

# The University of Queensland

## Research Computing Centre

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## Anaconda & Miniconda

### Anaconda & Miniconda

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## Document Status

This update: August 11 2020 by David.Green @ uq.edu.au, Ashley Wright

## Background

According to [www.continuum.io](http://www.continuum.io) website:

Anaconda is the leading open data science platform powered by Python.

The open source version of Anaconda is a high performance distribution of Python and R and includes over 100 of the most popular Python, R and Scala packages for data science.

Anaconda provides the means to easily work with a number of different versions of the python language.

It does this by supporting different environments seamlessly.

You may use the environments provided, you may clone them, or you can create fresh ones.

Environments can be exported and shared.

If you have an X11 enabled connection to a compute node, or a remote desktop session, you can run the anaconda-navigator tool to easily explore the functionality of Anaconda.

On Awoonga, FlashLite and Tinaroo, use the command `module help anaconda` for more information.

## Anaconda or Miniconda?

Anaconda and Miniconda are essentially the same. The difference is what packages are installed by default.

Choose Anaconda if you:

- Are new to conda or Python.
- Like the convenience of having Python and over 150 scientific packages automatically installed at once.
- Have the time and disk space---a few minutes and 300 MB.
- Do not want to individually install each of the packages you want to use.

Choose Miniconda if you:

- Do not mind installing each of the packages you want to use individually.
- Do not have time or disk space to install over 150 packages at once.
- Want fast access to Python and the conda commands and you wish to sort out the other programs later.

source: <https://docs.conda.io/projects/conda/en/latest/user-guide/install/download.html#anaconda-or-miniconda>

## Getting Started

The most important part of using Conda is to create a new environment. Without this most other commands will not work.

- `conda create --name myenv`
- `conda activate myenv`

You will also need to do this command once:

- `conda init`

For more info see the getting started guide:

<https://docs.conda.io/projects/conda/en/latest/user-guide/getting-started.html>

## Files Quota Problems

The convenience and flexibility of using anaconda to manage your python and associated environments is unquestioned. However it comes at a potential cost that you generate a lot of files in your home directory. This may impact your file count quota.

I recently discovered, while trying to figure out why my home directory had such a high number of files, that more than half of my Files quota was being consumed by anaconda environment and package files. You have been warned!

The following commands may be of assistance:

```
#To get a handle on if/where the trouble lies
/usr/local/bin/rquota

#if you are over the file count quota then you need to find the most populous directories
#This line will show you the non-hidden files in your home directory.
cd $HOME; du -s --inode *
#This line will show you the hidden files in your home directory.
cd $HOME; du -s --inode .[^.]*

#if you already suspect .conda then look in there
find ~/.conda | wc -l

#Use conda commands to delete any environments that you no longer need.
module load anaconda
conda info --envs
conda env remove -n name-of-environment-to-remove
conda clean --all
```

If you experience difficulties with file/disk quota in your home directory, then we recommend that you relocate your conda environments to your bigger directories on /30days or /90days. A symbolic link might be all you need, however this [conda documentation for specifying the location for storing conda environments](#) details how to do it "properly".

## Specific Examples and Gotchas

### Example 1: Various Packages

#### Scenario

I wanted to use Anaconda to

- create a python environment based on Python-2.7.3
- add NumPy and another package called spglib from conda-forge repository using the conda tool
- use pip to install a package called simplejson

I referred to the <https://conda.io/docs/using/index.html> documentation for guidance.

### Commands Summary

```
module purge
module load anaconda

conda create --name python-2.7.3 python=2.7.3
source activate python-2.7.3
conda info --envs

conda install numpy
conda install -c conda-forge spglib=1.9.9.44
conda list

which pip
pip install simplejson
conda list

source deactivate python-2.7.3
```

### Session Details

```
module purge
module load anaconda

#
#Create a new environment called "python-2.7.3" based on python=2.7.3
#
uqdgree5@tinaroo1:~> conda create --name python-2.7.3 python=2.7.3
Fetching package metadata .....
Solving package specifications: .

Package plan for installation in environment /home/uqdgree5/.conda/envs/python-2.7.3:

The following NEW packages will be INSTALLED:

  openssl:      1.0.1k-1
  pip:          9.0.1-py27_1
  python:       2.7.3-7
  readline:     6.2-2
  setuptools:  27.2.0-py27_0
  sqlite:       3.13.0-0
  system:       5.8-2
  tk:           8.5.18-0
  wheel:        0.29.0-py27_0
  zlib:         1.2.8-3

Proceed ([y]/n)? y

python-2.7.3-7 100% |#####

#
# To activate this environment, use:
# > source activate python-2.7.3
#
# To deactivate this environment, use:
# > source deactivate python-2.7.3
#
#Before I switch on the new environment, the default is the central root environment (which I cannot modify)
uqdgree5@tinaroo1:~> conda info --envs
# conda environments:
#
Python-2.7          /sw/RCC/Anaconda/4.3.1/envs/Python-2.7
Python-3.6          /sw/RCC/Anaconda/4.3.1/envs/Python-3.6
My-Biopython-2.7   /home/uqdgree5/.conda/envs/My-Biopython-2.7
python-2.7.3       /home/uqdgree5/.conda/envs/python-2.7.3
tensorflow          /home/uqdgree5/.conda/envs/tensorflow
root                * /sw/RCC/Anaconda/4.3.1

#Switch to my newly created environment
uqdgree5@tinaroo1:~> source activate python-2.7.3
```

```
(python-2.7.3) uqdgree5@tinarool1:~> conda info --envs
# conda environments:
#
Python-2.7          /sw/RCC/Anaconda/4.3.1/envs/Python-2.7
Python-3.6          /sw/RCC/Anaconda/4.3.1/envs/Python-3.6
My-Biopython-2.7   /home/uqdgree5/.conda/envs/My-Biopython-2.7
python-2.7.3       * /home/uqdgree5/.conda/envs/python-2.7.3
tensorflow          /home/uqdgree5/.conda/envs/tensorflow
root                /sw/RCC/Anaconda/4.3.1

#It is all about the "*" !

#Now take a look at what already is installed in my python-2.7.3 environment
(python-2.7.3) uqdgree5@tinarool1:~> conda list
# packages in environment at /home/uqdgree5/.conda/envs/python-2.7.3:
#
openssl            1.0.1k                1
pip                9.0.1                 py27_1
python             2.7.3                 7
readline           6.2                   2
setuptools         27.2.0                py27_0
sqlite             3.13.0                0
system             5.8                   2
tk                 8.5.18                0
wheel              0.29.0                py27_0
zlib               1.2.8                 3

#
#I want to add numpy (I don't care what version)
#
(python-2.7.3) uqdgree5@tinarool1:~> conda install numpy
Fetching package metadata .....
Solving package specifications: .

Package plan for installation in environment /home/uqdgree5/.conda/envs/python-2.7.3:

The following NEW packages will be INSTALLED:

    mkl: 2017.0.1-0
    numpy: 1.12.1-py27_0

Proceed ([y]/n)? y

mkl-2017.0.1-0 100% |#####|
numpy-1.12.1-p 100% |#####|
(python-2.7.3) uqdgree5@tinarool1:~>

#
#Check it installed OK
#
(python-2.7.3) uqdgree5@tinarool1:~> conda list
# packages in environment at /home/uqdgree5/.conda/envs/python-2.7.3:
#
mkl                2017.0.1              0
numpy              1.12.1                py27_0
openssl            1.0.1k                1
pip                9.0.1                 py27_1
python             2.7.3                 7
readline           6.2                   2
setuptools         27.2.0                py27_0
sqlite             3.13.0                0
system             5.8                   2
tk                 8.5.18                0
wheel              0.29.0                py27_0
zlib               1.2.8                 3
(python-2.7.3) uqdgree5@tinarool1:~>
```

If a package is available on the anaconda site, you can use the `conda install` method. The `-c` is used to change the channel (e.g. package owner)

The `spglib` is available as a anaconda package (enter `spglib` in the search tool on the `anaconda.org` website - there are several of them so choose a channel)

```
(python-2.7.3) uqdgree5@tinarool1:~> conda install -c conda-forge spglib=1.9.9.44
Fetching package metadata .....
Solving package specifications: .

Package plan for installation in environment /home/uqdgree5/.conda/envs/python-2.7.3:

The following NEW packages will be INSTALLED:

    spglib: 1.9.9.44-np112py27_0 conda-forge
```

```
Proceed ([y]/n)? y
```

```
spglib-1.9.9.4 100% |#####|
(python-2.7.3) uqdgree5@tinaroo1:~>
```

From this point, if your python software can be installed using pip you should.

```
(python-2.7.3) uqdgree5@tinaroo1:~> which pip
~/conda/envs/python-2.7.3/bin/pip

(python-2.7.3) uqdgree5@tinaroo1:~> conda list
# packages in environment at /home/uqdgree5/.conda/envs/python-2.7.3:
#
mkl                2017.0.1                0
numpy              1.12.1                  py27_0
openssl           1.0.1k                  1
pip               9.0.1                   py27_1
python            2.7.3                   7
readline          6.2                     2
setuptools        27.2.0                  py27_0
spglib            1.9.9.44                np112py27_0    conda-forge
sqlite            3.13.0                  0
system            5.8                     2
tk                8.5.18                  0
wheel             0.29.0                  py27_0
zlib              1.2.8                   3

(python-2.7.3) uqdgree5@tinaroo1:~> pip install simplejson
Collecting simplejson
/home/uqdgree5/.conda/envs/python-2.7.3/lib/python2.7/site-packages/pip/_vendor/requests/packages/urllib3/util/ssl_
  SNIMissingWarning
/home/uqdgree5/.conda/envs/python-2.7.3/lib/python2.7/site-packages/pip/_vendor/requests/packages/urllib3/util/ssl_
  InsecurePlatformWarning
  Downloading simplejson-3.10.0.tar.gz (77kB)
    100% |#####| 81kB 3.8MB/s
Building wheels for collected packages: simplejson
  Running setup.py bdist_wheel for simplejson ... done
  Stored in directory: /home/uqdgree5/.cache/pip/wheels/43/c5/ef/edcebbb19becffd2ba75bf219afdbb4ca85198b2d909f1b31b
Successfully built simplejson
Installing collected packages: simplejson
Successfully installed simplejson-3.10.0
/home/uqdgree5/.conda/envs/python-2.7.3/lib/python2.7/site-packages/pip/_vendor/requests/packages/urllib3/util/ssl_
  InsecurePlatformWarning

(python-2.7.3) uqdgree5@tinaroo1:~> conda list
# packages in environment at /home/uqdgree5/.conda/envs/python-2.7.3:
#
mkl                2017.0.1                0
numpy              1.12.1                  py27_0
openssl           1.0.1k                  1
pip               9.0.1                   py27_1
python            2.7.3                   7
readline          6.2                     2
setuptools        27.2.0                  py27_0
simplejson         3.10.0                  <pip>
spglib            1.9.9.44                np112py27_0    conda-forge
sqlite            3.13.0                  0
system            5.8                     2
tk                8.5.18                  0
wheel             0.29.0                  py27_0
zlib              1.2.8                   3
(python-2.7.3) uqdgree5@tinaroo1:~>
```

Otherwise you can do what you do to build python code from source code.

When you are finished simply deactivate the environment

```
(python-2.7.3) uqdgree5@tinaroo1:~> source deactivate python-2.7.3
uqdgree5@tinaroo1:~>
```

## Example 2: ALLMAPS

### Scenario

You want to use python software called ALLMAPS.  
You need to prepare a suitable python environment to do so.

Thereafter you can install the external dependencies (concorde, faSize and liftOver) followed by the ALLMAPS code.  
See <https://github.com/tanghaibao/jcvi/wiki/ALLMAPS> for details.

## Command Summary

### Python pre-requisites

```
module purge
module load anaconda
conda create --name ALLMAPS python=2.7.3
source activate ALLMAPS
conda install biopython
conda install matplotlib
pip install deap
pip install networkx
source deactivate ALLMAPS
```

### Complete the installation

There are two more steps to be done

- Install JCVI dependencies (concorde, faSize, liftOver)
- Install ALLMAPS itself

### Sample Usage

The following example is drawn from the ALLMAPS documentation.  
The csv input file names will need to be resident in the directory where you call python.

When it is time to use ALLMAPS you would do something like

```
module purge
module load anaconda
source activate ALLMAPS
python -m jcvi.assembly.allmaps merge JMMale.csv JMFemale.csv -o JM-2.bed
```

### Session Details

```
uqdgree5@tinaroo1:~> module purge

uqdgree5@tinaroo1:~> module load anaconda

uqdgree5@tinaroo1:~> conda create --name ALLMAPS python=2.7.3
Fetching package metadata .....
Solving package specifications: .

Package plan for installation in environment /home/uqdgree5/.conda/envs/ALLMAPS:

The following NEW packages will be INSTALLED:

 openssl: 1.0.1k-1
 pip: 9.0.1-py27_1
 python: 2.7.3-7
 readline: 6.2-2
 setuptools: 27.2.0-py27_0
 sqlite: 3.13.0-0
 system: 5.8-2
 tk: 8.5.18-0
 wheel: 0.29.0-py27_0
 zlib: 1.2.8-3

Proceed ([y]/n)? y

#
# To activate this environment, use:
# > source activate ALLMAPS
#
# To deactivate this environment, use:
# > source deactivate ALLMAPS
#

uqdgree5@tinaroo1:~> source activate ALLMAPS

(ALLMAPS) uqdgree5@tinaroo1:~> conda info --envs
# conda environments:
#
Python-2.7          /sw/RCC/Anaconda/4.3.1/envs/Python-2.7
Python-3.6          /sw/RCC/Anaconda/4.3.1/envs/Python-3.6
ALLMAPS             * /home/uqdgree5/.conda/envs/ALLMAPS
My-Biopython-2.7    /home/uqdgree5/.conda/envs/My-Biopython-2.7
python-2.7.3        /home/uqdgree5/.conda/envs/python-2.7.3
```

```

tensorflow                /home/uqdgree5/.conda/envs/tensorflow
root                      /sw/RCC/Anaconda/4.3.1

(ALLMAPS) uqdgree5@tinaroo1:~> conda install biopython
Fetching package metadata .....
Solving package specifications: .

Package plan for installation in environment /home/uqdgree5/.conda/envs/ALLMAPS:

The following NEW packages will be INSTALLED:

  biopython: 1.68-np113py27_0
  mkl:       2017.0.3-0
  numpy:     1.13.0-py27_0

Proceed ([y]/n)? y

mkl-2017.0.3-0 100% |#####|
numpy-1.13.0-p 100% |#####|
biopython-1.68 100% |#####|

(ALLMAPS) uqdgree5@tinaroo1:~> conda install matplotlib
Fetching package metadata .....
Solving package specifications: .

Package plan for installation in environment /home/uqdgree5/.conda/envs/ALLMAPS:

The following NEW packages will be INSTALLED:

  cairo:          1.14.8-0
  cycler:         0.10.0-py27_0
  dbus:           1.10.10-0
  expat:          2.1.0-0
  fontconfig:    2.12.1-3
  freetype:      2.5.5-2
  functools32:   3.2.3.2-py27_0
  glib:           2.50.2-1
  gst-plugins-base: 1.8.0-0
  gstreamer:     1.8.0-0
  icu:           54.1-0
  jpeg:          9b-0
  libffi:        3.2.1-1
  libgcc:        5.2.0-0
  libiconv:      1.14-0
  libpng:        1.6.27-0
  libxcb:        1.12-1
  libxml2:       2.9.4-0
  matplotlib:    2.0.2-np113py27_0
  pcre:          8.39-1
  pixman:        0.34.0-0
  pycairo:       1.10.0-py27_0
  pyparsing:     2.1.4-py27_0
  pyqt:          5.6.0-py27_2
  python-dateutil: 2.6.0-py27_0
  pytz:          2017.2-py27_0
  qt:            5.6.2-4
  sip:           4.18-py27_0
  six:           1.10.0-py27_0
  subprocess32:  3.2.7-py27_0

Proceed ([y]/n)? y

libgcc-5.2.0-0 100% |#####|
pytz-2017.2-py 100% |#####|
fontconfig-2.1 100% |#####|
qt-5.6.2-4.tar 100% |#####|
matplotlib-2.0 100% |#####|
dbus post-link :: /etc/machine-id not found ..
dbus post-link :: .. using /proc/sys/kernel/random/boot_id

(ALLMAPS) uqdgree5@tinaroo1:~> pip install deap
Collecting deap
/home/uqdgree5/.conda/envs/ALLMAPS/lib/python2.7/site-packages/pip/_vendor/requests/packages/urllib3/util/ssl_.py:31:
SNIMissingWarning
/home/uqdgree5/.conda/envs/ALLMAPS/lib/python2.7/site-packages/pip/_vendor/requests/packages/urllib3/util/ssl_.py:12:
InsecurePlatformWarning
  Downloading deap-1.0.2.post2.tar.gz (852kB)
    100% |#####| 860kB 1.5MB/s
Building wheels for collected packages: deap
  Running setup.py bdist_wheel for deap ... done
  Stored in directory: /home/uqdgree5/.cache/pip/wheels/c9/9c/cd/d52106f0148e675df35718c0efff2ecf03cc86d5bdcfb91db5
Successfully built deap
Installing collected packages: deap
Successfully installed deap-1.0.2
/home/uqdgree5/.conda/envs/ALLMAPS/lib/python2.7/site-packages/pip/_vendor/requests/packages/urllib3/util/ssl_.py:12:

```

```

InsecurePlatformWarning

(ALLMAPS) uqdgree5@tinarool1:~> pip install networkx
Collecting networkx
/home/uqdgree5/.conda/envs/ALLMAPS/lib/python2.7/site-packages/pip/_vendor/requests/packages/urllib3/util/ssl_.py:314:
SNIMissingWarning
/home/uqdgree5/.conda/envs/ALLMAPS/lib/python2.7/site-packages/pip/_vendor/requests/packages/urllib3/util/ssl_.py:120:
InsecurePlatformWarning
  Downloading networkx-1.11-py2.py3-none-any.whl (1.3MB)
    100% |#####| 1.3MB 995KB/s
Collecting decorator>=3.4.0 (from networkx)
  Downloading decorator-4.0.11-py2.py3-none-any.whl
Installing collected packages: decorator, networkx
Successfully installed decorator-4.0.11 networkx-1.11

(ALLMAPS) uqdgree5@tinarool1:~> pip install jcvl
Collecting jcvl
/home/uqdgree5/.conda/envs/ALLMAPS/lib/python2.7/site-packages/pip/_vendor/requests/packages/urllib3/util/ssl_.py:314:
SNIMissingWarning
/home/uqdgree5/.conda/envs/ALLMAPS/lib/python2.7/site-packages/pip/_vendor/requests/packages/urllib3/util/ssl_.py:120:
InsecurePlatformWarning
  Downloading jcvl-0.7.3.tar.gz (724kB)
    100% |#####| 727kB 1.7MB/s
Requirement already satisfied: biopython in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from jcvl)
Requirement already satisfied: numpy in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from jcvl)
Requirement already satisfied: matplotlib in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from jcvl)
Requirement already satisfied: deap in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from jcvl)
Requirement already satisfied: networkx in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from jcvl)
Requirement already satisfied: six>=1.10 in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from matplotlib->jcvl)
Requirement already satisfied: python-dateutil in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from matplotlib->jcvl)
Requirement already satisfied: functools32 in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from matplotlib->jcvl)
Requirement already satisfied: subprocess32 in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from matplotlib->jcvl)
Requirement already satisfied: pytz in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from matplotlib->jcvl)
Requirement already satisfied: cycler>=0.10 in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from matplotlib->jcvl)
Requirement already satisfied: pyparsing!=2.0.4,!2.1.2,!2.1.6,>=1.5.6 in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from matplotlib->jcvl)
Requirement already satisfied: decorator>=3.4.0 in ./conda/envs/ALLMAPS/lib/python2.7/site-packages (from networkx->jcvl)
Building wheels for collected packages: jcvl
  Running setup.py bdist_wheel for jcvl ... done
  Stored in directory: /home/uqdgree5/.cache/pip/wheels/10/9e/d4/0f1be4b99205bfacc1f4fe655448f7310149e2950dcd1bcf07
Successfully built jcvl
Installing collected packages: jcvl
Successfully installed jcvl-0.7.3
(ALLMAPS) uqdgree5@tinarool1:~>
(ALLMAPS) uqdgree5@tinarool1:~> source deactivate ALLMAPS
uqdgree5@tinarool1:~>

```

### Example 3: Python Code to be invoked from MATLAB

#### Scenario

MATLAB code can execute python calls, pass parameters to it and accept return values for subsequent processing.

I wanted to use Anaconda to

- create a python environment based on Python-3.5
- add NumPy
- use pip to install a package called nash

The system command to invoke a python script and pass it some parameters

```
[status,cmdout] = system(char("python mycode.py 1 2"))
```

You should ensure that you specify the full path to your python executable

#### By the Way

If you wish to use the MATLAB API engine, you will need to ensure that the version of Python you want to use is supported by your version of MATLAB.

```
> ls /sw/Matlab/2017a/extern/engines/python/dist/matlab/engine/glnxa64/
matlabengineforpython2_7.so matlabengineforpython3_4.so matlabengineforpython3_5.so
```

#### Commands Summary

```
module purge
```



```
module load anaconda
conda create --name python-3.5 python=3.5
source activate python-3.5
conda install numpy
pip install nash
```

In the MATLAB code you would use an invocation like

```
[status,cmdout] = system(char("/gpfs1/homes/USERNAME/.conda/envs/python-3.5/bin/python mycode.py 1 2"))
```

## Example 4: A Gurobi Python Environment

### Scenario

I want to run python code that utilises the Gurobi optimisation tool.  
I need to create an environment with a suitable python and Gurobi loaded into it.

The following is adapted from the [Gurobi documentation](#) (because we already have Anaconda installed on HPC)

```
conda info gurobi
.
.
.
gurobi 8.0.1 py36_0
-----
file name      : gurobi-8.0.1-py36_0.tar.bz2
name           : gurobi
version        : 8.0.1
build string   : py36_0
build number   : 0
channel        : http://conda.anaconda.org/gurobi/linux-64
size           : 30.3 MB
arch           : x86_64
constrains     : ()
license        : Copyright 2018, Gurobi Optimization, LLC. All rights reserved.
md5            : a1063f3e9f64215d07f2e5b764dd50cc
platform      : linux
subdir         : linux-64
url            : http://conda.anaconda.org/gurobi/linux-64/gurobi-8.0.1-py36_0.tar.bz2
dependencies:
  python 3.6*
```

### Commands Summary

```
module purge
module load gurobi/8.0

module load anaconda/5.2.0
conda info --envs
conda create --name gurobi-8.0.1-py36 python=3.6
conda info --envs

source activate gurobi-8.0.1-py36
conda config --add channels http://conda.anaconda.org/gurobi
conda install gurobi

which python
python -V
```

## Example 5: Building an isoseq3 Environment

### Session Transcript

```
uqdgree5@tinaroo2:~> module purge
uqdgree5@tinaroo2:~> module load anaconda
uqdgree5@tinaroo2:~> module list

Currently Loaded Modules:
  1) anaconda/5.2.0

uqdgree5@tinaroo2:~> conda create --name isoseq3 python=2.7.3
Solving environment: done

==> WARNING: A newer version of conda exists. <==
  current version: 4.5.4
  latest version: 4.6.2
```

Please update conda by running

```
$ conda update -n base conda
```

## Package Plan ##

environment location: /home/uqdgree5/.conda/envs/isoseq3

added / updated specs:

```
- python=2.7.3
```

The following packages will be downloaded:

package	build	
zlib-1.2.11	h7b6447c_3	120 KB
openssl-1.0.1k	_1	2.6 MB
ncurses-6.1	he6710b0_1	958 KB
pip-18.1	py27_0	1.8 MB
system-5.8	_2	170 KB
tk-8.5.18	_0	1.9 MB
libgcc-ng-8.2.0	hdf63c60_1	7.6 MB
sqlite-3.26.0	h7b6447c_0	1.9 MB
libedit-3.1.20181209	hc058e9b_0	188 KB
setuptools-40.6.3	py27_0	627 KB
libstdcxx-ng-8.2.0	hdf63c60_1	2.9 MB
python-2.7.3	_7	11.9 MB
certifi-2018.11.29	py27_0	146 KB
wheel-0.32.3	py27_0	34 KB
readline-6.2	_2	606 KB
Total:		33.4 MB

The following NEW packages will be INSTALLED:

```
certifi:      2018.11.29-py27_0
libedit:      3.1.20181209-hc058e9b_0
libgcc-ng:    8.2.0-hdf63c60_1
libstdcxx-ng: 8.2.0-hdf63c60_1
ncurses:      6.1-he6710b0_1
openssl:      1.0.1k-1
pip:          18.1-py27_0
python:       2.7.3-7
readline:     6.2-2
setuptools:   40.6.3-py27_0
sqlite:       3.26.0-h7b6447c_0
system:       5.8-2
tk:           8.5.18-0
wheel:        0.32.3-py27_0
zlib:         1.2.11-h7b6447c_3
```

Proceed ([y]/n)? y

Downloading and Extracting Packages

```
zlib-1.2.11           | 120 KB | #####
openssl-1.0.1k       | 2.6 MB | #####
ncurses-6.1          | 958 KB | #####
pip-18.1              | 1.8 MB | #####
system-5.8           | 170 KB | #####
tk-8.5.18            | 1.9 MB | #####
libgcc-ng-8.2.0      | 7.6 MB | #####
sqlite-3.26.0        | 1.9 MB | #####
libedit-3.1.20181209 | 188 KB | #####
setuptools-40.6.3    | 627 KB | #####
libstdcxx-ng-8.2.0   | 2.9 MB | #####
python-2.7.3         | 11.9 MB | #####
certifi-2018.11.29  | 146 KB | #####
wheel-0.32.3         | 34 KB  | #####
readline-6.2         | 606 KB | #####
```

Preparing transaction: done

Verifying transaction: done

Executing transaction: done

#

# To activate this environment, use:

```
# > source activate isoseq3
```

#

# To deactivate an active environment, use:

```
# > source deactivate
```

#

```
uqdgree5@tinaroo2:~> source activate isoseq3
```

```
(isoseq3) uqdgree5@tinaroo2:~> conda install --help
```

```
usage: conda install [-h] [--revision REVISION] [-y] [--dry-run] [-f]
                   [--file FILE] [--no-deps] [--only-deps] [-m] [-C]
```

```

[--use-local] [--offline] [--no-pin] [-c CHANNEL]
[--override-channels] [-n ENVIRONMENT | -p PATH] [-q]
[--copy] [-k] [--update-dependencies]
[--no-update-dependencies] [--channel-priority]
[--no-channel-priority] [--clobber] [--show-channel-urls]
[--no-show-channel-urls] [--download-only] [--json]
[--debug] [--verbose]
[package_spec [package_spec ...]]

```

Installs a list of packages into a specified conda environment.

<SNIP>

Examples:

```
conda install -n myenv scipy
```

```
(isoseq3) uqdgree5@tinaroo2:~> conda install -c bioconda isoseq3
Solving environment: done
```

```
==> WARNING: A newer version of conda exists. <==
current version: 4.5.4
latest version: 4.6.2
```

Please update conda by running

```
$ conda update -n base conda
```

## Package Plan ##

```
environment location: /home/uqdgree5/.conda/envs/isoseq3
```

```
added / updated specs:
- isoseq3
```

The following packages will be downloaded:

package	build		
chardet-3.0.4	py27_1	180 KB	
pbccs-3.3.0	0	1.7 MB	bioconda
htslib-1.7	0	1.1 MB	bioconda
bcftools-1.7	0	2.7 MB	bioconda
idna-2.8	py27_0	133 KB	
traceback2-1.4.0	py27_0	30 KB	
unittest2-1.1.0	py27_0	143 KB	
pyopenssl-17.4.0	py27h3149609_0	76 KB	
numpy-base-1.15.4	py27hde5b4d6_0	4.2 MB	
pycparser-2.19	py27_0	173 KB	
enum34-1.1.6	py27_1	57 KB	
lima-1.8.0	0	1.1 MB	bioconda
isoseq3-3.1.0	0	3.0 MB	bioconda
numpy-1.15.4	py27h7e9f1db_0	47 KB	
iso8601-0.1.12	py27_1	14 KB	
pytz-2018.9	py27_0	263 KB	
urllib3-1.24.1	py27_0	147 KB	
intel-openmp-2019.1	144	885 KB	
libgcc-7.2.0	h69d50b8_2	304 KB	
pysocks-1.6.8	py27_0	22 KB	
requests-2.21.0	py27_0	84 KB	
cryptography-2.0.3	py27hea39389_1	585 KB	
mkl-2019.1	144	204.6 MB	
cython-0.29.2	py27he6710b0_0	2.1 MB	
pbcoretools-0.2.4	py27_3	134 KB	bioconda
pysam-0.14.1	py27_htslib1.7_0	7.1 MB	bioconda
samtools-1.7	1	1.0 MB	bioconda
linecache2-1.0.0	py27_0	24 KB	
six-1.12.0	py27_0	22 KB	
libssh2-1.8.0	h8c220ad_2	243 KB	
curl-7.55.1	hcb0b314_2	626 KB	
pbcore-1.6.5	py27_0	9.7 MB	bioconda
libgfortran-ng-7.3.0	hdf63c60_0	1.3 MB	
mkl_random-1.0.2	py27hd81dba3_0	383 KB	
cffl-1.11.5	py27he75722e_1	209 KB	
h5py-2.9.0	py27h7918eee_0	1.1 MB	
pbcommand-1.1.1	py27_2	193 KB	bioconda
hdf5-1.10.4	hb1b8bf9_0	5.3 MB	
asn1crypto-0.24.0	py27_0	155 KB	
avro-python2-1.8.2	py_1	30 KB	bioconda
mkl_fft-1.0.10	py27ha843d7b_0	161 KB	
ipaddress-1.0.22	py27_0	32 KB	
-----			
Total:		251.3 MB	

The following NEW packages will be INSTALLED:

```

asn1crypto:      0.24.0-py27_0
avro-python2:   1.8.2-py_1      bioconda
bcftools:       1.7-0           bioconda
blas:           1.0-mkl
bzip2:          1.0.6-h14c3975_5
cffi:           1.11.5-py27he75722e_1
chardet:        3.0.4-py27_1
cryptography:   2.0.3-py27hea39389_1
curl:           7.55.1-hcb0b314_2
cython:         0.29.2-py27he6710b0_0
enum34:         1.1.6-py27_1
h5py:           2.9.0-py27h7918eee_0
hdf5:           1.10.4-hb1b8bf9_0
httplib:        1.7-0           bioconda
idna:           2.8-py27_0
intel-openmp:   2019.1-144
ipaddress:      1.0.22-py27_0
iso8601:        0.1.12-py27_1
isoseq3:        3.1.0-0        bioconda
libffi:         3.2.1-hd88cf55_4
libgcc:         7.2.0-h69d50b8_2
libgfortran-ng: 7.3.0-hdf63c60_0
libssh2:        1.8.0-h8c220ad_2
lima:           1.8.0-0        bioconda
linecache2:     1.0.0-py27_0
mkl:            2019.1-144
mkl_fft:        1.0.10-py27ha843d7b_0
mkl_random:     1.0.2-py27hd81dba3_0
numpy:          1.15.4-py27h7e9f1db_0
numpy-base:    1.15.4-py27hde5b4d6_0
pbccs:          3.3.0-0        bioconda
pbcommand:     1.1.1-py27_2   bioconda
pbcore:         1.6.5-py27_0   bioconda
pbcoretools:   0.2.4-py27_3   bioconda
pycparser:      2.19-py27_0
pyopenssl:     17.4.0-py27h3149609_0
pysam:         0.14.1-py27_httplib1.7_0 bioconda
pysocks:       1.6.8-py27_0
pytz:          2018.9-py27_0
requests:       2.21.0-py27_0
samtools:      1.7-1          bioconda
six:            1.12.0-py27_0
traceback2:    1.4.0-py27_0
unittest2:     1.1.0-py27_0
urllib3:       1.24.1-py27_0
xz:            5.2.4-h14c3975_4
    
```

Proceed ([y]/n)? y

Downloading and Extracting Packages

```

chardet-3.0.4      | 180 KB | #####
pbccs-3.3.0       | 1.7 MB | #####
httplib-1.7       | 1.1 MB | #####
bcftools-1.7      | 2.7 MB | #####
idna-2.8          | 133 KB | #####
traceback2-1.4.0 | 30 KB  | #####
unittest2-1.1.0  | 143 KB | #####
pyopenssl-17.4.0 | 76 KB  | #####
numpy-base-1.15.4 | 4.2 MB | #####
pycparser-2.19   | 173 KB | #####
enum34-1.1.6     | 57 KB  | #####
lima-1.8.0       | 1.1 MB | #####
isoseq3-3.1.0    | 3.0 MB | #####
numpy-1.15.4     | 47 KB  | #####
iso8601-0.1.12   | 14 KB  | #####
pytz-2018.9      | 263 KB | #####
urllib3-1.24.1   | 147 KB | #####
intel-openmp-2019.1 | 885 KB | #####
libgcc-7.2.0     | 304 KB | #####
pysocks-1.6.8    | 22 KB  | #####
requests-2.21.0  | 84 KB  | #####
cryptography-2.0.3 | 585 KB | #####
mkl-2019.1       | 204.6 MB | #####
cython-0.29.2    | 2.1 MB | #####
pbcoretools-0.2.4 | 134 KB | #####
pysam-0.14.1     | 7.1 MB | #####
samtools-1.7     | 1.0 MB | #####
linecache2-1.0.0 | 24 KB  | #####
six-1.12.0       | 22 KB  | #####
libssh2-1.8.0    | 243 KB | #####
curl-7.55.1      | 926 KB | #####
pbcore-1.6.5     | 6.7 MB | #####
libgfortran-ng-7.3.0 | 1.3 MB | #####
mkl_random-1.0.2 | 383 KB | #####
    
```

```
cffi-1.11.5 | 209 KB | #####
h5py-2.9.0 | 1.1 MB | #####
pbcommand-1.1.1 | 193 KB | #####
hdf5-1.10.4 | 5.3 MB | #####
asn1crypto-0.24.0 | 155 KB | #####
avro-python2-1.8.2 | 30 KB | #####
mkl_fft-1.0.10 | 161 KB | #####
ipaddress-1.0.22 | 32 KB | #####
Preparing transaction: done
Verifying transaction: done
Executing transaction: /
#####
# #####
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# necessarily ISO compliant, intended for Research Use Only and not for use #
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# #
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# #
# We make no warranty that any such issue will be addressed, #
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#####
# #####
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#####
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# #
```

```

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# #
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#####
/
#####
# #
# PacBio(R) tools distributed via Bioconda are: pre-release versions, not #
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# Bioconda release. We instead provide an issue tracker for you to report #
# issues to us at: #
# #

```

```
#
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#
# BSD 3-Clause Clear License
#
# Please see https://github.com/PacificBiosciences/pbbioconda for
# information on License, Copyright and Disclaimer
#
#####

done
(isoseq3) uqdgree5@tinaroo2:~> source deactivate isoseq3
uqdgree5@tinaroo2:~>
```

## Example 6: Using a package provided in the installation base

### Scenario

You wish to use a package like scikit-learn which is distributed with anaconda and so forms part of the "base" environment. You do not need to build any packages, just activate the base and use it.

### Session

Here is a demo session (with extra whitespace for clarity):

```
uqdgree5@tinaroo1:~> echo "This is a fresh login session"
This is a fresh login session

uqdgree5@tinaroo1:~> module load anaconda/2020.02

uqdgree5@tinaroo1:~> conda info --envs
# conda environments:
#
gurobi-8.0.1-py36      /home/uqdgree5/.conda/envs/gurobi-8.0.1-py36
isoseq3              /home/uqdgree5/.conda/envs/isoseq3
base                  * /sw/RCC/Anaconda/2020.02

uqdgree5@tinaroo1:~> echo "base is the default env and has SciKit-Learn V 0.22.1 included"
base is the default env and has SciKit-Learn V 0.22.1 included

uqdgree5@tinaroo1:~> source activate base

(base) uqdgree5@tinaroo1:~> which python
/sw/RCC/Anaconda/2020.02/bin/python

(base) uqdgree5@tinaroo1:~> python -V
Python 3.7.7

(base) uqdgree5@tinaroo1:~> python
Python 3.7.7 (default, Mar 26 2020, 15:48:22)
[GCC 7.3.0] :: Anaconda, Inc. on linux
Type "help", "copyright", "credits" or "license" for more information.

>>> from sklearn.ensemble import RandomForestClassifier
>>> clf = RandomForestClassifier(random_state=0)
>>> X = [[ 1,  2,  3], # 2 samples, 3 features
...      [11, 12, 13]]
>>> y = [0, 1] # classes of each sample
>>> clf.fit(X, y)
RandomForestClassifier(random_state=0)

>>> clf.predict(X) # predict classes of the training data
array([0, 1])

>>> clf.predict([[4, 5, 6], [14, 15, 16]]) # predict classes of new data
array([0, 1])

>>> quit()

(base) uqdgree5@tinaroo1:~> conda deactivate
uqdgree5@tinaroo1:~>
```

## Gotcha 1: GDAL and libcrypto

If you use the following to enhance your python environment

```
from osgeo import gdal
```

then you may experience an issue that relates to the version of the libcrypto that is provided as part of the openssl package in the operating system.

The version of openssl that is currently provided by the operating system is `openssl-1.0.2k-8` and this is too fresh for the python gdal in osgeo.

The workaround for it is to install an earlier version of openssl into your gdal conda environment.

This will have the effect of changing your `$PATH` so that `libcrypto.so.1.0.0` is found before the system one.

Identify a suitable version from the list provided as the output of the command `conda search openssl`

Install the suitable version with the command `conda install -c anaconda openssl=1.0.1k`

See <https://anaconda.org/anaconda/openssl> for further information.