ncWMS: a Web Map Service for the visualization of multidimensional gridded environmental data

Jon Blower, Keith Haines, Alastair Gemmell, and Adit Santokhee
University of Reading, United Kingdom (j.d.blower@reading.ac.uk)

ncWMS is a Web Map Service implementation for gridded scientific data held in multiple file formats, including NetCDF, HDF and GRIB. It is widely used in the ocean modelling and forecasting communities and is also gaining traction in the meteorological and climate communities; in all these communities the need to efficiently handle large four-dimensional (x-y-z-t) datasets is paramount. ncWMS is available as a standalone web application or as a component of the widely-used THREDDS Data Server.

In this presentation we will discuss our experiences with the development and application of ncWMS, based on several years of real-world use. We will focus on the following topics:

1. The conceptual mapping between the WMS data model and that of the Unidata Common Data Model, highlighting omissions and areas of ambiguity that could compromise interoperability.

2. The features that are required by the community that are not found in most other WMS implementations. These include the generation of animations, the handling of complex numerical grids and the handling of unusual calendar systems (which are common in climate science).

3. The performance of the implementation, including a discussion of why the accurate and repeatable measurement of real-world performance is very difficult. Much effort has been expended in ensuring that ncWMS performs efficiently for large datasets and scales as well as possuble to multiple users.

4. The extensions to the WMS standard that ncWMS implements. These include extra parameters for controlling the styling of map images, the production of "non-map" plot types, the serving of metadata that does not fit the standard Capabilities structure and the interpretation of the GetFeatureInfo operation. We will discuss why and how these extensions were implemented and the reaction of real users. Note that ncWMS remains fully backward-compatible with WMS 1.1.1 and 1.3.0.

5. Experiences with interoperability in the real world, including the compatibility of GIS clients with the WMS specification, particularly regarding four-dimensional data.