

# Installing WRF-Sfire

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Adam Kochanski

# Installing Steps

- Check system requirements
- Download required libraries
- Install required libraries
- Download source data
- Download datasets
- Compile WRF
- Compile WPS

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# Check System Requirements

- Fortran and C compilers (gnu, Intel or PGF) possibly with MPI
- C-shell
- Traditional Unix utilities: zip, tar, make, etc.
- netcdf libraries compiled with the same compiler that will be used to build the code
- JASPER compression library (libpng) (needed by the WRF Preprocessing System – WPS)
- zlib compression library (zlib) (needed by WPS)
- ncarg package (needed by WPS tools)
- ncview (quick netcdf data visualizer)
- git (needed to get the WRF-Sfire code)
- libtiff, libgeotiff for fire data processing
- Vapor

# Downloading Libraries

To make sure your environment is ready to install WRF, and to download libraries go to:

[http://www2.mmm.ucar.edu/wrf/users/prepare\\_for\\_compilation.html](http://www2.mmm.ucar.edu/wrf/users/prepare_for_compilation.html)

Links to download particular libraries:

[http://www2.mmm.ucar.edu/wrf/src/tutorial\\_compiling/netcdf-4.1.3.tar.gz](http://www2.mmm.ucar.edu/wrf/src/tutorial_compiling/netcdf-4.1.3.tar.gz)

[http://www2.mmm.ucar.edu/wrf/src/tutorial\\_compiling/mpich-3.0.4.tar.gz](http://www2.mmm.ucar.edu/wrf/src/tutorial_compiling/mpich-3.0.4.tar.gz)

[http://www2.mmm.ucar.edu/wrf/src/tutorial\\_compiling/jasper-1.900.1.tar.gz](http://www2.mmm.ucar.edu/wrf/src/tutorial_compiling/jasper-1.900.1.tar.gz)

[http://www2.mmm.ucar.edu/wrf/src/tutorial\\_compiling/libpng-1.2.50.tar.gz](http://www2.mmm.ucar.edu/wrf/src/tutorial_compiling/libpng-1.2.50.tar.gz)

[http://www2.mmm.ucar.edu/wrf/src/tutorial\\_compiling/zlib-1.2.7.tar.gz](http://www2.mmm.ucar.edu/wrf/src/tutorial_compiling/zlib-1.2.7.tar.gz)

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- **Install required libraries**
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# Installing Libraries - MPI

- Installation of the MPICH2, NetCDF, JasPer, zlib, and libpng libraries is NOT part of the WPS and WRF installation scripts, they must be installed separately
- Make sure these libraries are installed using the same compilers as will be used to install WRF and WPS
- Installing **MPI Libraries: MPICH2**

```
setenv DIR directory-where-your-tar-files-are setenv CC  
gcc setenv CXX g++ setenv FC gfortran  
setenv FCFLAGS -m64 # FCFLAGS may be needed on some  
systems  
setenv F77 gfortran  
setenv FFLAGS -m64 # FFLAGS may be needed on some systems  
  
tar xzvf mpich-3.0.4.tar.gz  
cd mpich-3.0.4  
./configure --prefix=$DIR/mpich make  
make install  
setenv PATH $DIR/mpich/bin:$PATH
```

# Installing Libraries - NetCDF

- Installation of the MPICH2, NetCDF, JasPer, zlib, and libpng libraries is NOT part of the WPS and WRF installation scripts, they must be installed separately
- Make sure these libraries are installed using the same compilers as will be used to install WRF and WPS
- Installing **NetCDF libraries**

```
tar xzvf netcdf-4.1.3.tar.gz
cd netcdf-4.1.3
./configure --prefix=$DIR/netcdf --disable-dap --
disable-netcdf-4 --enable-shared
make
make install
setenv PATH $DIR/netcdf/bin:$PATH setenv NETCDF $DIR/
netcdf cd . .
```



# Installing Libraries - zlib

- Installation of the MPICH2, NetCDF, JasPer, zlib, and libpng libraries is NOT part of the WPS and WRF installation scripts, they must be installed separately
- Make sure these libraries are installed using the same compilers as will be used to install WRF and WPS
- Installing **zlib Libraries:**

```
tar xzvf zlib-1.2.7.tar.gz
```

```
cd zlib-1.2.7
```

```
./configure --prefix=$DIR/zlib make
```

```
make install cd . .
```

# Installing Libraries - libpng

- Installation of the MPICH2, NetCDF, JasPer, zlib, and libpng libraries is NOT part of the WPS and WRF installation scripts, they must be installed separately
- Make sure these libraries are installed using the same compilers as will be used to install WRF and WPS
- Installing **libpng Libraries**:

```
tar xzvf libpng-1.2.50.tar.gz
```

```
cd libpng-1.2.50
```

```
./configure --prefix=$DIR/libpng
```

```
make
```

```
make install cd ..
```

# Installing Libraries -JasPer

- Installation of the MPICH2, NetCDF, JasPer, zlib, and libpng libraries is NOT part of the WPS and WRF installation scripts, they must be installed separately
- Make sure these libraries are installed using the same compilers as will be used to install WRF and WPS
- Installing **JasPer Libraries:**

```
tar xzvf jasper-1.900.1.tar.gz
```

```
cd jasper-1.900.1
```

```
./configure --prefix=$DIR/jasper
```

```
make
```

```
make install cd . .
```

# Installing Libraries – libtiff and geotiff

- Besides the standard libraries needed by WRF, in order to use fire data processing tool `convert_geotiff`, additional libraries are needed – libtiff and geotiff
- Installing libgeotiff libraries and `convert_geotiff`:

```
sudo apt-get install libgeotiff-dev
```

- Getting `convert_geotiff`:

[https://github.com/jbeezley/convert\\_geotiff/releases/download/v0.1/convert\\_geotiff-0.1.0.tar.gz](https://github.com/jbeezley/convert_geotiff/releases/download/v0.1/convert_geotiff-0.1.0.tar.gz)

```
tar -xzvf convert_geotiff-0.1.0.tar.gz
```

```
cd convert_geotiff-0.1.0
```

```
./configure
```

```
make
```

# Getting the source code of WRF-Sfire

- The most current version of the code is available from our GIT repository:

```
git clone git://github.com/jbeezley/wrf-fire.git
```

This command will create the wrf-fire directory containing WRF, WPS, plus additional tools

You need git installed on your machine in order to get the code from GIT.

# Download datasets

- Static geographical data are available from:

[http://www2.mmm.ucar.edu/wrf/src/wps\\_files/geog.tar.gz](http://www2.mmm.ucar.edu/wrf/src/wps_files/geog.tar.gz)

- GRIB files containing meteorological data are available from:

<http://nomads.ncep.noaa.gov/>

For instance NARR data are available under:

[http://nomads.ncdc.noaa.gov/data.php?name=access#narr\\_datasets](http://nomads.ncdc.noaa.gov/data.php?name=access#narr_datasets)

# Installing WRF-Sfire

- If you got the WRF-Sfire code from GIT it will be already extracted and ready for compilation. You won't need to untar anything.
- Before you start the compilation process set your environment variables to the locations where you installed required libraries:

```
setenv NETCDF /where-netcdf-is  
setenv JASPERLIB /where-jasper-lib-is  
setenv JASPERINC /where-jasper-include-is  
setenv WRFIO_NCD_LARGE_FILE_SUPPORT 1  
setenv LIBTIFF /where-libtiff-is  
setenv GEOTIFF /where-geotiff-is
```

You can verify if these paths have been set by typing:

```
echo $NETCDF  
echo $JASPERLIB and so on.
```

# Installing WRF-Sfire

- Inside the wrf-fire/WRFV3/ directory, type: `./configure`

```
checking for perl5... no
checking for perl... found /usr/bin/perl (perl)
Will use NETCDF in dir: /share_home/jmandel/lib/netcdf
PHDF5 not set in environment. Will configure WRF for use without.
```

If you REALLY want Grib2 output from WRF, modify the arch/Config\_new.pl script.  
Right now you are not getting the Jasper lib, from the environment, compiled into WRF.

-----  
Please select from among the following supported platforms.

1. Linux x86\_64, PGI compiler with pgcc (serial)
2. Linux x86\_64, PGI compiler with pgcc (smpar)
3. Linux x86\_64, PGI compiler with pgcc (dmpar)
4. Linux x86\_64, PGI compiler with pgcc (dm+sm)
5. Linux x86\_64 i486 i586 i686, ifort compiler with icc (serial)
6. Linux x86\_64 i486 i586 i686, ifort compiler with icc (smpar)
7. Linux x86\_64 i486 i586 i686, ifort compiler with icc (dmpar)
8. Linux x86\_64 i486 i586 i686, ifort compiler with icc (dm+sm)
9. x86\_64 Linux, gfortran compiler with gcc (serial)
10. x86\_64 Linux, gfortran compiler with gcc (smpar)
11. x86\_64 Linux, gfortran compiler with gcc (dmpar)
12. x86\_64 Linux, gfortran compiler with gcc (dm+sm)

Enter selection [1-12] :



# Installing WRF-Sfire

- After selecting appropriate option check if the file `configure.wrf` has been created. It should contain all the information needed by WRF to build on your platform.

- If configure file is there compile WRF typing:

```
./compile em_real >& compile_em_real.log&
```

- In order to compile fire test cases compile them typing:

```
./compile em_fire >& compile_em_fire.log&
```

- Check for errors in the compilation logs

```
grep Error compile_em_real.log&
```

```
grep Error compile_em_fire.log&
```

Or just open them in your favorite text editor vi, emacs etc...

If the code compiled properly there should be NO Error messages.

# Installing WRF-Sfire

- **Go to your** `./wrf-fire/WRFV3/run` **directory and check for:**
  - `ideal.exe`
  - `real.exe`
  - `wrf.exe`
- **Go to** `wrf-fire/WRFV3/test/em_fire` **directory, you should see there multiple fire cases:**
  - `fireflux`
  - `fireflux_ak`
  - `fireflux_med`
  - `fireflux_sfc`
  - `fireflux_small`
  - `hillflux`
  - `hill`
  - ...
- **During this workshop we will be working on specially prepared test cases named** `Experiment1-5` **which you should be copied to your**  
`wrf-fire/WRFV3/test/em_fire`

# Installing Steps

- Check system requirements
- Download required libraries
- Install required libraries
- Get the source code of WRF-Sfire
- Download datasets
- Compile WRF
- **Compile WPS**

# Installing WPS

- If you got the WRF-Sfire code from GIT the WRP preprocessor (WPS) should be in `wrf-fire/WPS`
- Go to that directory and configure WPS typing:  
`./configure`

```
Will use NETCDF in dir: /share_home/jmandel/lib/netcdf
Configuring to use jasper library to build Grib2 I/O...
  $JASPERLIB = /share_home/jmandel/lib/netcdf/lib
  $JASPERINC = /share_home/jmandel/lib/netcdf/include
$GEOTIFF or $LIBTIFF not found in environment, configuring to build without GeotIFF I/O...
```

```
-----
Please select from among the following supported platforms.
```

1. PC Linux x86\_64, Intel compiler serial, NO GRIB2
2. PC Linux x86\_64, Intel compiler serial
3. PC Linux x86\_64, Intel compiler DM parallel, NO GRIB2
4. PC Linux x86\_64, Intel compiler DM parallel
5. PC Linux i486 i586 i686,x86\_64 gfortran compiler, serial, NO GRIB2
6. (gross) PC Linux x86\_64, gfortran compiler, serial
7. PC Linux x86\_64 (IA64 and Opteron), PGI compiler 5.2 or higher, serial, NO GRIB2
8. PC Linux x86\_64 (IA64 and Opteron), PGI compiler 5.2 or higher, serial
9. PC Linux x86\_64 (IA64 and Opteron), PGI compiler 5.2 or higher, DM parallel, NO GRIB2
10. PC Linux x86\_64 (IA64 and Opteron), PGI compiler 5.2 or higher, DM parallel
11. PC Linux x86\_64, g95 compiler, serial, NO GRIB2
12. PC Linux x86\_64, g95 compiler, serial
13. PC Linux x86\_64, g95 compiler, DM PARALLEL, NO GRIB2
14. PC Linux x86\_64, g95 compiler, DM PARALLEL

```
Enter selection [1-14] :
```

# Installing WPS

- Select right option and make sure `configure.wps` has been created.
- Compile WPS by typing:  

```
./compile >& compile_wps.log
```
- Check `compile_wps.log` for Error messages:  

```
grep Error compile_wps.log
```

  
or open `compile_wps.log` in your favorite editor and search for 'Error'
- Verify that the WPS components got installed correctly. Go to: `wrf-fire/WPS`  
You should have there three main components of the WPS:  

```
geogrid.exe  
metgrid.exe  
ungrib.exe
```

Questions?