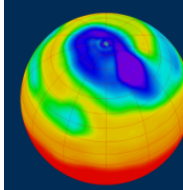




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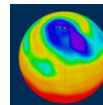
# Overview of NetCDF

Thanks to all contributors:

Alison Pamment, the Unidata team.



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# What is NetCDF?

NetCDF is more than just a file format. In the simple view, netCDF is a:

- Data model
- File format
- Application programming interface (API)
- Library implementing the API

Together the data model, file format, and APIs support the creation, access, and sharing of scientific data.

# What is netCDF, really?

In the real world, things are more complicated. NetCDF evolves to keep up with needs of its users, and is actually:

- Two data models:
  - **Classic model** (for netCDF-1, netCDF-2, netCDF-3)
  - **Enhanced model** (for netCDF-4)
- Four file formats:
  - **Classic format** and **64-bit offset format** variant
  - **NetCDF-4 format** and **netCDF-4 classic model format** variant
- Two independent flavours of APIs:
  - **C-based** (C, F90, F77, C++, Python, Perl, Ruby, Matlab, ...)
  - **Java-based**

# However, we only use one of these

Most scientists, most of the time, will only interact with one of these - so the story isn't so complex after all.

# NetCDF Features

Several characteristics make netCDF useful for storing and accessing scientific data.

- **Self-Describing:** A netCDF file may include metadata as well as data: names of variables, data locations in time and space, units of measure, and other useful information.
- **Portable:** Data written on one platform can be read on other platforms.
- **Direct-access:** A small subset of a large dataset may be accessed efficiently, without first reading through all the preceding data.
- **Appendable:** Data may be appended to a netCDF file without copying the dataset or redefining its structure.

# NetCDF Features

- **Networkable:** The netCDF library provides client access to structured data on remote servers through OPeNDAP protocols.
- **Extensible:** Adding new dimensions, variables, or attributes to netCDF files does not require changes to existing programs that read the files.
- **Sharable:** One writer and multiple readers may simultaneously access the same netCDF file. With parallel netCDF, multiple writers may efficiently and concurrently write into the same netCDF file.
- **Archivable:** Access to all earlier forms of netCDF data will be supported by current and future versions of the software.

# NetCDF's niche

- The netCDF niche is ***array-oriented scientific data***.
- It also has a large user community to foster:
  - Support in third-party applications
  - Third-party APIs for many programming and scripting languages
  - Community conventions, such as Climate and Forecast (CF) metadata conventions
  - Standards for interoperability

# Installing NetCDF

Download an appropriate release from:

<http://www.unidata.ucar.edu/downloads/netcdf/index.jsp>

(If you want python-netCDF to work you will need the NetCDF libraries written in C).

To install, see the installation guide at:

<http://www.unidata.ucar.edu/software/netcdf/docs/netcdf-install/>

However, you should be able to pick up binary and RPM distributions for most computing environments.



# Acknowledgement

The material presented here was primarily taken from the Unidata NetCDF workshop notes at:

<http://www.unidata.ucar.edu/software/netcdf/workshops/2012>