

OPeNDAP Roadmap to New Server-Side Capabilities and Other Supports for Data-Intensive Science

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BACKGROUND

OPeNDAP, the Open-Source Project for a Data Access Protocol, is a not-for-profit organization that develops, disseminates and supports software that enables client-server access—via Web-style transport over Internet—to scientific data. OPeNDAP methodologies are particularly effective for *structured* data (such as multidimensional grids, with or without geo-referencing) for which traditional database management system (DBMS) methodologies are a poor fit.

HYRAX

Central to the OPeNDAP capabilities is a robust, widely used, open-source server system dubbed Hyrax. This presentation summarizes the roadmap (parts of which are firm while others are tentative) being charted for the future of Hyrax and OPeNDAP. Four topics will be covered:

SERVER-SIDE SUBSETTING

Extended forms of server-side subsetting are being planned that will fully embrace non-rectangular meshes and so-called unstructured grids (UGRIDs). Focused initially on server-side subsetting of UGRIDs, these extensions eventually will embrace large classes of non-rectangular meshes as well as unstructured collections of (space-time) point observations. The latter are applicable to many types of observational data sets, including profiles and various forms of station data.

DATA INVENTORIES

Expanding beyond Hyrax's current support for THREDDS Catalogs, capabilities are under consideration for building and utilizing true *inventories* of OPeNDAP-accessible data sets. Defining “inventory” to be a form of dataset characterization that is more detailed than a THREDDS Catalog, the envisaged capabilities might be dynamically created in a manner that reflects, e.g., user-specified constraint expressions and space-time resolutions. Appropriate advances will better enable “digital library” services for cataloging data sets, both metadata, and content.

HYRAX-TDS CONFORMANCE

Increased compatibility and commonality between OPeNDAP's Hyrax and Unidata's THREDDS Data Server (TDS) will result from conformance to a newly minted set of OPeNDAP protocol specifications (mutually agreed by OPeNDAP and Unidata) and an associated set of conformance tests. These advances may eventually lead to a common framework for Hyrax and TDS.

HYRAX AND CLOUD COMPUTING

Plans are beginning to take shape regarding the impact of cloud computing on needed (Hyrax) data services, including potential changes in the social aspects of data exchange, use and reuse. For example, might a new paradigm emerge in which cloud-based processing systems are expected to create provenance and citation records, immediately suitable for publication.

ABOUT THE AUTHOR

Dave Fulker, President of OPeNDAP, has focused his career on serving scientists and science educators via computing and networking advances. His teams have combined leading-edge technologies with end-user service, underpinned by expertise in both technical and social aspects of the information age.

Dave directed the Unidata Program (at the University Corp. for Atmospheric Research) from inception until 2002, overseeing development of the Network Common Data Form (netCDF) and other software now considered critical infrastructure in the geosciences and other fields. Unidata is often considered an exemplar of community participation and data sharing. Before launching Unidata and serving as (founding) Executive Director of the National Science Digital Library (NSDL), Dave spent 18 years in software-development and leadership at the National Center for Atmospheric Research (NCAR).

Dave is a Fellow of the American Meteorological Society (AMS) and recipient of the AMS Cleveland Abbe Award, the Educom Medal for Technology in Education and the NCAR Technology Advancement Award. Dave holds Master and Bachelor of Arts degrees in Mathematics from the University of Colorado, is a professional trumpet player (jazz and classical), and is President of the Boulder Philharmonic Orchestra.