Installing Citcoms in Workstation

Caution!! All ways use tar files for installation. Extract and install. Do all the installation sequentialy. If you get error before trying to reinstall always excute make clean before executing make install. To check whether the package will succesfully install or not do make check after running ./configure.

1 Source files that you need.

- zlib
- HDF5
- Netcdf
- Gmt-4.5.18
- HC
- Openmpi
- Citcoms

2 Building all the packages from source codes.

2.1 Zlib

1. Enter into the downloaded zlib directory.
2. Create a **.bashrc** file where the source code is downloaded and write the following commands and source it.

   ```
   export F77=gfortran
   export FC=gfortran
   export CC=gcc
   export CXX=g++
   export CFLAGS=-fPIC
   export fld_install=set path where you want to install
   ```

   Remember install **zlib, hdf5 and netcdf** in same directory.
3. Then execute the following line:
   `./configure --prefix=$fld_install; make clean; make install`

2.2 HDF5

1. Enter into the downloaded HDF5 directory.
2. Make sure the **F77, FC, CC, CXX, CFLAGS, fld_install** shows the same outputs as described earlier. Check using for example **printenv 77** or **CC**.
3. Then execute the following line:
   `./configure --prefix=$fld_install --with-zlib=$fld_install; make clean; make all install`

2.3 NETCDF

1. Enter into the downloaded NETCDF directory.
2. Again make sure the **F77, FC, CC, CXX, CFLAGS, fld_install** shows the same outputs as described earlier. Check using for example **printenv F77** or **CC**.
3. Then execute the following line:
   `LDFLAGS=-L$fld_install/lib CPPFLAGS=-I$fld_install/include ./configure --prefix=$fld_install; make clean; make all install`.

For queries use youtube link: Building NetCDF with HDF5, use GNU Compiler

2.4 GMT

1. Enter into downloaded GMT-4.5.18 directory.
2. Create .bashrc file type the following commands:
   ```
   export NETCDFHOME=directory where netcdf is installed i.e, $fld_install export F77=gfortran
   export FC=gfortran
   export CC=gcc
   export CXX=g++
   export CFLAGS=-fPIC
   ```
3. Then execute the following line:
   ```
   ./configure --prefix=directory of installtion; make install-all
   ```
   If problem with netcdf.h arises then run:
   ```
   ./configure --prefix=directory of installtion --enable-netcdf=directory of installed netcdf;
   make install-all
   ```

2.5 HC-1.0.7

1. Enter into downloaded HC-1.0.7 directory.
2. Create .bashrc file type the following commands:
   ```
   export F77=gfortran
   export F90=$F77
   export CC=gcc
   export LDFLAGS="-lm"
   export CFLAGS="-O3 -DLINUX_SUBROUTINE_CONVENTION"
   export CFLAGS_DEBUG="-g -DLINUX_SUBROUTINE_CONVENTION"
   export FFLAGS="-O3 -x f77-cpp-input"
   export FFLAGS_DEBUG="-g -x f77-cpp-input"
   export F90FLAGS="-O3 -x f95-cpp-input"
   export F90FLAGS_DEBUG="-O3 -x f95-cpp-input"
   export F_EXT_SOURCE_FLAG=-extend_source
   export FTRN_LIB="-lifcore" export MATHLIBS="-llapack -lblas"
   export GMTHOME=directory of GMT-4.5.18 installation.
   export NETCDFHOME=directory of NETCDFHOME installtion.
   ```
3. Then execute the following line:
   ```
   make all
   ```

2.6 Openmpi-4.1.1

Note: Install openmpi as root user, to login as root execute sudo -i

1. Enter into downloaded Openmpi directory.
2. Execute the following commands:
   ```
   ./configure --prefix=directory of folder
   autoreconf -fiv
   make all
   make check
   make install
   ```

Don't install openmpi as sudo apt install will cause compilation problem for c code compilation in c++ compiler. Citcoms installation will give error.

After installation add all this line to main .bashrc file for example:

```
export GMTHOME=/home/gtrajulu/gmt1/gmt-4.5.13/
export PATH=$GMTHOME/bin/:$PATH
export HC_HOME=/home/gtrajulu/hc/
export PATH=$HC_HOME/bin/x86_64/:$PATH
export NETCDFHOME=/home/gtrajulu/local/
export PATH=$NETCDFHOME/bin:$PATH
export OPENMPI=/home/gtrajulu/local/
export PATH=$OPENMPI/bin:$PATH
export LD_LIBRARY_PATH=/home/geodynamics/Install/openmpi-4.1.3/lib:$ LD_LIBRARY_PATH
```

2.7 Citcoms-3.3.1

1. Enter into downloaded Citcoms-3.3.1 directory.

2. Create .bashrc file type the following commands:

   ```
   export GMTHOME=/home/gtrajulu/gmt1/gmt-4.5.13/
   export HC_HOME=/home/gtrajulu/hc/
   export NETCDFHOME=/home/gtrajulu/local/
   ```

   If GZip library not found is shown during configure file execution use this:

   ```
   export LDFLAGS=-L/(dir to where zlib is downloaded and extracted)/
   ```

3. Execute the following commands:

   ```
   ./configure --prefix=dir to install CC=/path to mpicc*/ --with-ggrd
   make check
   make install prefix=dir to install
   ```

   * **mpicc** path is the **/directory of openmpi installation/bin/mpicc**

2.8 Running Citcoms

Execute: `mpirun -np 12 CitcomsFull test.input`

Note: If you get this message while running CitcomsFull: **mpirun: error while opening shared librarires libopen-rte.so.40: cannot open shared object file: No such file or directory**

In the working terminal execute the following command:

```
export LD_LIBRARY_PATH=/home/geodynamics/Install/openmpi-4.1.3/lib:$ LD_LIBRARY_PATH
```