--	--	--
none	DK-RisFLUXNET	1	0 | 0 | 0 | 1	0 | 0 | 0 | 0	lsce-obelix38	mmcgrath	ol2	ensemble	PROD	--	--	--

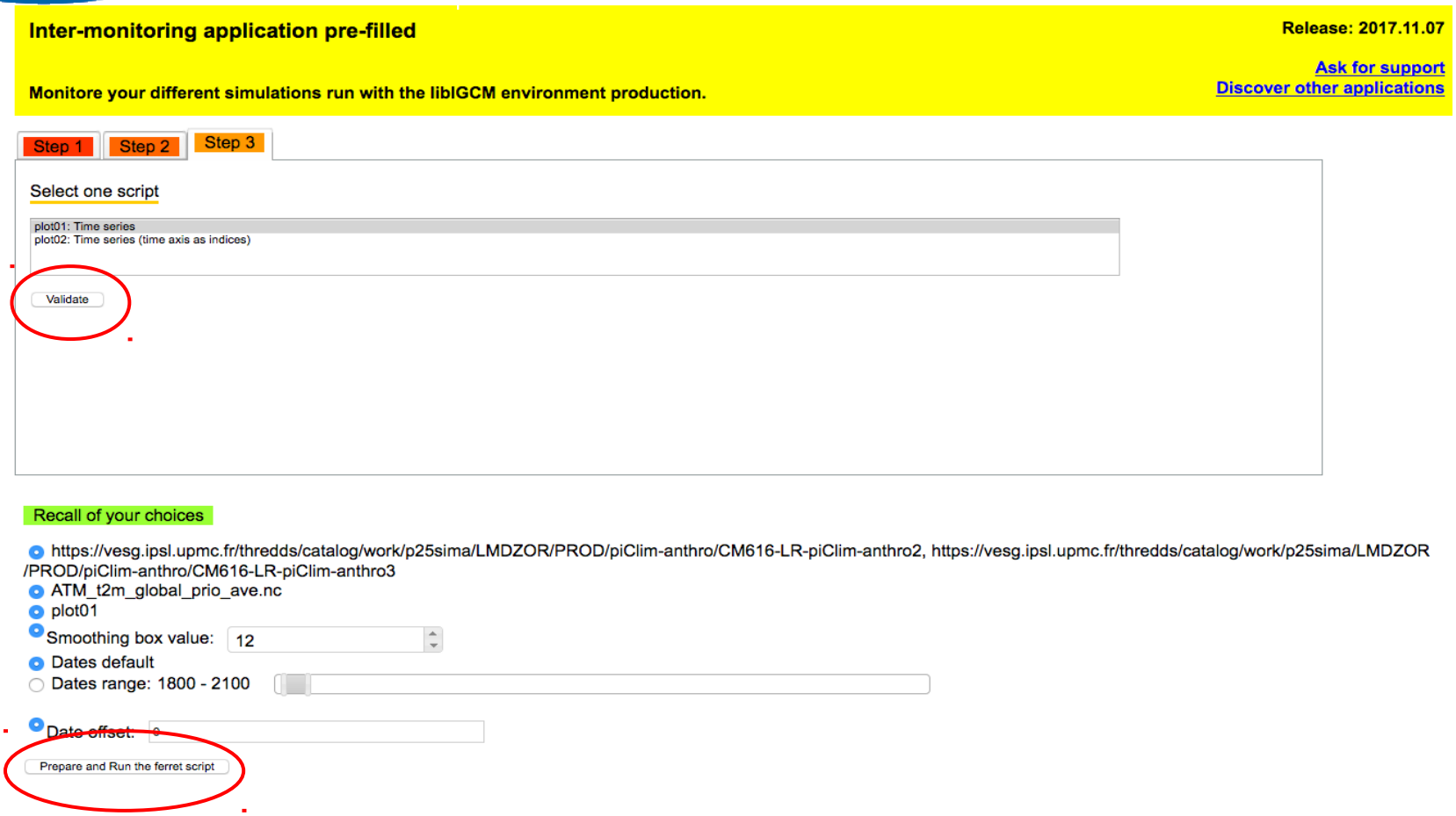
Intermonitoring



Intermonitoring

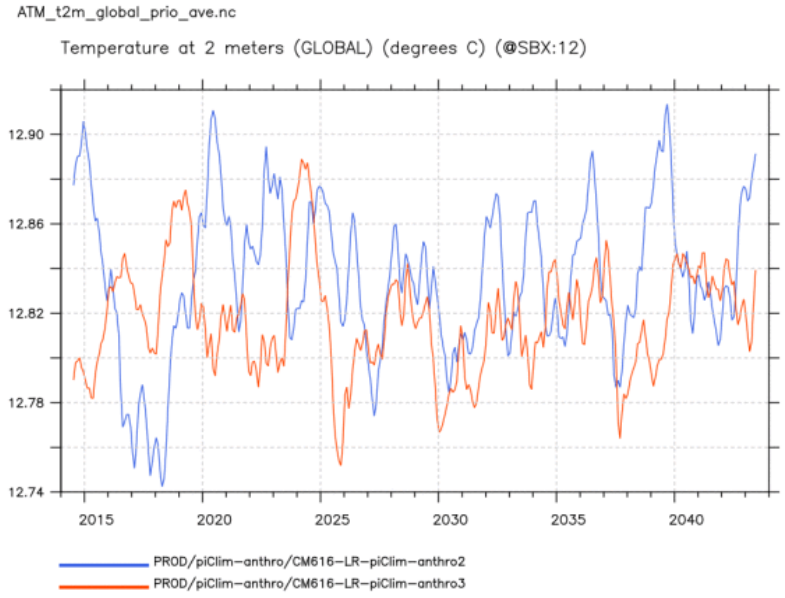


Intermonitoring



Intermonitoring

Resulting image:



Download the ferret script run: tmp/interMonitoring_plot01_kulWIJ.jnl	
Download a shell script to run this ferret script for all files: tmp/interMonitoring_plot01_kulWIJ_prod.bash	Run this script on the server

```
!============================
! Script generated by the inter-monitoring application by LSCE

set mode linecolors 30
set window/size=0.4 1 ; cancel mode logo
set view full ; go margins_set 15 30 10 08

!============================
!Please change the colors or/and legends if needed
let colors={"3B63E6", "FF4500", "FFE000", "34D314", "FF1392", "FFA400", "775BB4", "9ACD32", "789BF1", "AFDFE6", "0000C7", "1FB1AA", "B12121", "DEB886", "FFB6C1", "CC(
```