

Kernels

And customizing Jupyter

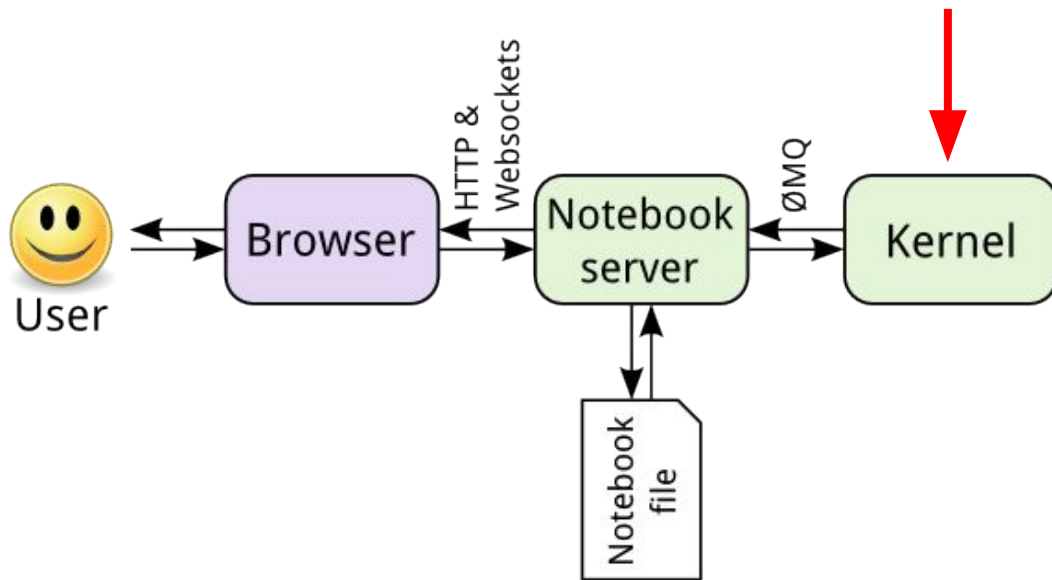
What is the kernel

A **kernel** provides programming language support in Jupyter. IPython is the default kernel. Additional kernels include R, Julia, and many more.

Fun fact: Jupyter was named after **JULia** **PY**Thon and **R** once the old IPython notebook started supporting other languages

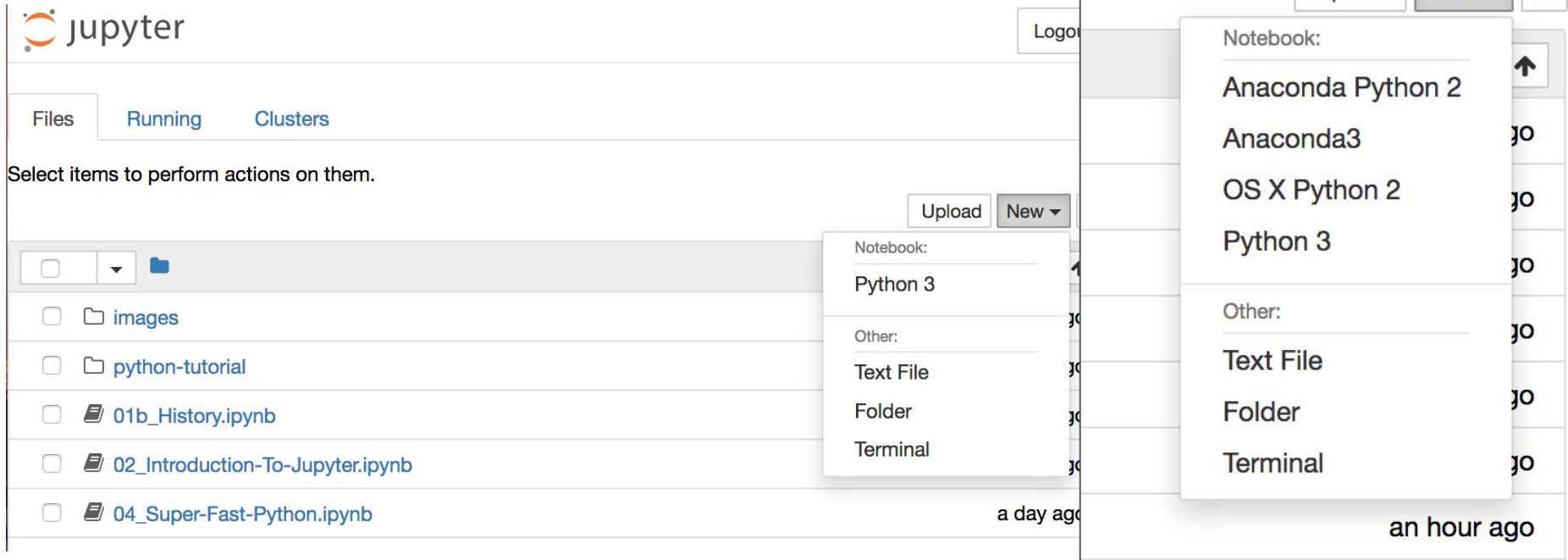


Under the Covers



Selecting a Kernel

In the Jupyter File Browser ...



The screenshot displays the Jupyter File Browser interface. At the top, the Jupyter logo is visible. Below it, there are tabs for 'Files', 'Running', and 'Clusters'. A message states: 'Select items to perform actions on them.' The file list includes folders 'images' and 'python-tutorial', and notebooks '01b_History.ipynb', '02_Introduction-To-Jupyter.ipynb', and '04_Super-Fast-Python.ipynb'. Two 'New' dropdown menus are open. The first menu, located over the file list, shows 'Notebook:' with 'Python 3' selected, and 'Other:' with 'Text File', 'Folder', and 'Terminal' options. The second menu, located over the top right of the interface, shows 'Notebook:' with 'Anaconda Python 2', 'Anaconda3', 'OS X Python 2', and 'Python 3' options, and 'Other:' with 'Text File', 'Folder', and 'Terminal' options. The 'Upload' and 'New' buttons are visible above the file list, and 'Upload', 'New', and a refresh icon are visible at the top right.

jupyter

Files Running Clusters

Select items to perform actions on them.

Upload New

Notebook:

- Python 3

Other:

- Text File
- Folder
- Terminal

Notebook:

- Anaconda Python 2
- Anaconda3
- OS X Python 2
- Python 3

Other:

- Text File
- Folder
- Terminal

a day ago

an hour ago

Adding a New Kernel

Instructions will vary from each language but you basically install a package and write a kernel.json file

Python 2

https://ipython.readthedocs.io/en/latest/install/kernel_install.html

```
> conda create -n ipykernel_py2 python=2 ipykernel  
> source activate ipykernel_py2 # Windows: remove 'source'  
> python -m ipykernel install --user
```

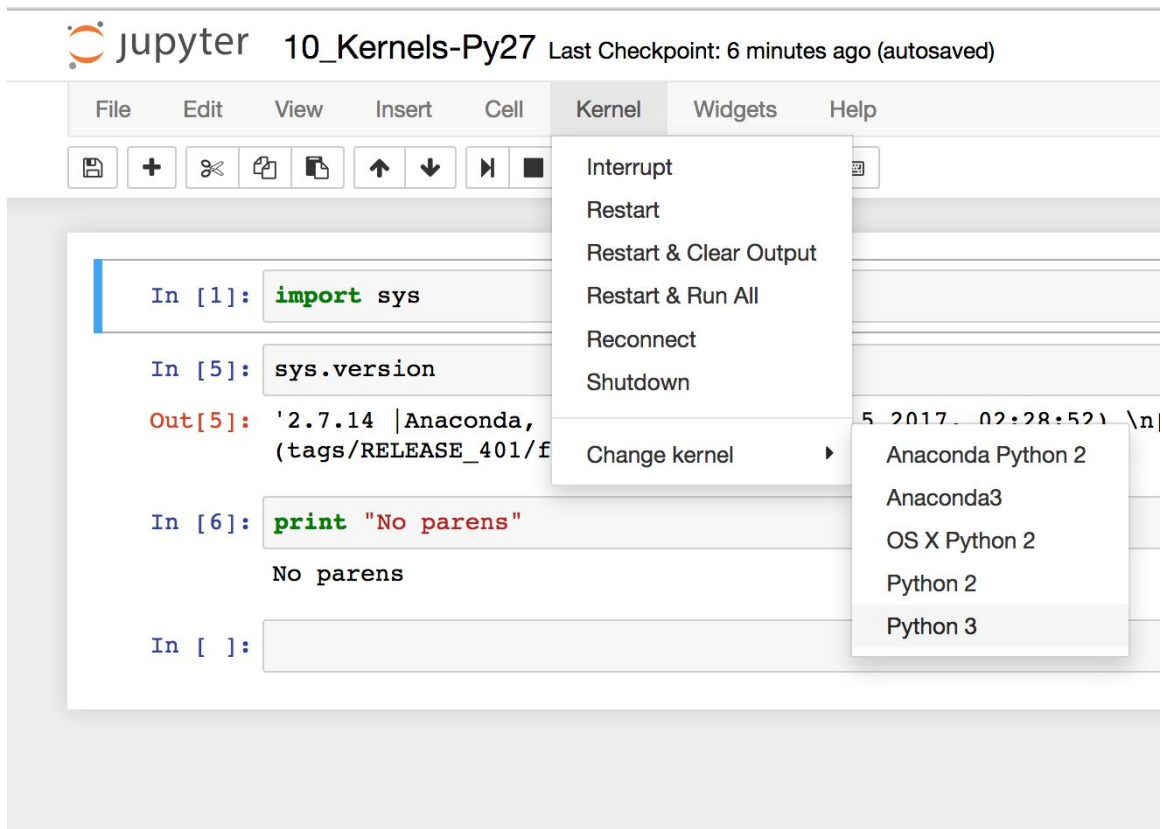
Now restart jupyter and open up notebook 10b_Kernels-Py27.ipynb

R

<https://www.anaconda.com/developer-blog/jupyter-and-conda-r/>

```
> conda install -c rdonnellyr r-essentials
```

Switching Kernels



The screenshot shows the JupyterLab interface for a notebook named '10_Kernels-Py27'. The top bar indicates the last checkpoint was 6 minutes ago (autosaved). The 'Kernel' menu is open, showing options: Interrupt, Restart, Restart & Clear Output, Restart & Run All, Reconnect, Shutdown, and Change kernel. The 'Change kernel' option is selected, opening a sub-menu with the following options: Anaconda Python 2, Anaconda3, OS X Python 2, Python 2, and Python 3. The notebook content shows the following code cells:

```
In [1]: import sys
```

```
In [5]: sys.version
```

```
Out[5]: '2.7.14 |Anaconda,
(tags/RELEASE_401/f
```

```
In [6]: print "No parens"
```

```
No parens
```

```
In [ ]:
```

Re-run the notebook
with a Python 3
kernel

Where do Kernels Live?

Look for a `kernel.json` file in

UNIX

`~/Library/Jupyter/kernels` (Mac OS)

`~/.local/share/jupyter/kernels` (Linux)

`{sys.prefix}/share/jupyter/kernels`

`/usr/share/jupyter/kernels`

`/usr/local/share/jupyter/kernels`

WINDOWS

`%APPDATA%\jupyter\kernels`

`%PROGRAMDATA%\jupyter\kernels`

Customizing the Kernel Spec (kernel.json)

```
{
  "argv": [
    "/Users/shreyas/anaconda2/bin/python",
    "-m",
    "IPython.kernel",
    "-f",
    "{connection_file}"
  ],
  "env": {
    "PATH": "/Users/shreyas/anaconda2/bin:/usr/local/bin:/usr/bin:/bin:/usr/sbin:/sbin",
    "PYTHONPATH": "/my/python/libs",
    "LD_LIBRARY_PATH": "/usr/local/lib"
  },
  "display_name": "Custom Python",
  "language": "python"
}
```

Jupyter Settings

For command line options see

```
> jupyter notebook --help
```

Options can also be set by creating a file named `jupyter_notebook_config.py` in your Jupyter folder (`$HOME/.jupyter`).

To create a `jupyter_notebook_config.py` file, with all the defaults commented out, you can use the following command line:

```
> jupyter notebook --generate-config
```



Let's change the Jupyter Default Directory

Edit `.jupyter/jupyter_notebook_config.py`

Change

```
#c.NotebookApp.notebook_dir = ''
```

to

```
c.NotebookApp.notebook_dir = '/'
```

Restart the notebook and notice where you are in the file browser!