Remote Data Exploration with IDL

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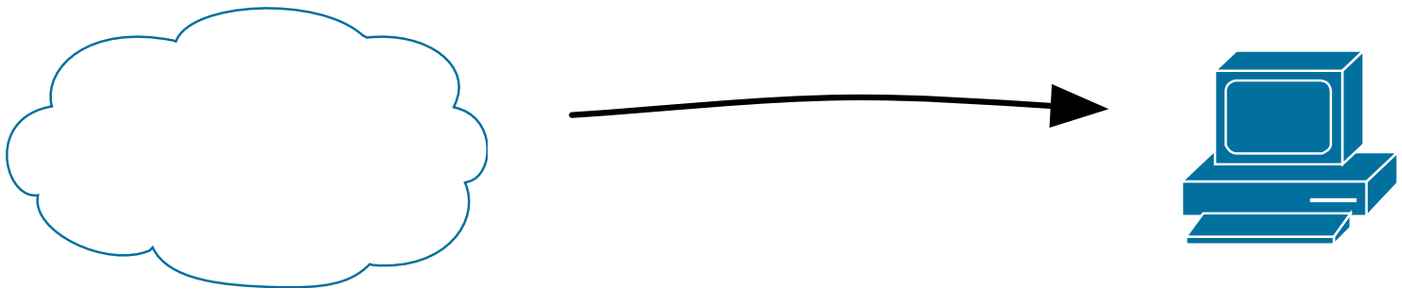
Remote data workflows



Choices:

1. “download”,
2. work remotely, or
3. selective access

Download and work locally

- If you can do this still, you're lucky!
- Might happen if you need only a portion of the full data set and the organization of the data allows a simple download

Keep data remote

Techniques: ssh/X or remote visualization tools like VisIt

- might not have ssh access to server
- VisIt requires user-level backend to be running on server (at NERSC requires use of interactive queue, so a wait)

Access select data

- Data might not be organized in the manner best suited for your analysis
- Great mode for data centers: the organization of the data can't be optimized for everyone's purposes

IDL (Interactive Data Language)

- Interpreted, array based
- Easy to use for scientists
- Used heavily in earth sciences, astronomy, and other image based analysis
- Basic networking capabilities
- GDL (open source version)

Data Access Protocol (DAP)

- Lightweight, HTTP based web service
- Support for extracting portions of file
- Many server implementations (Hyrax from OPeNDAP, PyDAP, THREDDS Data Server (TDS) from Unidata, and GrADS Data Server (GDS) from COLA)
- Clients for many languages/environments (C, C++, Python, GrADS, Matlab, IDL, Ferret, IDV, McIDAS-V, and Panoply)

OPeNDAP IDL bindings

- Provided by OPeNDAP (opendap.org)
- IDL bindings incomplete
- Difficult to install for novices or on older systems

TxDAP IDL bindings

- More complete support of DAP standard
- Pure IDL (easy installation)
- Documentation
- Superset of OPeNDAP bindings
- Collaboration with ITT VIS to add operator overloading

netCDF bindings

- netCDF 4+ library works with local netCDF files and DAP URLs
- A low-level interface is provided with IDL 8.0+
- We provide high-level routines with graphical browser

netCDF Browser - many files
/Applications/itt/idl/idl80/examples/data/
Submarine
Diesel_Electric
Sub Depth
Nuclear
Attack
Sub Depth
Missile
Sub Depth
/Applications/itt/idl/idl80/examples/data/
image
Name: image
Type: BYTE
Dimensions: [768, 512]
Variable name for import:
image
Include data
Import to IDL
Done

Server-side functions

- Useful for reduction operations, including visualization
- OPeNDAP Hyrax server

All files

.pro files 48 files

electrons_plot_macro.pro
idl_object__define.pro
macro_test.pro
mg_src_root.pro
tx_arrayindtostr.pro
tx_base64decode.pro
tx_base64encode.pro
tx_braces2slash.pro
tx_converttype.pro
tx_hasneturl.pro
tx_index.pro
tx_isidlversion8.pro
tx_nc_browser.pro
tx_nc_dump.pro
tx_nc_getdata.pro
tx_newline.pro
tx_simplemap__define.pro
tx_slash2braces.pro
tx_structtoarray.pro
txcohashtable__define.pro
txdap__define.pro
txdap_atomic__define.pro
txdap_compile_opt.pro
txdap_convertbounds.pro
txdap_createatomic.pro
txdap_daptype2idltypecod
txdap_datapkt__define.pro

IDL DAP bindings

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Overview

The IDL source code for the RDL project. See the TxDAP introduction for more information about using the TxDAP bindings.

Directories

lib/	helper routines
netcdf/	routines/classes for accessing netCDF files and DAP data sets
txdap/	code for pure IDL DAP implementation
txdap/varobjects/	data objects for TxDAP
xdap/	GUI for exploring DAP servers

Project statistics

Directories:	5
.pro files:	48
.sav files:	0
Routines:	439
Lines:	10,378
Required IDL version:	6.4

Thank you!

Questions?

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txcorp.com/products/RemoteDataToolkit