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WRF4G Tutorial part 2

How to manage WRF4G errors

In this section, we are going to see how to manage WRF4G errors. In order to do that, we are going to create a new experiment called `test_1`, based on `single_test`, in which the `end_date` will be `"2011-08-30_12:00:00"`. Follow the steps below.

```
[user@mycomputer~]$ cd $WRF4G_LOCATION/experiments

[user@mycomputer~]$ ls
single_test  wrfuc_physics  wrfuc_single_serial

[user@mycomputer~]$ cp -r single_test single_test_1

[user@mycomputer~]$ cd single_test_1

[user@mycomputer~]$ cat experiment.wrf4g | grep "experiment_name"
experiment_name = "test"

[user@mycomputer~]$ cat experiment.wrf4g | grep "start_date="
start_date="2011-08-28_12:00:00"

[user@mycomputer~]$ cat experiment.wrf4g | grep "experiment_name"
experiment_name = "test_1"

[user@mycomputer~]$ cat experiment.wrf4g | grep "end_date "
end_date      = "2011-08-30_12:00:00"

[user@mycomputer~]$ wrf4g_prepare
Warning: You are using resources.wrf4g located in the /home/carlos/WRF4G/etc/ directory.
Preparing namelist...
WRFV3/run/namelist.input
WRF Check Warning: CAM radiation selected but paerlev/levsiz/cam_abs_dim1/cam_abs_dim2 was not set. Fixing...
WRF Check Warning: radt is shorter than dx (0.500000)

---> Single params run
---> Continuous run
    ---> cycle_chunks: test_1 2011-08-28_00:00:00 2011-08-30_00:00:00
        ---> chunks 1: test_1 2011-08-28_00:00:00 2011-08-28_12:00:00
        ---> chunks 2: test_1 2011-08-28_12:00:00 2011-08-29_00:00:00
        ---> chunks 3: test_1 2011-08-29_00:00:00 2011-08-29_12:00:00
        ---> chunks 4: test_1 2011-08-29_12:00:00 2011-08-30_00:00:00

[user@mycomputer~]$ wrf4g_status --long
Realization      GW  Stat Chunks  Comp.Res  WN      Run.Sta  ext  %
test             2   D   3/3    mycomputer  ciclón  Finished  0 100.00
test_1          -   P   0/4    -          -       Prepared  -  0.00

[user@mycomputer~]$ wrf4g_submit
Submitting realization: "test_1"
    Submitting Chunk 1: 2011-08-28_00:00:00 2011-08-28_12:00:00
    Submitting Chunk 2: 2011-08-28_12:00:00 2011-08-29_00:00:00
    Submitting Chunk 3: 2011-08-29_00:00:00 2011-08-29_12:00:00
    Submitting Chunk 4: 2011-08-29_12:00:00 2011-08-30_00:00:00

[user@mycomputer~]$ wrf4g_status --long
Realization      GW  Stat Chunks  Comp.Res  WN      Run.Sta  ext  %
test             2   D   3/3    mycomputer  ciclón  Finished  0 100.00
test_1          3   F   1/4    mycomputer  ciclón  Failed    62 0.00
```

Like you can see before, the realization `test_1` has finished with an exit [code 62](#). What happened ? The exit code 62 indicates that `ungrib` binary had an error during its execution. In order to solve the error, we are going to check out the log of the chunk number 1.

```
[user@mycomputer~]$ cat $WRF4G_LOCATION/etc/resources.wrf4g | grep WRF4G_BASEPATH=
WRF4G_BASEPATH="/home/user/WRF4G/repository/output"

[user@mycomputer~]$ cd $WRF4G_LOCATION/repository/output/test_1/test_1/log/

[user@mycomputer~]$ ls
log_1_4.tar.gz
```

The chunk log name is composed of using chunk number and job identifier (GW).

- `log_{chunk_number}_{job_identifier}.tar.gz`

In our case, chunk log name will be `log_1_4.tar.gz` because the chunk number is 1 and the job identifier is 4.

```
[user@mycomputer~]$ tar xzvf log_1_4.tar.gz
WRF4G.log
configure.wps
ls.wps
ls.wrf
ungrib_GFS_2011082800.out
```

In each log package you are able to see all WRF log binaries as well as WRF4G logs such as `WRF4G.log`, `wrfgel.out` and `monitor.log`. In our case, we are going to focus on `WRF4G.log` which is the main log.

```
[user@mycomputer~]$ cat WRF4G.log
* Mon Oct 1 17:27:45 CEST 2012: Creating WRF4G structure ...
~/home/user/WRF4G/repository/apps/WRFbin-3.1.1_r832INTEL_OMP
~/home/user/WRF4G/repository/output/test_1/test_1/namelist.input' -> ~/home/user/.gw_user_3/WRFV3/run/namelist.input'
* Mon Oct 1 17:27:46 CEST 2012: Preparing WRF4G binaries ...
* Mon Oct 1 17:27:46 CEST 2012: Creating parallel environment ...
* Mon Oct 1 17:27:46 CEST 2012: Using default configuration ...
* Mon Oct 1 17:27:46 CEST 2012: Checking restart information ...
* Mon Oct 1 17:27:46 CEST 2012: The boundaries and initial conditions are not available ...
* Mon Oct 1 17:27:46 CEST 2012: Downloading geo_em files and namelist.wps ...
/home/user/.gw_user_3/WRF4G/vcp -v /home/user/WRF4G/repository/domains/Santander_50km/* .
cp -v -R /home/user/WRF4G/repository/domains/Santander_50km/* /home/user/.gw_user_3/WPS
~/home/user/WRF4G/repository/domains/Santander_50km/geo_em.d01.nc' -> ~/home/user/.gw_user_3/WPS/geo_em.d01.nc'
~/home/user/WRF4G/repository/domains/Santander_50km/namelist.wps' -> ~/home/user/.gw_user_3/WPS/namelist.wps'
* Mon Oct 1 17:27:46 CEST 2012: Modifying namelist ...
Updating parameter start_date in file: namelist.wps
Updating parameter end_date in file: namelist.wps
Updating parameter max_dom in file: namelist.wps
Updating parameter prefix in file: namelist.wps
Updating parameter interval_seconds in file: namelist.wps
* Mon Oct 1 17:27:46 CEST 2012: About to run preprocessor and Ungrib ...
* Mon Oct 1 17:27:46 CEST 2012: Running preprocessor.default ...
Linking global data from: /home/user/WRF4G/repository/input/NCEP/GFS
~/home/user/.gw_user_3/WPS/grbData/gfs2011082812_00.grb' -> ~/home/user/WRF4G/repository/input/NCEP/GFS/2011/gfs2011082812
~/home/user/.gw_user_3/WPS/grbData/gfs2011082812_06.grb' -> ~/home/user/WRF4G/repository/input/NCEP/GFS/2011/gfs2011082812
~/home/user/.gw_user_3/WPS/grbData/gfs2011082812_12.grb' -> ~/home/user/WRF4G/repository/input/NCEP/GFS/2011/gfs2011082812
~/home/user/.gw_user_3/WPS/grbData/gfs2011082812_18.grb' -> ~/home/user/WRF4G/repository/input/NCEP/GFS/2011/gfs2011082812
~/home/user/.gw_user_3/WPS/grbData/gfs2011082812_24.grb' -> ~/home/user/WRF4G/repository/input/NCEP/GFS/2011/gfs2011082812
~/home/user/.gw_user_3/WPS/grbData/gfs2011082812_30.grb' -> ~/home/user/WRF4G/repository/input/NCEP/GFS/2011/gfs2011082812
~/home/user/.gw_user_3/WPS/grbData/gfs2011082812_36.grb' -> ~/home/user/WRF4G/repository/input/NCEP/GFS/2011/gfs2011082812
* Mon Oct 1 17:27:47 CEST 2012: Running ungrib ...
*****
WRF4G was deployed in ...
/home/user/.gw_user_3
```

```
and it ran in ...
/home/user/.gw_user_3
*****
```

WRF4G.log shows that ungrib was the last WRF binary. Therefore, if you check out ungrib log, you will probably discover the error.

```
[user@mycomputer~]$ tail ungrib_GFS_2011082800.out
200.0 X      X      X      X      X
150.0 X      X      X      X      X
100.0 X      X      X      X      X
 70.0 X      X      X      X      X
 50.0 X      X      X      X      X

Subroutine DATINT: Interpolating 3-d files to fill in any missing data...
Looking for data at time 2011-08-28_00
ERROR: Data not found: 2011-08-28_00:00:00.0000
Begin rrpr
-----
```

The problem is that there is not input data to simulate the last chunk.

```
[user@mycomputer~]$ cat experiment.wrf4g | grep "extdata_path"
extdata_path = "${WRF4G_INPUT}/NCEP/GFS"

[user@mycomputer~]$ cat $WRF4G_LOCATION/etc/resources.wrf4g | grep "WRF4G_INPUT="
WRF4G_INPUT="/home/user/WRF4G/repository/input"

[user@mycomputer~]$ ls -l /home/user/WRF4G/repository/input/NCEP/GFS/2011/
total 36388
-rw-r--r-- 1 user user 4909850 2012-09-13 11:38 gfs2011082812_00.grb
-rw-r--r-- 1 user user 5411705 2012-09-13 11:38 gfs2011082812_06.grb
-rw-r--r-- 1 user user 5411214 2012-09-13 11:38 gfs2011082812_12.grb
-rw-r--r-- 1 user user 5415031 2012-09-13 11:38 gfs2011082812_18.grb
-rw-r--r-- 1 user user 5397677 2012-09-13 11:38 gfs2011082812_24.grb
-rw-r--r-- 1 user user 5386190 2012-09-13 11:38 gfs2011082812_30.grb
-rw-r--r-- 1 user user 5316014 2012-09-13 11:38 gfs2011082812_36.grb
```

Now, try to ...

How to add new computing resources to WRF4G

WRF4G uses [DRM4G](#) to access to different Distributed Resource Managements (DRM) such as:

- PBS/Torque
- SGE
- FORK
- LoadLeveler
- MN SLRUM (only for Red Española de Supercomputación)

In order to add new resources, you need to edit Computing Resources section in the [framework4g.conf](#) file which is located under `$WRF4G_LOCATION/etc` directory. The file has to contain one resource per line with the format:

```
resource_name  attributes
...
resource_name  attributes
```

where:


```

multiparams_labels="phys1/phys2/phys3/phys4/phys5"

```

```

[user@mycomputer~]$ wrf4g_prepare

```

```

Warning: You are using resources.wrf4g located in the /home/carlos/WRF4G/etc/ directory.

```

```

Preparing namelist...

```

```

WRFV3/run/namelist.input

```

```

WRF Check Warning: CAM radiation selected but paerlev/levsiz/cam_abs_dim1/cam_abs_dim2 was not set. Fixing...

```

```

WRF Check Warning: radt is shorter than dx (0.500000)

```

```

--->Realization: multiparams=phys1 2011-08-28_12:00:00 2011-08-30_00:00:00

```

```

Updating parameter mp_physics in file: namelist.input

```

```

Updating parameter cu_physics in file: namelist.input

```

```

Updating parameter ra_lw_physics in file: namelist.input

```

```

Updating parameter ra_sw_physics in file: namelist.input

```

```

Updating parameter sf_sfclay_physics in file: namelist.input

```

```

Updating parameter bl_pbl_physics in file: namelist.input

```

```

Updating parameter sf_surface_physics in file: namelist.input

```

```

---> Continuous run

```

```

    ---> cycle_chunks: uc_phys__phys1 2011-08-28_12:00:00 2011-08-30_00:00:00

```

```

        ---> chunks 1: uc_phys__phys1 2011-08-28_12:00:00 2011-08-29_00:00:00

```

```

        ---> chunks 2: uc_phys__phys1 2011-08-29_00:00:00 2011-08-29_12:00:00

```

```

        ---> chunks 3: uc_phys__phys1 2011-08-29_12:00:00 2011-08-30_00:00:00

```

```

--->Realization: multiparams=phys2 2011-08-28_12:00:00 2011-08-30_00:00:00

```

```

Updating parameter mp_physics in file: namelist.input

```

```

Updating parameter cu_physics in file: namelist.input

```

```

Updating parameter ra_lw_physics in file: namelist.input

```

```

Updating parameter ra_sw_physics in file: namelist.input

```

```

Updating parameter sf_sfclay_physics in file: namelist.input

```

```

Updating parameter bl_pbl_physics in file: namelist.input

```

```

Updating parameter sf_surface_physics in file: namelist.input

```

```

---> Continuous run

```

```

    ---> cycle_chunks: uc_phys__phys2 2011-08-28_12:00:00 2011-08-30_00:00:00

```

```

        ---> chunks 1: uc_phys__phys2 2011-08-28_12:00:00 2011-08-29_00:00:00

```

```

        ---> chunks 2: uc_phys__phys2 2011-08-29_00:00:00 2011-08-29_12:00:00

```

```

        ---> chunks 3: uc_phys__phys2 2011-08-29_12:00:00 2011-08-30_00:00:00

```

```

--->Realization: multiparams=phys3 2011-08-28_12:00:00 2011-08-30_00:00:00

```

```

Updating parameter mp_physics in file: namelist.input

```

```

Updating parameter cu_physics in file: namelist.input

```

```

Updating parameter ra_lw_physics in file: namelist.input

```

```

Updating parameter ra_sw_physics in file: namelist.input

```

```

Updating parameter sf_sfclay_physics in file: namelist.input

```

```

Updating parameter bl_pbl_physics in file: namelist.input

```

```

Updating parameter sf_surface_physics in file: namelist.input

```

```

---> Continuous run

```

```

    ---> cycle_chunks: uc_phys__phys3 2011-08-28_12:00:00 2011-08-30_00:00:00

```

```

        ---> chunks 1: uc_phys__phys3 2011-08-28_12:00:00 2011-08-29_00:00:00

```

```

        ---> chunks 2: uc_phys__phys3 2011-08-29_00:00:00 2011-08-29_12:00:00

```

```

        ---> chunks 3: uc_phys__phys3 2011-08-29_12:00:00 2011-08-30_00:00:00

```

```

--->Realization: multiparams=phys4 2011-08-28_12:00:00 2011-08-30_00:00:00

```

```

Updating parameter mp_physics in file: namelist.input

```

```

Updating parameter cu_physics in file: namelist.input

```

```

Updating parameter ra_lw_physics in file: namelist.input

```

```

Updating parameter ra_sw_physics in file: namelist.input

```

```

Updating parameter sf_sfclay_physics in file: namelist.input

```

```

Updating parameter bl_pbl_physics in file: namelist.input

```

```

Updating parameter sf_surface_physics in file: namelist.input

```

```

---> Continuous run

```

```

    ---> cycle_chunks: uc_phys__phys4 2011-08-28_12:00:00 2011-08-30_00:00:00

```

```

---> chunks 1: uc_phys__phys4 2011-08-28_12:00:00 2011-08-29_00:00:00
---> chunks 2: uc_phys__phys4 2011-08-29_00:00:00 2011-08-29_12:00:00
---> chunks 3: uc_phys__phys4 2011-08-29_12:00:00 2011-08-30_00:00:00

--->Realization: multiparams=phys5 2011-08-28_12:00:00 2011-08-30_00:00:00
Updating parameter mp_physics in file: namelist.input
Updating parameter cu_physics in file: namelist.input
Updating parameter ra_lw_physics in file: namelist.input
Updating parameter ra_sw_physics in file: namelist.input
Updating parameter sf_sfclay_physics in file: namelist.input
Updating parameter bl_pbl_physics in file: namelist.input
Updating parameter sf_surface_physics in file: namelist.input
---> Continuous run
---> cycle_chunks: uc_phys__phys5 2011-08-28_12:00:00 2011-08-30_00:00:00
---> chunks 1: uc_phys__phys5 2011-08-28_12:00:00 2011-08-29_00:00:00
---> chunks 2: uc_phys__phys5 2011-08-29_00:00:00 2011-08-29_12:00:00
---> chunks 3: uc_phys__phys5 2011-08-29_12:00:00 2011-08-30_00:00:00

[user@mycomputer~]$ wrf4g_status --long
Realization      GW  Stat Chunks Comp.Res  WN      Run.Sta      ext  %
uc_phys__phys1  -   P  0/3  -        -        Prepared     -  0.00
uc_phys__phys2  -   P  0/3  -        -        Prepared     -  0.00
uc_phys__phys3  -   P  0/3  -        -        Prepared     -  0.00
uc_phys__phys4  -   P  0/3  -        -        Prepared     -  0.00
uc_phys__phys5  -   P  0/3  -        -        Prepared     -  0.00

[user@mycomputer~]$ wrf4g_submit
Submitting realization: "uc_phys__phys1"
Submitting Chunk 1:      2011-08-28_12:00:00      2011-08-29_00:00:00
Submitting Chunk 2:      2011-08-29_00:00:00      2011-08-29_12:00:00
Submitting Chunk 3:      2011-08-29_12:00:00      2011-08-30_00:00:00
Submitting realization: "uc_phys__phys2"
Submitting Chunk 1:      2011-08-28_12:00:00      2011-08-29_00:00:00
Submitting Chunk 2:      2011-08-29_00:00:00      2011-08-29_12:00:00
Submitting Chunk 3:      2011-08-29_12:00:00      2011-08-30_00:00:00
Submitting realization: "uc_phys__phys3"
Submitting Chunk 1:      2011-08-28_12:00:00      2011-08-29_00:00:00
Submitting Chunk 2:      2011-08-29_00:00:00      2011-08-29_12:00:00
Submitting Chunk 3:      2011-08-29_12:00:00      2011-08-30_00:00:00
Submitting realization: "uc_phys__phys4"
Submitting Chunk 1:      2011-08-28_12:00:00      2011-08-29_00:00:00
Submitting Chunk 2:      2011-08-29_00:00:00      2011-08-29_12:00:00
Submitting Chunk 3:      2011-08-29_12:00:00      2011-08-30_00:00:00
Submitting realization: "uc_phys__phys5"
Submitting Chunk 1:      2011-08-28_12:00:00      2011-08-29_00:00:00
Submitting Chunk 2:      2011-08-29_00:00:00      2011-08-29_12:00:00
Submitting Chunk 3:      2011-08-29_12:00:00      2011-08-30_00:00:00

[user@mycomputer~]$ wrf4g_status --long
Realization      GW  Stat Chunks Comp.Res  WN      Run.Sta      ext  %
uc_phys__phys1  0   W  1/3  -        -        Submitted     -  0.00
uc_phys__phys2  3   W  1/3  -        -        Submitted     -  0.00
uc_phys__phys3  6   W  1/3  -        -        Submitted     -  0.00
uc_phys__phys4  9   W  1/3  -        -        Submitted     -  0.00
uc_phys__phys5 12   W  1/3  -        -        Submitted     -  0.00

[user@mycomputer~]$ wrf4g_status --long
Realization      GW  Stat Chunks Comp.Res  WN      Run.Sta      ext  %
uc_phys__phys1  0   R  1/3  mycomputer ciclogenes WRF           -  0.00
uc_phys__phys2  3   W  1/3  -        -        Submitted     -  0.00
uc_phys__phys3  6   W  1/3  -        -        Submitted     -  0.00

```

uc_phys__phys4	9	W	1/3	-	-	Submitted	- 0.00
uc_phys__phys5	12	W	1/3	-	-	Submitted	- 0.00

As the experiment is working now, we are going to stop the chunks of the uc_phys__phys1 realization using wrf4g_kill command.

```
[user@mycomputer~]$ wrf4g_kill -r uc_phys__phys1

[user@mycomputer~]$ wrf4g_status --long
Realization      GW  Stat Chunks Comp.Res  WN      Run.Sta      ext  %
uc_phys__phys1  -   P   0/3   -         -       Prepared     - 0.00
uc_phys__phys2   3   W   1/3   -         -       Submitted    - 0.00
uc_phys__phys3   6   W   1/3   -         -       Submitted    - 0.00
uc_phys__phys4   9   W   1/3   -         -       Submitted    - 0.00
uc_phys__phys5  12  W   1/3   -         -       Submitted    - 0.00
```

Note that, Run.Sta has changed into Prepared value. If you want you submit again the realization, you only need to execute wrf4g_submit -r uc_phys__phys1.

```
[user@mycomputer~]$ wrf4g_submit -r uc_phys__phys1
Submitting realization: "uc_phys__phys1"
    Submitting Chunk 1:    2011-08-28_12:00:00    2011-08-29_00:00:00
    Submitting Chunk 2:    2011-08-29_00:00:00    2011-08-29_12:00:00
    Submitting Chunk 3:    2011-08-29_12:00:00    2011-08-30_00:00:00

[user@mycomputer~]$ wrf4g_status --long
Realization      GW  Stat Chunks Comp.Res  WN      Run.Sta      ext  %
uc_phys__phys1  15  W   1/3   -         -       Submitted    - 0.00
uc_phys__phys2   3   R   1/3   mycomputer ciclogenes real    - 0.00
uc_phys__phys3   6   W   1/3   -         -       Submitted    - 0.00
uc_phys__phys4   9   W   1/3   -         -       Submitted    - 0.00
uc_phys__phys5  12  W   1/3   -         -       Submitted    - 0.00

[user@mycomputer~]$ wrf4g_status --long
Realization      GW  Stat Chunks Comp.Res  WN      Run.Sta      ext  %
uc_phys__phys1  15  W   1/3   -         -       Submitted    - 0.00
uc_phys__phys2   3   R   1/3   mycomputer ciclogenes WRF    - 0.00
uc_phys__phys3   6   W   1/3   -         -       Submitted    - 0.00
uc_phys__phys4   9   W   1/3   -         -       Submitted    - 0.00
uc_phys__phys5  12  W   1/3   -         -       Submitted    - 0.00
```

The uc_phys__phys2 is running because all realizations are independents.

Now, try to stop the uc_phys experiment and then resubmit it again