

WRF

[blocked URL](#)

- [Opis](#)
- [Verzije](#)
- [Dokumentacija](#)
- [Primjer korištenja](#)
- [Napomene](#)

Opis

WRF (*engl. Weather Research and Forecasting Model*) je mezoskalni meteorološki model namijenjen znanstvenom istraživanju i operativnoj prognozi koji u sebi sadrži razne metode parametrizacije fizikalnih procesa poput: kemijskih procesa u atmosferi, hidrologije, površinske razmjene, požara ili uragana. Verzija koja je podržana na [superračunalu Supek](#) je verzija s [dinamičkom jezgrom ARW](#), koja se tipično koristi u [prognostičke svrhe](#).

Verzije

verzija	modul	red
4.3.3	scientific/wrf/4.3.3-gnu	cpu
4.3.3	scientific/wrf/4.3.3-openmpi5	cpu
4.5.2	scientific/wrf/4.5.2-openmpi5	cpu

Dokumentacija

- WRF model - <https://www.mmm.ucar.edu/models/wrf>
- WRF-ARW model - <https://www2.mmm.ucar.edu/wrf/users/>
- Forum za korisnike - <https://forum.mmm.ucar.edu/>

Primjer korištenja

Ispod se nalaze skripte [osnovnog primjera korištenja na uraganu Matthew](#) koje odgovaraju [tipičnom workflowu](#) za pripremu i izvođenje simulacije.

Ulazni podaci su:

- **namelist.wps** - ulazna datoteka dijela WPS
- **namelist.input** - ulazna datoteka dijela WRF

PBS skripte koje treba izvršiti navedenim redom su:

1. **wps.sh** - preprocessing dio WPS
2. **wrf-real.sh** - preprocessing dio WRF
3. **wrf.sh** - simulacija modelom WRF

namelist.wps

```
&share
wrf_core      = 'ARW'
max_dom       = 1
start_date    = '2016-10-06_00:00:00'
end_date      = '2016-10-06_12:00:00'
interval_seconds = 21600
io_form_geogrid = 2
active_grid   = .true.
/

&geogrid
parent_id      = 1
parent_grid_ratio = 1
i_parent_start = 1
j_parent_start = 1
e_we          = 1600
e_sn          = 1600
geog_data_res  = 'default'
dx            = 1685
dy            = 1685
map_proj       = 'mercator'
ref_lat       = 28.00
ref_lon       = -75.00
truelat1      = 30.0
truelat2      = 60.0
stand_lon     = -75.0
geog_data_path = WPS_GEOG_PATH
opt_geogrid_tbl_path = GEOGRID_PATH
/

&ungrib
out_format = 'WPS'
prefix     = 'FILE'
/

&metgrid
fg_name      = 'FILE'
io_form_metgrid = 2
opt_metgrid_tbl_path = METGRID_PATH
/
```

namelist.input

```
&time_control
run_days      = 0
run_hours     = 1
run_minutes   = 0
run_seconds   = 0
start_year    = 2016
start_month   = 10
start_day     = 06
start_hour    = 00
end_year      = 2016
end_month     = 10
end_day       = 06
end_hour      = 12
interval_seconds = 21600
input_from_file = .true.
history_interval = 180
frames_per_outfile = 1
restart       = .false.
restart_interval = 40000000
io_form_history = 2
io_form_restart = 2
io_form_input  = 2
```

```

    io_form_boundary = 2
    debug_level      = 0
/

&domains
    time_step        = 4
    max_dom           = 1
    e_we              = 1600
    e_sn              = 1600
    e_vert            = 45
    p_top_requested   = 5000
    num_metgrid_levels = 32
    num_metgrid_soil_levels = 4
    dx                = 1685
    dy                = 1685
    grid_id           = 1
    parent_id         = 0
    i_parent_start    = 1
    j_parent_start    = 1
    parent_grid_ratio = 1
    feedback          = 1
    smooth_option     = 0
/

&physics
    mp_physics        = 3
    ra_lw_physics     = 1
    ra_sw_physics     = 1
    radt              = 30
    sf_sfclay_physics = 1
    sf_surface_physics = 2
    num_soil_layers   = 4
    bl_pbl_physics    = 1
    bldt              = 0
    cu_physics        = 1
    cudt              = 5
    isfflx            = 1
    ifsnow            = 1
    icloud            = 1
    surface_input_source = 3
    num_land_cat       = 21
    sf_urban_physics  = 0
    sf_ocean_physics  = 0
/

&dynamics
    w_damping         = 0
    diff_opt          = 1
    km_opt            = 4
    diff_6th_opt      = 0
    diff_6th_factor   = 0.12
    base_temp         = 290.
    damp_opt          = 0
    zdamp             = 5000.
    dampcoef          = 0.2
    damp_opt          = 0
    damp_opt          = 0
    non_hydrostatic   = .true.
    moist_adv_opt     = 1
    scalar_adv_opt    = 1
/

&bdy_control
    spec_bdy_width    = 5
    spec_zone         = 1
    relax_zone        = 4
    specified         = .true.
    nested            = .false.
/

&namelist_quilt

```

```
nio_tasks_per_group = 0
/
```

wps.sh

```
#!/bin/bash

#PBS -q cpu
#PBS -l select=1:ncpus=1:mem=20GB

module load scientific/wrf/4.3.3-gnu

# change to working dir
cd $PBS_O_WORKDIR

# edit namelist.wps
sed -i "s|WPS_GEOG_PATH|'${WPS_HOME}/WPS_GEOG'|" namelist.wps
sed -i "s|GEOGRID_PATH|'${WPS_HOME}/geogrid'|" namelist.wps
sed -i "s|METGRID_PATH|'${WPS_HOME}/metgrid'|" namelist.wps

# wps
ln -sf $WPS_HOME/ungrib/Variable_Tables/Vtable.GFS Vtable
link_grib.csh matthew/fnl_
ungrib.exe
geogrid.exe
metgrid.exe
```

wrf-real.sh

```
#!/bin/bash

#PBS -q cpu
#PBS -l select=32:ncpus=1

module load cray-pals
module load scientific/wrf/4.3.3-gnu

# change to working dir
cd $PBS_O_WORKDIR

# real
mpiexec -np 32 real.exe
```

wrf.sh

```
#!/bin/bash

#PBS -q cpu
#PBS -l select=128:ncpus=1

module load cray-pals
module load scientific/wrf/4.3.3-gnu

# change to working dir
cd $PBS_O_WORKDIR

# real
ln -sf $WRF_HOME/run/*.TBL .
ln -sf $WRF_HOME/run/RRTM* .
ln -sf $WRF_HOME/run/CAMtr_* .
mpiexec -np 128 wrf.exe
```

Napomene



Variable okoliša i ulazni rasteri

Dvije varijable okoliša su definirane u svrhu razvoja skripta sustava PBS (primjeri iznad):

- **WRF_HOME** - putanja do izvornog direktorija instalacije modela WRF
- **WPS_HOME** - putanja do izvornog direktorija instalacije modela WPS

Statički podaci za izradu površinskih rastera (npr. orografija i landmask) mogu se povezati korištenjem izraza ispod u skriptama sustava PBS :

```
...  
primjer_putanje="${WPS_HOME}/WPS_GEOG"  
...
```