A High performance I/O Module: the HDF5 WRF I/O module

http://www.ncsa.uiuc.edu/apps/WRF-ROMS

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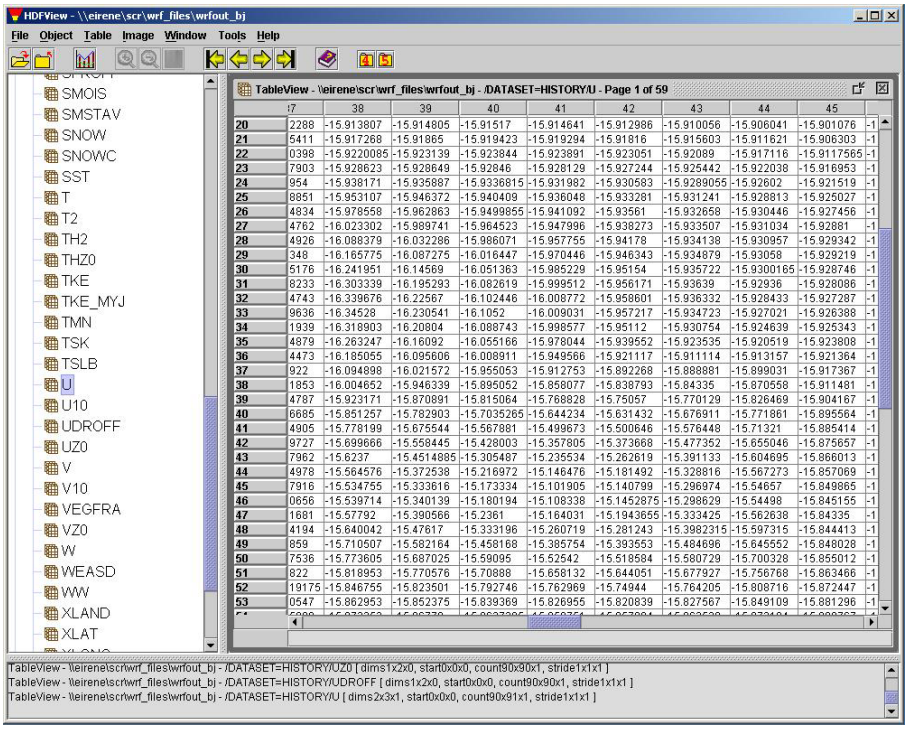
NCSA is currently developing an implementation of WRF I/O module that reads and writes HDF5 datasets. The module will be available to anyone using WRF as a new option for I/O. We believe that the high performance features of HDF5 will definitely help the WRF user community.

The WRF-HDF5 module is being developed as part of the NSF funded MEAD project at NCSA. The module implements the standard WRF/IO interface, so it can be used with any WRF application. All the I/O features of the WRF-I/O netCDF module are supported. A serial I/O version is available for evaluation, and a parallel I/O version is being developed now.

Below is the illustration of WRF model output in HDF5. The initial data is provided by Brain F. Jewett and Robert B. Wilhelmson's numerical study of tornado outbreaks in 1996 in the state of Illinois and nearby states. We are using the HDF View Java tool to visualize the data structure and data.

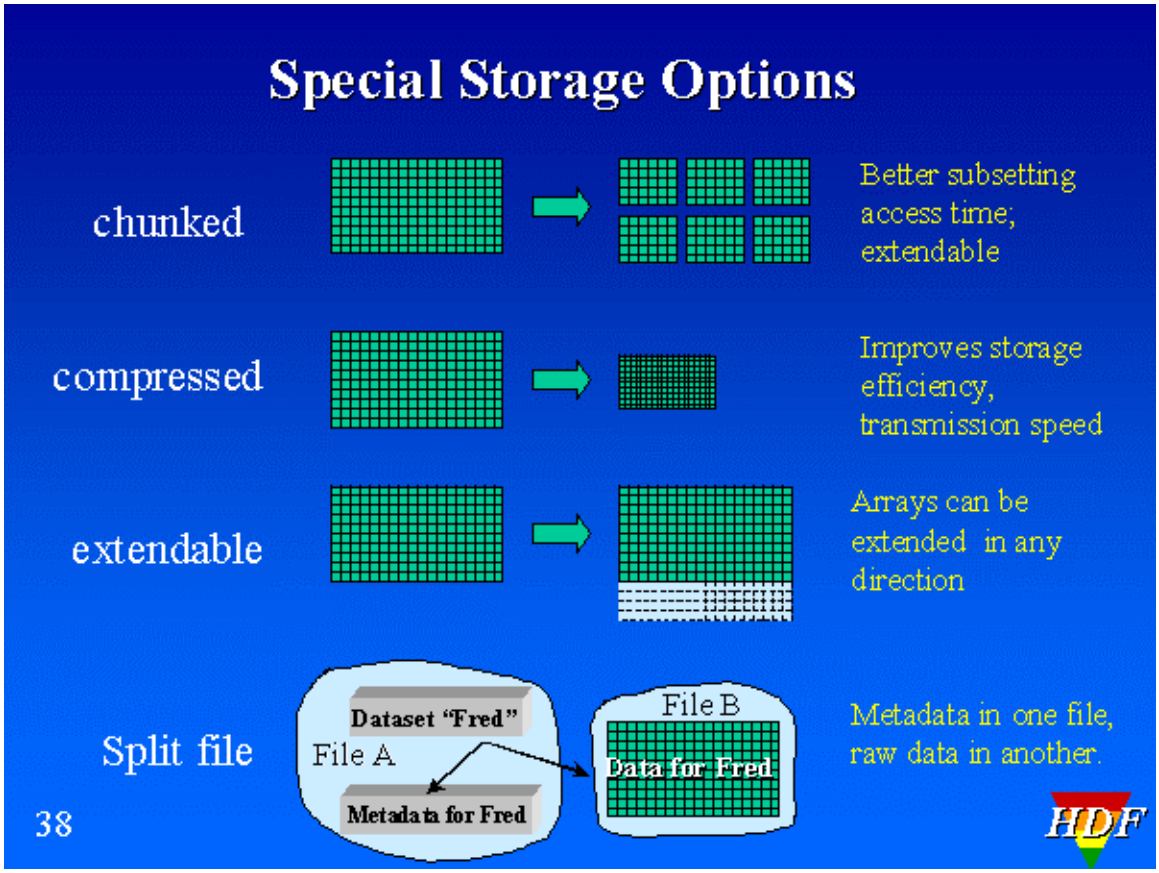


Hierarchical Data Format (HDF) 5

http://hdf.ncsa.uiuc.edu

HDF5 was developed to support contemporary high performance computing environments, including datasets larger than 2 Gigabytes, very large numbers of objects in a file, and alternative storage layouts, such as chunking and compression [1]. HDF5 was designed to use MPI-I/O, which is capable of performing I/O efficiently in parallel computing environments. HDF5 can also handle complex data structures and complex subsetting.

The following schematic illustrates the special storage options of HDF5.



HDF5 is used by many scientific communities, including those that manage important Earth Science data, including the NASA EOS 'Aura' satellite [2] and the NPOESS system [3].

1. http://hdf.ncsa.uiuc.edu/HDF5
2. http://lennier.gsfc.nasa.gov/seeds/W3pr_Craig.pdf
3. http://lennier.gsfc.nasa.gov/hdfeos/workshops/WSsix/presentations/Goldberg/HDF5_for_NPOESS.pdf