# GCHP Build and Run Instructions

## Step 1: Load Required Modules

***module load openmpi hdf5***

## Step 2: Clone the GCHP Repository

***git clone --recurse-submodules https://github.com/geoschem/GCHP.git ~/GCHP  
cd ~/GCHP***

## Step 3: Create Run Directory

***cd run  
./createRunDir.sh***  
# After this, configure your run settings as needed and set the run directory

## Step 4: Prepare Build Directory

***cd ~/GCHP***

***mkdir -p build  
cd build***

## Step 5: Set Environment Variables (adjust paths as per your setup)

***export NETCDF\_ROOT=/data/lab/meng/jahidul/netcdf  
export NETCDF\_C\_LIBRARY=$NETCDF\_ROOT/lib/libnetcdf.so  
export NETCDF\_F\_LIBRARY=$NETCDF\_ROOT/lib/libnetcdff.so  
export NETCDF\_C\_INCLUDE\_DIR=$NETCDF\_ROOT/include  
export NETCDF\_F90\_INCLUDE\_DIR=$NETCDF\_ROOT/include  
  
export LD\_LIBRARY\_PATH=$NETCDF\_ROOT/lib:$LD\_LIBRARY\_PATH  
  
export OPENMPI\_ROOT=/home/mdjahidul.islam/software/openmpi/5.0.0  
  
export PATH=$OPENMPI\_ROOT/bin:$PATH  
export LD\_LIBRARY\_PATH=$OPENMPI\_ROOT/lib:$LD\_LIBRARY\_PATH  
export INCLUDE=$OPENMPI\_ROOT/include:$INCLUDE  
export FPATH=$OPENMPI\_ROOT/include:$FPATH  
  
# Add other required library paths if necessary  
export LD\_LIBRARY\_PATH=/home/rohit.dhariwal/cadence/installs/SPECTRE211/tools.lnx86/lib/64bit/SuSE/SLES12:$LD\_LIBRARY\_PATH***

## Step 6: Configure Build with CMake

***cmake .. \  
 -DCMAKE\_C\_COMPILER=/opt/apps/gcc/11.5/bin/gcc \  
 -DCMAKE\_CXX\_COMPILER=/opt/apps/gcc/11.5/bin/g++ \  
 -DCMAKE\_Fortran\_COMPILER=/opt/apps/gcc/11.5/bin/gfortran \  
 -DCMAKE\_PREFIX\_PATH="$NETCDF\_ROOT;/data/lab/meng/jahidul/ESMF/DEFAULTINSTALLDIR;$OPENMPI\_ROOT" \  
 -DNETCDF\_DIR="$NETCDF\_ROOT" \  
 -DNETCDF\_C\_LIBRARY="$NETCDF\_C\_LIBRARY" \  
 -DNETCDF\_F\_LIBRARY="$NETCDF\_F\_LIBRARY" \  
 -DNETCDF\_C\_INCLUDE\_DIR="$NETCDF\_C\_INCLUDE\_DIR" \  
 -DNETCDF\_F90\_INCLUDE\_DIR="$NETCDF\_F90\_INCLUDE\_DIR" \  
 -DNETCDF\_FORTRAN\_INCLUDE\_DIR="$NETCDF\_F90\_INCLUDE\_DIR" \  
 -DNETCDF\_FORTRAN\_LIBRARY="$NETCDF\_F\_LIBRARY" \  
 -DMPI\_C\_COMPILER=$OPENMPI\_ROOT/bin/mpicc \  
 -DMPI\_CXX\_COMPILER=$OPENMPI\_ROOT/bin/mpicxx \  
 -DMPI\_Fortran\_COMPILER=$OPENMPI\_ROOT/bin/mpif90 \  
 -DMPI\_HOME=$OPENMPI\_ROOT \  
 -DMPI\_C\_INCLUDE\_DIR=$OPENMPI\_ROOT/include \  
 -DMPI\_C\_LIBRARIES=$OPENMPI\_ROOT/lib/libmpi.so \  
 -DMPI\_Fortran\_INCLUDE\_DIR=$OPENMPI\_ROOT/include \  
 -DMPI\_Fortran\_LIBRARIES=$OPENMPI\_ROOT/lib/libmpi\_usempif08.so \  
 -DESMF\_DIR=/data/lab/meng/jahidul/ESMF/DEFAULTINSTALLDIR \  
 -DESMF\_MOD\_DIR=/data/lab/meng/jahidul/ESMF/mod/modO/Linux.gfortran.64.openmpi.default \  
 -DESMF\_HEADERS\_DIR=/data/lab/meng/jahidul/ESMF/DEFAULTINSTALLDIR/include \  
 -DESMF\_LIBRARY=/data/lab/meng/jahidul/ESMF/lib/libO/Linux.gfortran.64.openmpi.default/libesmf.a***

## Step 7: Build GCHP

***make -j***

## Step 8: Setup Run Directory for Build

***cmake . -DRUNDIR=/data/lab/meng/jahidul/trialgchp146 # Your run directory path***

## Step 9: Install the Build

***make install***

## Step 10: Prepare to Run GCHP

- Go to your run directory:  
***cd /data/lab/meng/jahidul/trialgchp146***  
  
- Edit `setCommonRunSettings.sh` to configure your simulation settings.  
***nano setCommonRunSettings.sh***  
- Source the settings:  
***./setCommonRunSettings.sh***

## Step 11: Setup Restart and Input File Links

- Download required restart and input files to appropriate locations.  
- Then run the restart linking script:  
***./setRestartLink.sh***

## Step 12: Submit the Job via Slurm

Assuming you have a batch script named `gchp\_run.sh`, submit your job:  
  
***sbatch gchp\_run.sh***