conda Environments Basics

Environments

If you are going to be sharing your work with others, you need to be aware of managing dependencies.

Dependencies are the libraries, including the *versions* of libraries that you have installed.

Environments

Why do you have to worry about dependencies?

- Libraries release new versions, which add, deprecate, or remove functions.
- Particular versions of libraries may not work well together.

Version 1.0

- What's new in 1.0.5 (June 17, 2020)
  - Fixed regressions
  - Bug fixes
  - Contributors
- What's new in 1.0.4 (May 28, 2020)
  - Fixed regressions
  - Bug fixes
  - Contributors
- What's new in 1.0.3 (March 17, 2020)
  - Fixed regressions
  - Bug fixes
  - Contributors
- What's new in 1.0.2 (March 12, 2020)
  - Fixed regressions
  - Indexing with Nullable Boolean Arrays
  - Bug fixes
  - Contributors
- What's new in 1.0.1 (February 5, 2020)
  - Fixed regressions
  - Deprecations
  - Bug fixes
  - Contributors
- What's new in 1.0.0 (January 29, 2020)
  - New Deprecation Policy
  - Enhancements
  - Experimental new features
  - Other enhancements
  - Backwards incompatible API changes
  - Deprecations

Release Notes for the pandas Library

Package Managers

The two most common package managers for installing third party packages you'll use are *pip* and *conda*.

pip: The standard package manager for Python. Installs packages from the Python Package Index, aka PyPI, aka the Cheese Shop, the official third-party repository for Python.

conda: A package manager designed for use by data analysts/data scientists. Installs packages from Anaconda's repository. When installing, will analyze the current environment and ensure that there are no conflicts between package versions.

conda

It is recommended that you install packages using **conda** whenever possible and use pip only when a package is not available from conda.

See https://www.anaconda.com/blog/using-pip-in-a-conda-environment for more information.

conda

conda is not just a package manager, but is also an *environment* manager, meaning that you can create separate environments containing files, packages, their dependencies, and their own versions of the Python interpreter.

This serves two purposes:

1. Isolates your projects
2. Makes it easier to share your work and allows for reproducibility.

conda environments

Two ways to create a conda environment:

1. Start from scratch:

```
$ conda create -n <environment name> python=<version>
```

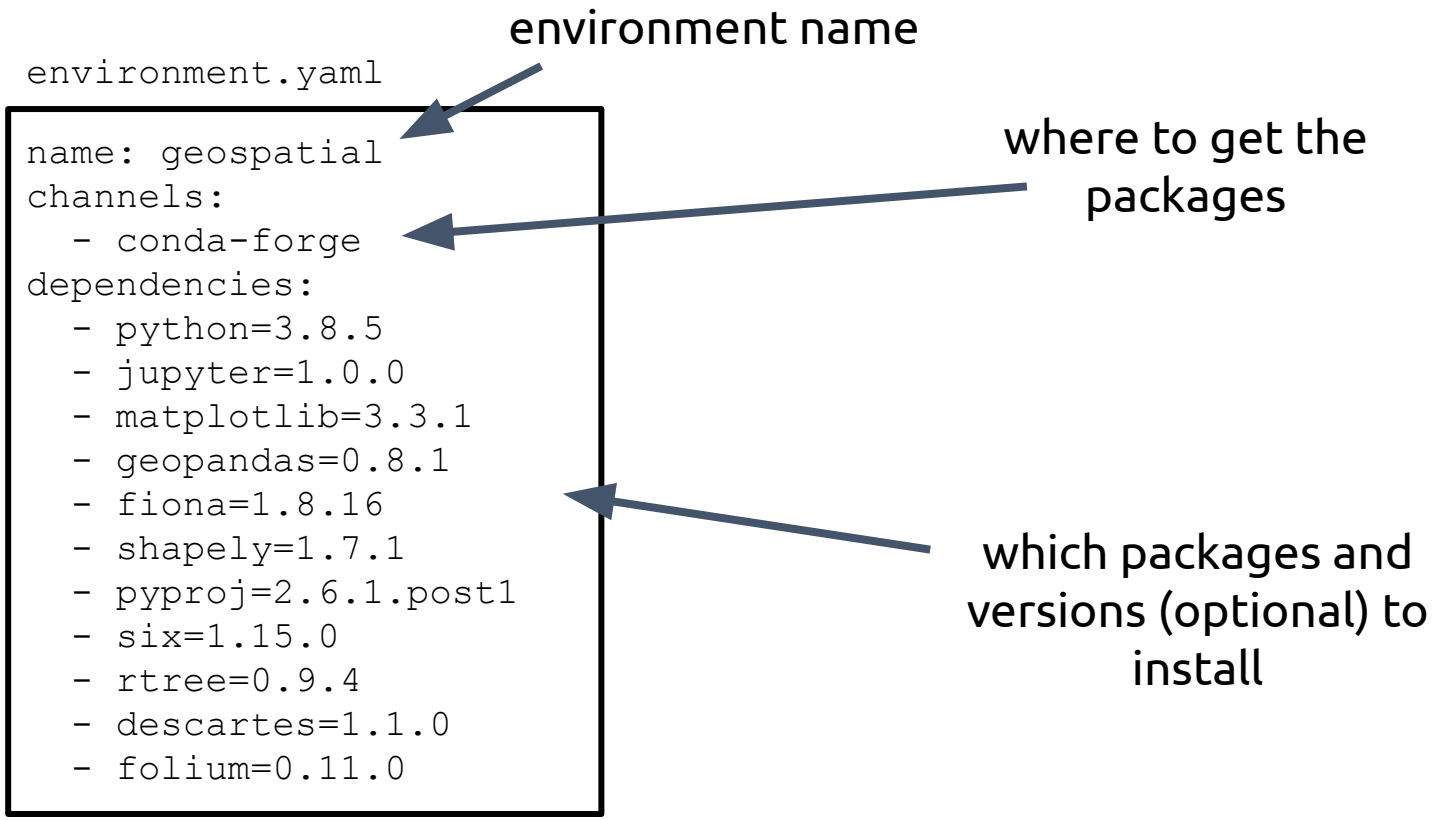
```
(base) michael@michael-HP-Pavilion-Laptop-15-cs3xxx ~ $ conda create -n testenv
python=3.8
Collecting package metadata (current_repodata.json): done
Solving environment: done

## Package Plan ##

  environment location: /home/michael/anaconda3/envs/testenv

  added / updated specs:
    - python=3.8


The following NEW packages will be INSTALLED:

  _libgcc_mutex      pkgs/main/linux-64::_libgcc_mutex-0.1-main
  ca-certificates    pkgs/main/linux-64::ca-certificates-2020.6.24-0
  certifi            pkgs/main/linux-64::certifi-2020.6.20-py38_0
  ld_impl_linux-64   pkgs/main/linux-64::ld_impl_linux-64-2.33.1-h53a641e_7
```

conda Environments

2. Create from a YAML file which lists which packages and versions should be installed.

environment.yaml

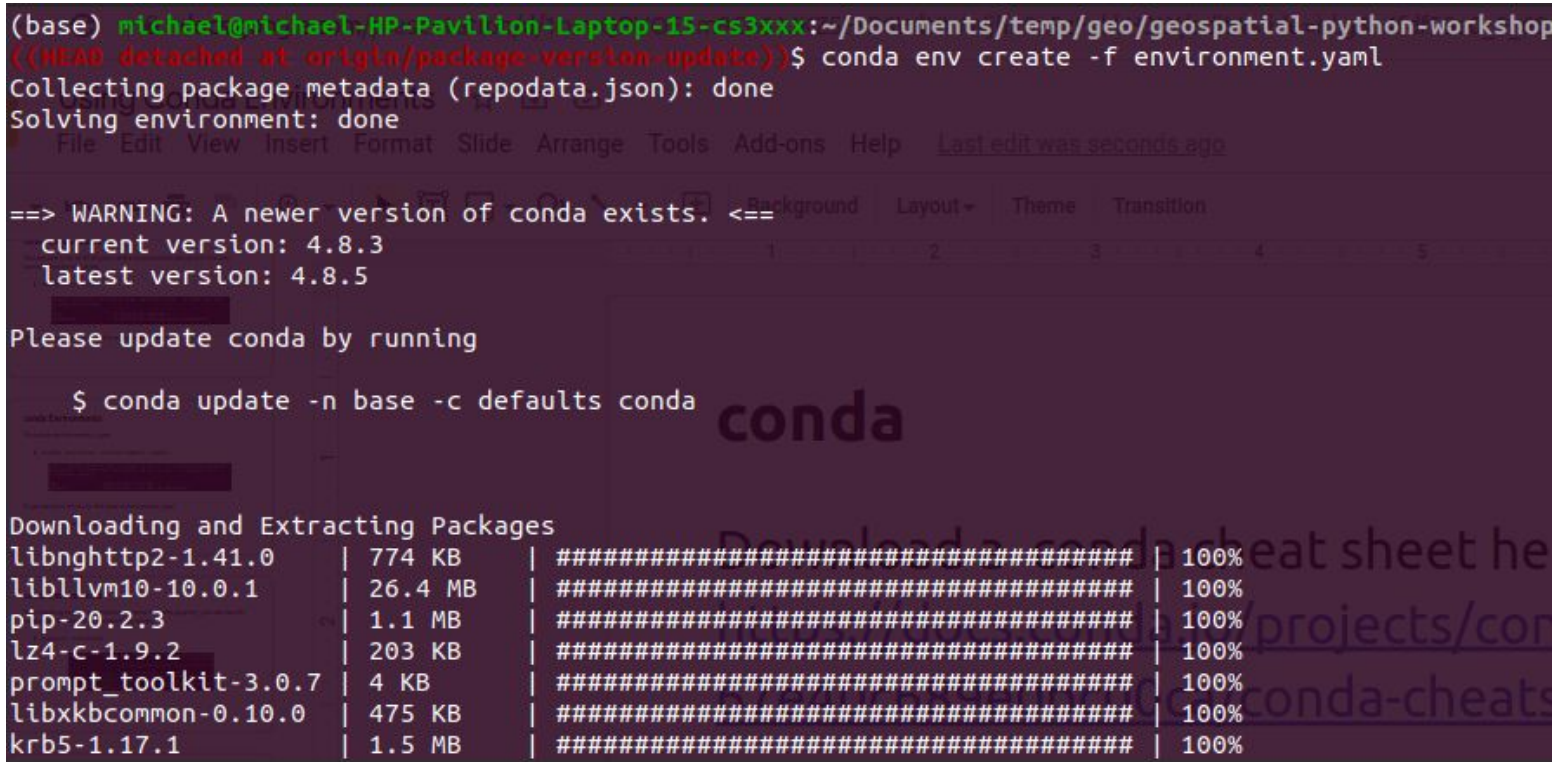
```
name: geospatial
channels:
  - conda-forge
dependencies:
  - python=3.8.5
  - jupyter=1.0.0
  - matplotlib=3.3.1
  - geopandas=0.8.1
  - fiona=1.8.16
  - shapely=1.7.1
  - pyproj=2.6.1.post1
  - six=1.15.0
  - rtree=0.9.4
  - descartes=1.1.0
  - folium=0.11.0
```



conda Environments

To create an environment from a YAML file, run this from the folder containing the environment file:

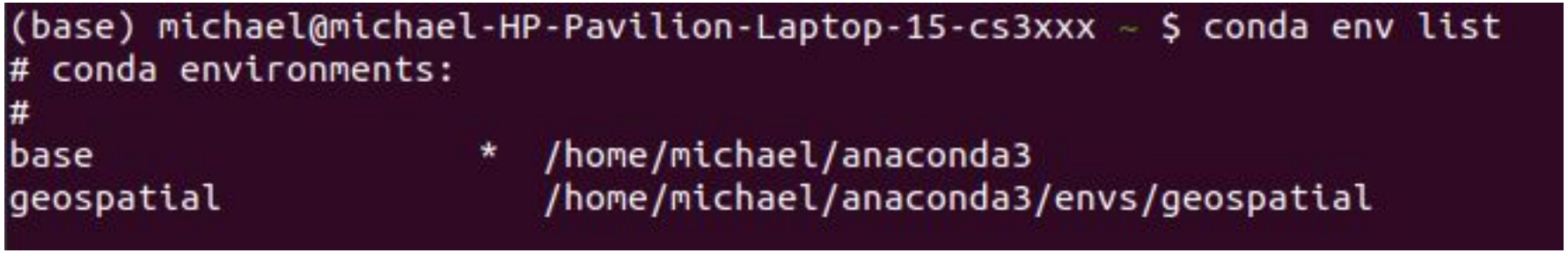
```
$ conda env create -f environment.yaml
```



conda Environments

You can see a list of all of your conda environments along with the one currently active by typing

```
$ conda env list
```



This will display a * next to the active environment.

conda Environments

To switch environments, type

```
$ conda activate <environment name>
```

```
(base) michael@michael-HP-Pavilion-Laptop-15-cs3xxx ~ $ conda activate geospatial
(geospatial) michael@michael-HP-Pavilion-Laptop-15-cs3xxx ~ $ conda env list
# conda environments:
#
base                  /home/michael/anaconda3
geospatial            *  /home/michael/anaconda3/envs/geospatial
```

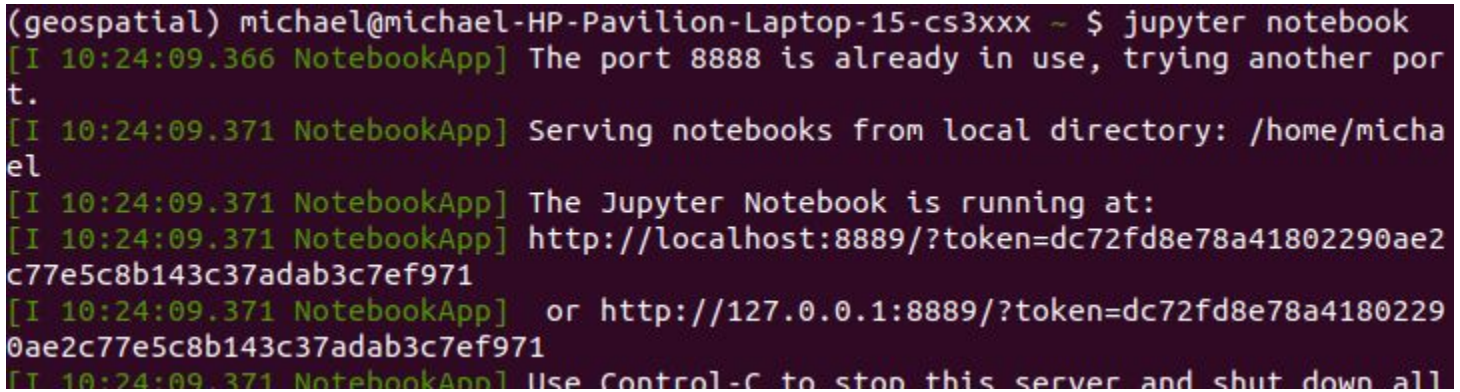
If you need to return to the base environment, type

```
$ conda deactivate
```

conda Environments

Then (as long as your current environment includes jupyter), you can launch jupyter in the current environment by typing

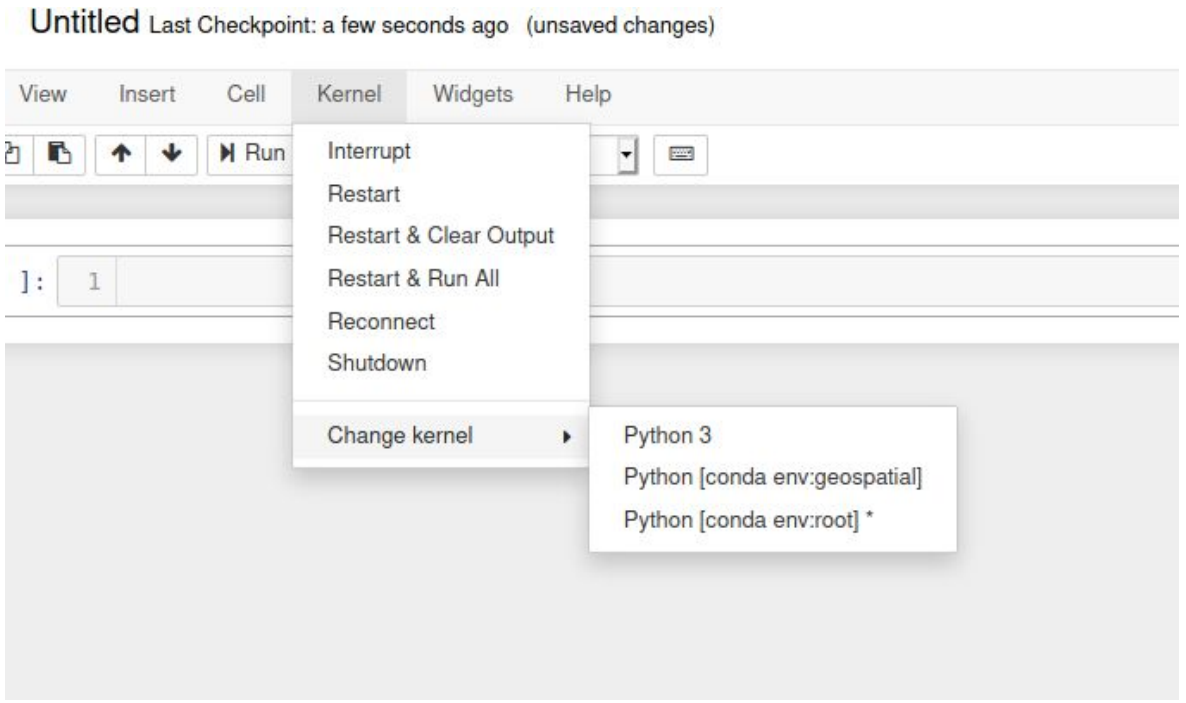
```
$ jupyter notebook
```



conda Environments

You may also want to install the nb_conda_kernels package in your base environment, which lets you choose the kernel from within jupyter (as long as jupyter is installed in that environment):

```
$ conda install nb_conda_kernels
```



Installing packages

To search for a package in conda, use

```
$ conda search <package name>
```

For example, to see if plotly is available through conda:

```
(base) michael@michael-HP-Pavilion-Laptop-15-cs3xxx ~ $ conda search plotly
Loading channels: done
# Name                       Version           Build  Channel
plotly                        2.0.15  py27h139127e_0  pkgs/main
plotly                        2.0.15  py35h43bf465_0  pkgs/main
plotly                        2.0.15  py36hd032def_0  pkgs/main
plotly                         2.1.0  py27h77e25ac_0  pkgs/main
plotly                         2.1.0  py35hac5c16f_0  pkgs/main
plotly                         2.1.0  py36h56a57e5_0  pkgs/main
plotly                         2.2.2  py27hb784091_0  pkgs/main
plotly                         2.2.2  py35h6d67e38_0  pkgs/main
plotly                         2.2.2  py36hd7be514_0  pkgs/main
plotly                         2.4.0           py27_0  pkgs/main
plotly                         2.4.0           py35_0  pkgs/main
plotly                         2.4.0           py36_0  pkgs/main
plotly                         2.4.1           py27_0  pkgs/main
plotly                         2.4.1           py35_0  pkgs/main
plotly                         2.4.1           py36_0  pkgs/main
plotly                         2.5.1           py27_0  pkgs/main
```

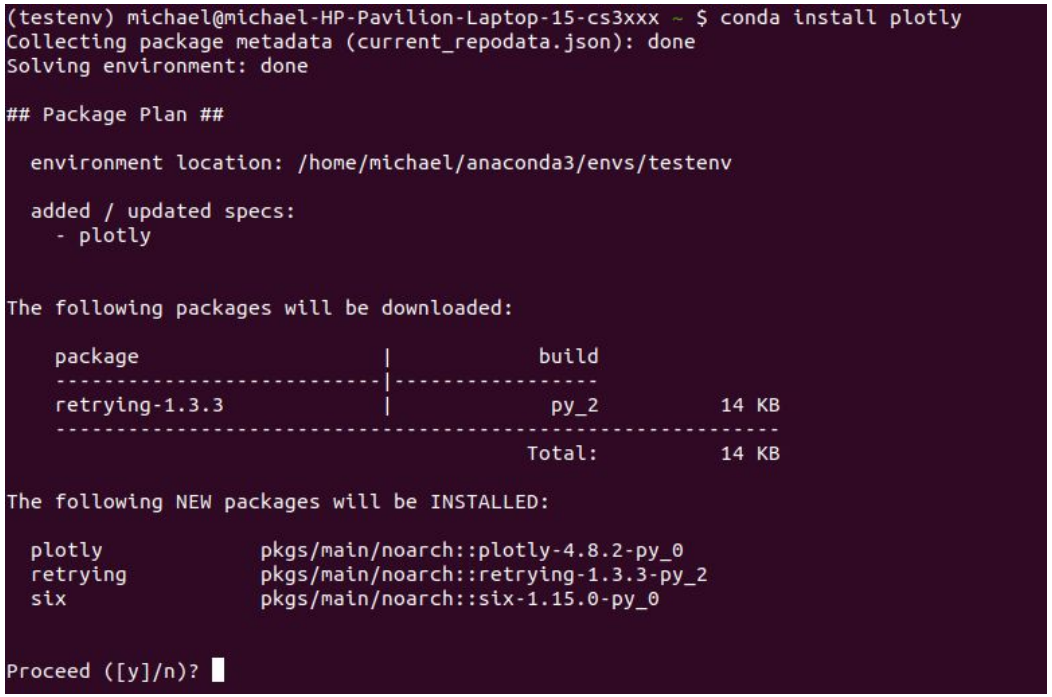
Installing packages

Then to install in the **current environment**

```
$ conda install <package name>
```

For a specific version:

```
$ conda install <package name>=<version number>
```



Creating an environment.yml

If you want to share your environment so that others can recreate it, you need to create an environment.yml file. Two ways to do this are

1. Do it by hand by creating a .yaml file and listing the packages and versions needed.

2. Create one automatically by using the conda env export command and redirecting the output into an environment.yaml file:

```
$ conda env export > environment.yaml
```

conda

Download a conda cheat sheet here:
https://docs.conda.io/projects/conda/en/4.6.0/_downloads/52a95608c49671267e40c689e0bc00ca/conda-cheatsheet.pdf

For more information, see also the DataCamp course *Conda Essentials:*
https://learn.datacamp.com/courses/conda-essentials