Developing Pegasus Workflows via Jupyter Notebooks

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http://pegasus.isi.edu

Jupyter Notebooks

From Jupyter.org:

The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text. Uses include: data cleaning and transformation, numerical simulation, statistical modeling, data visualization, machine learning, and much more.

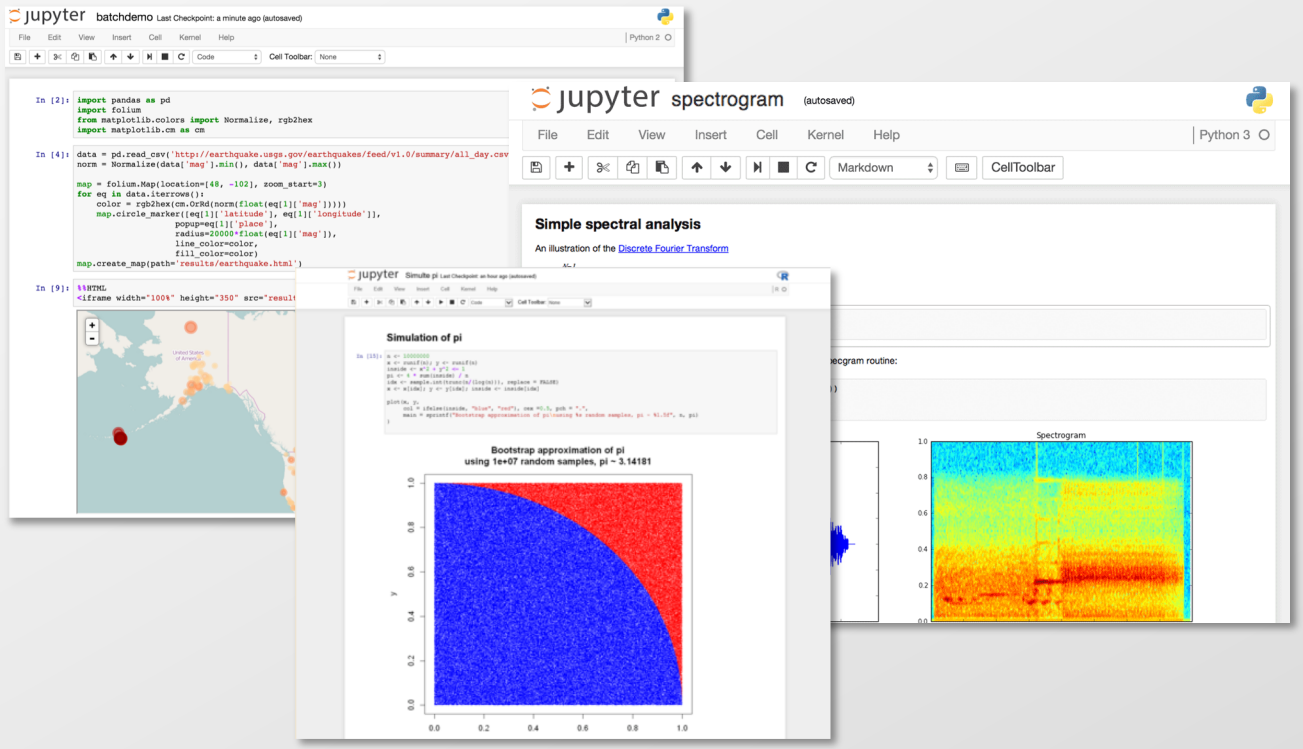
Key Advantages

- Collaboration
- Easy access to resources
- Building blocks
- Reproducibility

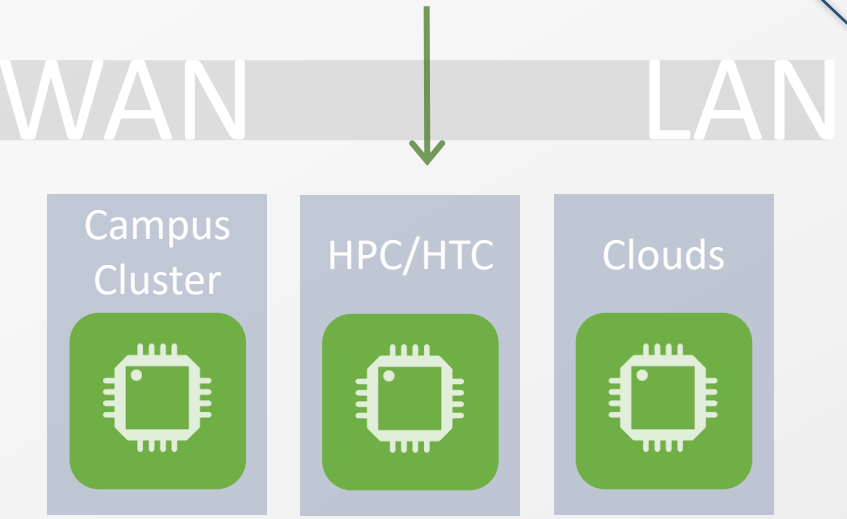
Examples

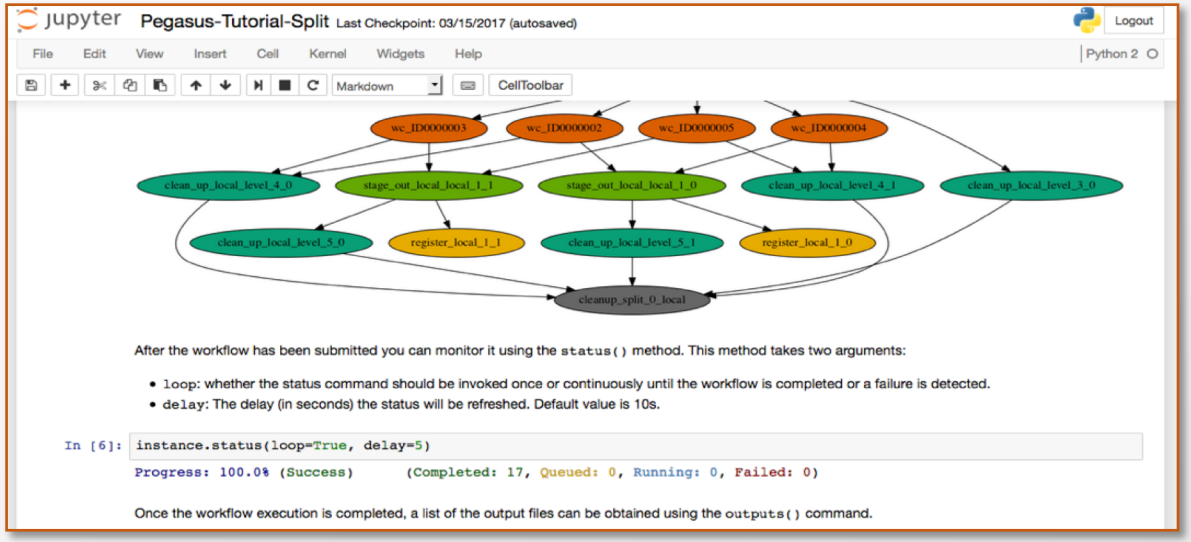
- LIGO Gravitational Wave Data
- Satellite Imagery Analysis
- 12 Steps to Navier-Stokes
- Computer Vision
- Machine Learning

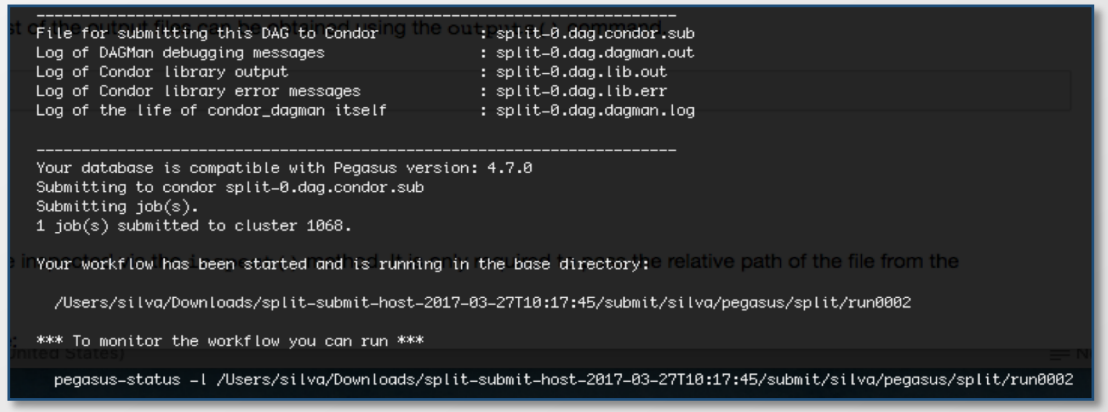
https://unidata.github.io/online-python-training/introduction.html



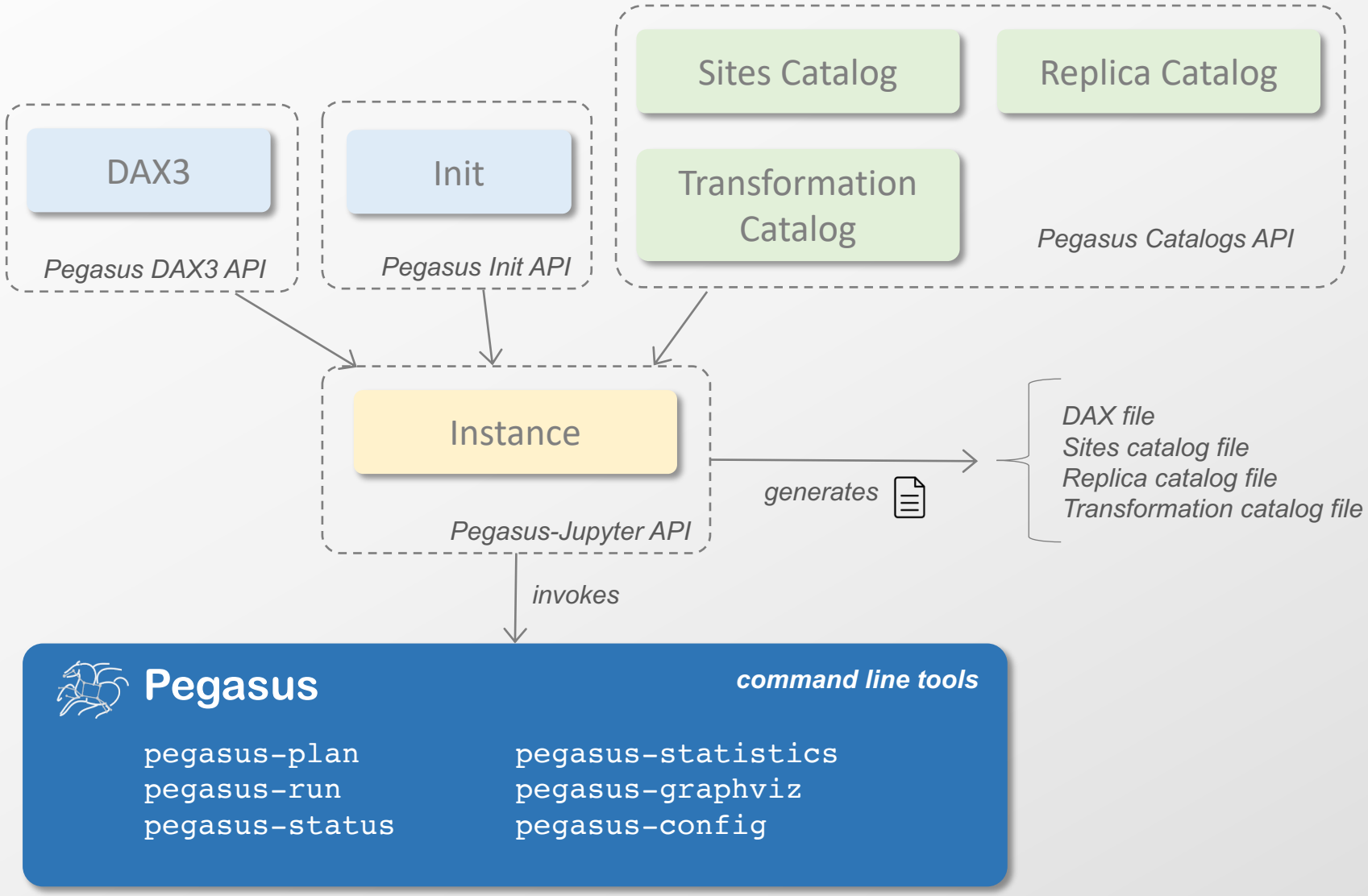
Running Pegasus workflows with Jupyter







Pegasus – Jupyter Integration Overview



Pegasus-Jupyter Python API

```
from Pegasus.jupyter.instance import *
```

importing the API

```
instance = Instance(dax)
```

creating an instance of the DAX

```
# Create an abstract dag
dax = ADAG("split")

# the split job that splits the webpage into smaller chunks
split = Job("split")
split.addArguments("-l","100","-a","1",webpage,"part.")
split.uses(webpage, link=Link.INPUT)
# associate the label with the job. All jobs with same label
# are run with PMC when doing job clustering
split.addProfile( Profile("pegasus","label","p1"))
dax.addJob(split)
```

using the Pegasus DAX3 API to write a workflow

```
instance.run(site='condorpool')
```

running a workflow

```
instance.status(loop=True, delay=5)
```

monitoring a workflow execution

```
Progress: 100.0% (Success)      (Completed: 17, Queued: 0, Running: 0, Failed: 0)
```

Available since:

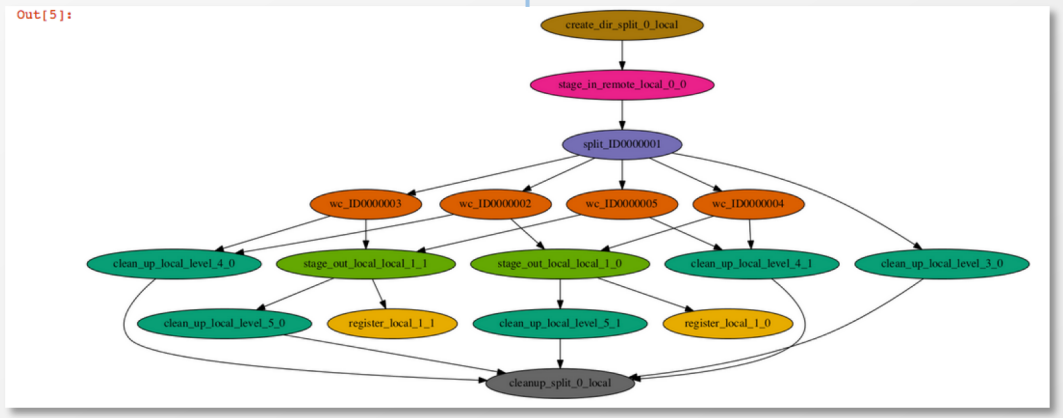
Pegasus 4.8

Additional capabilities…

```
wf_image_exe = instance.view(abstract=False)

# IPython package for visualizing images
from IPython.display import Image
Image(wf_image_exe)
```

visualizing the workflow




```
instance.statistics()
```

collect statistics

```
Workflow Wall Time: 47 min, 23 secs
```

```
# creating a site catalog. A local site is automatically created
sites_catalog = SitesCatalog()

# adding a site with some profile characteristics
sites_catalog.add_site('condorpool', Arch.X86_64, OSType.LINUX)
sites_catalog.add_profile('condorpool', Namespace.ENV, 'JAVA_HOME', '/usr/local/jre')

dax.set_sites_catalog(sites_catalog)
```

create catalogs: site, replica, and transformation

Available since:

Pegasus 4.8

Requirements

Pegasus submit node

Python 2.7 or higher (Jupyter requires version 2.7+)
Java 1.8 or higher
Pegasus 4.8.0 or higher
https://pegasus.isi.edu/downloads/
Jupyter
http://jupyter.org/install.html

JupyterHub

Due to the strict requirement of **Python 3** for running the multi-user hub, our API requires the Python **future package** in order to be compatible with Python 3.

Python Future package:
https://pypi.python.org/pypi/future

References

Documentation

https://pegasus.isi.edu/documentation/jupyter.php

API Reference

Instance: https://pegasus.isi.edu/documentation/python/instance.html

Catalogs:

https://pegasus.isi.edu/documentation/python/sites_catalog.html
https://pegasus.isi.edu/documentation/python/replica_catalog.html
https://pegasus.isi.edu/documentation/python/transformation_catalog.html

Example Tutorial Notebook

Distributed with Pegasus releases (since 4.8)

Also available in the Pegasus Tutorial VM (https://pegasus.isi.edu/downloads/)

Instructions
https://pegasus.isi.edu/documentation/jupyter-example.php

Pegasus est. 2001

Automate, recover, and debug scientific computations.

Get Started

Pegasus Website

http://pegasus.isi.edu

Users Mailing List

pegasus-users@isi.edu

Support

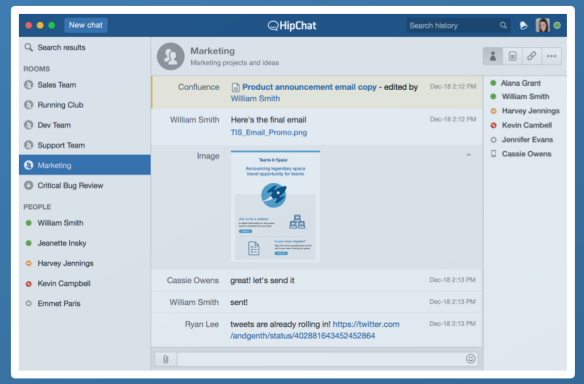
pegasus-support@isi.edu

Pegasus Online Office Hours

https://pegasus.isi.edu/blog/online-pegasus-office-hours/

Bi-monthly basis on second Friday of the month, where we address user questions and also apprise the community of new developments

HipChat



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Thank You

Questions?

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Meet our team


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