Conda

Easier Installs and Simpler Builds

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Conda is

- An installer similar to pip
- An environment manager similar to virtualenv
- Cross-platform
- Not limited to Python
- Strong in the scientific community
- Useful for all Python users
Conda is

- BSD licensed
- Included in:
  - Miniconda
  - or Anaconda
Miniconda

- Small bootstrap-like version
- Includes Python and conda, as well as dependencies and helpers (pip, wheel, setuptools, etc.)
- Provides access to many hundreds (or thousands) of mainly scientific packages
- They are just a conda install away
Anaconda

• Large distribution of Python packages with focus on scientific applications
• Includes Python, conda, conda-build and about 200 scientific packages (new ones get added continuously)
• Needs about 2 GB of disk space
• One-stop install with all essential scientific Python tools
Channels

- Locations of packages
- default = Anaconda server
- conda-forge
- Private channels
- install -c my_channel package_name
Basic Tasks

- Install packages
- Create and administer environments
- Create packages
$ conda search pandas
Using Anaconda Cloud api site https://api.anaconda.org
Fetching package metadata ..........
geopandas                    0.1.1                    py27_0  conda-forge/osx-64
sx-64
...
... osx-64 pandas
0.2                      py35_0  conda-forge/
... 0.8.1                np16py26_0  defaults
...
...   . 0.16.2               np19py34_0  defaults
...
... * 0.18.1              np110py35_0  defaults
sx-64
0.18.1
sx-64
0.18.1
sx-64
0.18.1
sx-64
0.18.1
sx-64
0.18.1

conda search --full-name pandas
Using Anaconda Cloud api site https://api.anaconda.org
Fetching package metadata ............
pandas                       0.8.1                np16py26_0  defaults
                               0.8.1                np16py27_0  defaults
                               ...                               ...
 ...                               . 0.17.1              np110py35_0  defaults
                               0.18.0              np110py27_0  defaults
                               0.18.0              np110py34_0  defaults
                               0.18.0              np110py35_0  defaults
                               0.18.0              np111py27_0  defaults
                               0.18.0              np111py34_0  defaults
                               0.18.0              np111py35_0  defaults
                               0.18.0              np111py27_0  conda-forge/osx-64
                               0.18.1              np110py27_0  conda-forge/osx-64
                               *  0.18.1              np110py27_0  defaults
conda search --platform win-32 --spec pandas=0.18.1
Using Anaconda Cloud api site https://api.anaconda.org
Fetching package metadata ..........
Install a Package

conda install pandas
Using Anaconda Cloud api site https://api.anaconda.org
Fetching package metadata ...........
Solving package specifications: ..........

Package plan for installation in environment /Users/mike/anaconda/envs/mypy35:
The following NEW packages will be INSTALLED:

mkl:       11.3.3-0
numpy:     1.11.1-py35_0
pandas:    0.18.1-np111py35_0 conda-forge
python-dateutil:  2.5.2-py35_0    conda-forge
pytz:      2016.3-py35_0     conda-forge
six:       1.10.0-py35_0     conda-forge

Proceed ([y]/n)?

Linking packages ...
[ COMPLETE ]..................................| 100%
Create an Environment I

$ conda create -n mypy35 python=3.5
Using Anaconda Cloud api site https://api.anaconda.org
Fetching package metadata .......
Solving package specifications: ..........

Package plan for installation in environment /Users/mike/anaconda/envs/mypy35:
The following packages will be downloaded:

<table>
<thead>
<tr>
<th>package</th>
<th>build</th>
</tr>
</thead>
<tbody>
<tr>
<td>----------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>setuptools-23.0.0</td>
<td>py35_0</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The following NEW packages will be INSTALLED:

<table>
<thead>
<tr>
<th>package</th>
<th>version</th>
<th>channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>ca-certificates:</td>
<td>2016.2.28-1</td>
<td>conda-forg</td>
</tr>
<tr>
<td>ncurses:</td>
<td>5.9-7</td>
<td>conda-forg</td>
</tr>
<tr>
<td>openssl:</td>
<td>1.0.2h-0</td>
<td>conda-forg</td>
</tr>
<tr>
<td>pip:</td>
<td>8.1.2-py35_0</td>
<td>conda-forg</td>
</tr>
<tr>
<td>python:</td>
<td>3.5.2-1</td>
<td>conda-forg</td>
</tr>
<tr>
<td>readline:</td>
<td>6.2-0</td>
<td>conda-forg</td>
</tr>
<tr>
<td>setuptools:</td>
<td>23.0.0-py35_0</td>
<td>conda-forg</td>
</tr>
<tr>
<td>sqlite:</td>
<td>3.13.0-1</td>
<td>conda-forg</td>
</tr>
<tr>
<td>tk:</td>
<td>8.5.19-0</td>
<td>conda-forg</td>
</tr>
<tr>
<td>wheel:</td>
<td>0.29.0-nv35_0</td>
<td>conda-forg</td>
</tr>
</tbody>
</table>
Create an Environment II

Pruning fetched packages from the cache ...
Fetching packages ...
setuptools-23. 100% |###################################################
# Time: 0:00:05  89.34 kB/s
Extracting packages ...
  COMPLETE
|
| 100%
Linking packages ...
  COMPLETE
|
| 100%
#
# To activate this environment, use:
# $ source activate mypy35
Show Environments

conda env list
# conda environments:
#

fipy_py26 /Users/mike/anaconda/envs/fipy_py26
fipy_py27 /Users/mike/anaconda/envs/fipy_py27
fipy_py34 /Users/mike/anaconda/envs/fipy_py34
fipy_py35 /Users/mike/anaconda/envs/fipy_py35
mypy35 /Users/mike/anaconda/envs/mypy35
py26 /Users/mike/anaconda/envs/py26
py27 /Users/mike/anaconda/envs/py27
py33 /Users/mike/anaconda/envs/py33
py34 /Users/mike/anaconda/envs/py34
py35 /Users/mike/anaconda/envs/py35
py35_test /Users/mike/anaconda/envs/py35_test
pydatabln2016 /Users/mike/anaconda/envs/pydatabln2016
tensorflow /Users/mike/anaconda/envs/tensorflow
root * /Users/mike/anaconda
Activate an Environment

- Linux, OS X
  
  # $ source activate mypy35

- Windows
  
  # $ activate mypy35
Environment Marked as Active

conda env list

...  
mypy35  *  /Users/mike/anaconda/envs/mypy35
# List All Installed Packages

```bash
conda list
# packages in environment at /Users/mike/anaconda/envs/mypy35:
#
  ca-certificates           2016.2.28                     1    conda-forge
  ncurses                   5.9                           7    conda-forge
  openssl                   1.0.2h                        0    conda-forge
  pandas                    0.18.1              np111py35_0    conda-forge
  python                    3.5.2                         1    conda-forge
  python-dateutil           2.5.2                    py35_0    conda-forge
  pytz                      2016.3                   py35_0    conda-forge
  readline                  6.2                           0    conda-forge
  setuptools                23.0.0                   py35_0    conda-forge
  six                       1.10.0                   py35_0    conda-forge
  sqlite                    3.13.0                        1    conda-forge
  tk                        8.5.19                        0    conda-forge
  xz                        5.2.2                         0    conda-forge
  zlib                      1.2.8                         3    conda-forge
  mkl                       11.3.3                        0    conda-forge
  numpy                     1.11.1                        <pip>
  phreeqpy                  0.2.0                    <pip>
  pip                       8.1.2                   py35_0
  wheel                     0.29.0                    py35_0
```
Building a Package

1. From a package on PyPi
2. From scratch
Build from PyPi with a Skeleton

conda install conda-build
conda skeleton pypi mypackage
conda build mypackage
Result is a Tarball

/Users/mike/anaconda/conda-bld/osx-64/mypackage-0.1.0-py35_0.tar.bz2
Install from Local File

conda install --use-local mypackage

- With full path
conda install /Users/mike/anaconda/conda-bld/osx-64/mypackage-0.1.0-py35_0.tar.bz2
Specify a Python Version

conda build --python 3.4 mypackage
Convert to Other Platforms

conda convert --platform all ./mypackage-0.1.0-py35_0.tar.bz2 -o outputdir/
Upload to Anaconda Cloud

conda install anaconda-client

anaconda upload /Users/mike/anaconda/conda-bld/osx-64/mypackage-0.1.0-py35_0.tar.bz2
Building from Scratch

- meta.yaml
- build.sh - Linux and Mac OS X
- build.bat - Windows
- setup.py - just as with pip
The `meta.yaml` package:

- `name`: 
- `version`: 

`source`:
- `git_rev`: 
- `git_url`: 

`requirements`:
- `build`:
  - python
  - setuptools
- `run`:
  - python

`about`:
- `home`: 
- `license`: 
- `license_file`: 

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[Python Academy](https://www.pythonacademy.com) Training & Consulting
Example

package:
  name: mypackage
  version: 1.0

source:
  path: ../..

requirements:
  build:
    - python
    - setuptools
  run:
    - jupyter
    - [libpython # [win]
      - numpy
      - pandas
      - python
      - pywin32 # [win]
      - pyyaml

about:
  home: me
  license: MIT
The Build Files

- Windows build.bat
  "%PYTHON%" setup.py install
  if errorlevel 1 exit 1

- Linux/OS X build.sh
  $PYTHON setup.py install

- Add more commands as needed
Build It

conda build mypackage

- Install and upload as with skeleton
Conclusions

• **conda** is a great
  - Installer
  - Package manager
  - Environment manager
  - Build tool

• Works together with **pip**

• Well known in the scientific Python community
• Can be really useful for all Python programmers
• You should give it a try
Thanks - Questions?