



ESIPHub

Services and infrastructure to support
computational geosciences
education, research and collaboration
with JupyterHub

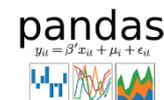
Winter 2019 Incubator Project Update

Keith E. Maull, PhD

ESIPHub | Project Goals

BROAD PROJECT GOALS

- 1 **provide ESIP community with shared resources** based on current tools, platforms and workflows to support computational geoscience inquiry for experimentation, collaboration, education and research
- 2 **develop skill and capacity for workshop support** and expansion of platform at 2018 ESIP summer meeting and beyond
- 3 **sustain stable long-term platform** for continued use in varied ESIP projects and communities



ESIPHub | Project initialization

Summer 2018

ESIPHUB PILOT WITH UCAR SOARS

- ESIPHub piloted at UCAR summer research programs
- Computational thinking and data science workshops



```
from cartopy.io import shapely_to_mpl
fig = plt.figure(figsize=(10, 10))
ax = fig.axes[0].projection = Basemap(projection='cyl', lon0=0, lon1=360, lat0=90, lat1=-90, rsphere=6371e5, xunits='m', yunits='m')
ax.set_global()
ax.imshow(data, cmap=cm.viridis)
ax.coastlines(linewidth=1)
plt.show()
```

Pydap

Pydap is a pure Python library implementing the Data Access Protocol, also known as DAPS or OPeNDAP. You can use Pydap as a client to access hundreds of scientific datasets in a transparent and efficient way through the internet, or as a server to easily

OUTCOMES

- Refined operating environment
- Developed experience with infrastructure scaling

ESIPHub | Project initialization

Summer 2018

The screenshot displays a JupyterLab environment. The main notebook, '02 - Interactive', is open and shows the following content:

Initialize Earth Engine

We start by importing the [Earth Engine Python API](#) module.

```
In [2]: import ee # the Earth Engine Python API library
```

The following command initializes the Earth Engine Python API.

```
In [3]: ee.Initialize()
```

If the cell produces output that displays an error about needing to authenticate, open up the notebook entitled 01 - Setup auth credentials and follow the instructions.

Display a Static Map

This section demonstrates how to obtain a static map image from Earth Engine, and display it

... as simple as referencing an image stored in the [Earth Engine Public Data Catalog](#) or a Computed image that includes several processing steps. The following example uses a reference to the [SRTM Digital Elevation Data 30m](#) dataset.

```
In [4]: ee.Image.getThumbUrl
```

... the `ee.Image.getThumbUrl` method to construct a URL that will return an image file.

The 'QuickStart.md' file on the right lists the components of the JupyterLab GUI:

ESIPhub Quickstart



JupyterLab GUI

- Interface
- Menu Bar
- Main Work Area
- Left Side Bar
- Tabs

The terminal window at the bottom shows the following output:

```
groups: cannot find name for group ID 1000  
jovyan@jupyter-esip0000:~$
```

Metadata Evaluation Lab at ESIP: Assessing if community metadata is ready for Schema.org
(Sean Gordon • John Relph)

Custom Built Jupyter Widgets for Earth Science
(Tyler Erickson • Sean Gordon)

Interactive Data Analysis on Cloud Environment
(Frank Greguska • Thomas Huang • Joe Jacob • Rich Signell)

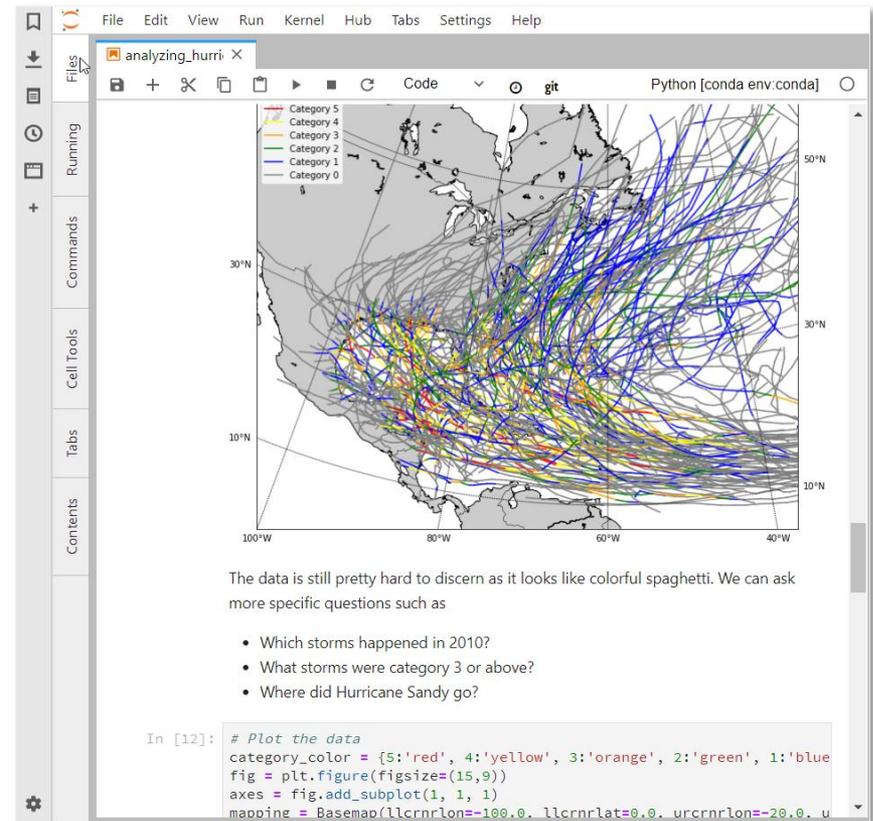
ESIPHub | Lessons learned

- **Scalability** should be a principal concern
- Platform more compelling in **directed contexts** (workshops)
- Sharing and **collaboration model** still **needs refinement** (e.g. /shared, etc.)
- **Ongoing support necessary** to guarantee service quality
- Hub visibility requires more **marketing and promotion**
- More work needs to go into understanding **supportable use cases**

ESIPHub | Refinement Iteration

Winter 2019

- ESIP Education committee taking interest in using the **Hub** in middle and high school geoscience
- **Committee working session** (yesterday 1/15) provided feedback for summer 2019 meeting goals for Hub



ESIP Hub | Next Steps

- Hub **sustainability** is a priority:
 - What is the operating model?
 - How will it be paid for?
 - How can ongoing operational budget develop to support a broad array of needs?
- Hub **service model** needs development:
 - Who can you the Hub within the community (and for what)?
 - Will education/training be the primary role of the Hub?
 - When will access requests be rejected or suspended?

Thanks!

The National
DATA SERVICE



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