Contents

1 Background

This document assumes that the reader is familiar with NetCDF and OPeNDAP. Background reading on these topics can be found in Section 6.

NetCDF-4 files can be downloaded through OPeNDAP from an environment such as a THREDDS server [1], provided that the user's NetCDF build includes DAP support. This document provides instructions for verifying if a NetCDF build has DAP support, and some options for getting such a build.

2 Checking if a build has DAP support

If you already have a NetCDF installation, you can check if it has DAP support by running the following command:

```
nc-config --has-dap --has-dap2 --has-dap4
```

and verifying that all options return 'yes'. Older NetCDF builds may not have all of these options.

3 Install NetCDF locally with DAP support

If you do not have a NetCDF installation, or the one you have does not include DAP support, the simplest way to get a build with DAP support is most likely through a package manager such as APT or Homebrew. For example, on Ubuntu Linux, you can get a full NetCDF installation with the following commands:

```
apt install libnetcdf-dev libnetcdff-dev
apt install netcdf-bin
```

This deafult installation should include DAP support. If you are only interested in running the NetCDF utilities such as `ncdump` and `nccopy` and you do not need the library for development, just installing `netcdf-bin` may be enough.

4 NetCDF on HPC with modules

On a high-performance computing system, you may have access to a NetCDF build with DAP through environment modules. For example, on the Frontera system at the Texas Advanced Computing Center, you can load the latest NetCDF build with:

[1] https://www.unidata.ucar.edu/software/tds/current/

```
module load netcdf/4.7.4
```

On the other hand, the `netcdf/4.6.2` module on Frontera does not include DAP support. Similarly, the NetCDF modules on TACC's Stampede2 do not have this functionality.

5 Install NetCDF from source with DAP support

If you cannot use a package manager and you need to build NetCDF from source, the main resource to read for instructions is:
https://www.unidata.ucar.edu/software/netcdf/documentation/NUG/getting_and_building_netcdf.html

For this section, example steps based on this resource will be listed that can be used to build NetCDF from source on the Stampede2 system at TACC. This process is simpler than a full build from source, since Stampede2's modules are used for NetCDF's dependencies, but it is included here for reference.

5.1 Example: Installing NetCDF from source on Stampede2 at TACC

First, load the libraries that NetCDF depends on using modules. It is necessary to load a previous version of the Intel library due to the dependencies of zlib:

```
module load intel/17.0.4
module load hdf5
module load zlib
```

Next, navigate to a directory where you want to download the NetCDF source code. Then run:

```
wget https://github.com/Unidata/netcdf-c/archive/refs/tags/v4.7.4.tar.gz
tar zxvf v4.7.4.tar.gz
cd netcdf-c-4.7.4/
```

Now run the build commands, using TACC's environment variables for convenience (installation location is up to the user; the `NCDIR` here is just an example):

```
mkdir -p ${WORK}/netcdf-workflow-libs/netcdf4-withdap
NCDIR=${WORK}/netcdf-workflow-libs/netcdf4-withdap
CPPFLAGS="-I${TACC_HDF5_INC} -I${TACC_ZLIB_INC}" LDFLAGS="-L${TACC_HDF5_LIB} -L${TACC_ZLIB_LIB
    }" ./configure --prefix=${NCDIR}
make check
make install
```

It may be necessary to add your installation to `LD_LIBRARY_PATH`:

```
LD_LIBRARY_PATH=${WORK}/netcdf-workflow-libs/netcdf4-withdap/lib:${LD_LIBRARY_PATH}
```

You can optionally add `${WORK}/netcdf-workflow-libs/netcdf4-withdap/bin` to `PATH`.

6 Resources

- NetCDF homepage: https://www.unidata.ucar.edu/software/netcdf/
- OPeNDAP homepage: https://www.opendap.org/about
- DAP standard homepage: https://earthdata.nasa.gov/esdis/eso/standards-and-references/data-access-protocol-2

7 Where to find the latest version of this document

The latest version of this document can be found at: https://github.com/mbotto123/paraview-adcirc-vis/tree/master/documentation

8 Author information

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