Cluster Computing Using IPython Notebook with Amazon EC2
1. Launching EC2 Cluster Instance
1. Launch Spot Instance from Spot Instance Menu

http://randyzwitch.com
1b. Launch Spot Instance – Ubuntu Server 12.04LTS for HVM Instances
1c. Launch Spot Instance - Choose cc2.8xlarge instance
1d. Launch Spot Instance - Set bid price

For max bid, set price that you’re comfortable paying to keep instance running. Cost has been pretty stable at $0.27/hr for a while.
1e. Launch Spot Instance - Set security

I generally open all ports and only allow my IP address as a simplistic security protocol, since this is a spot instance that I use for a few hours.
1f. Launch Spot Instance - Launch

```markdown
<table>
<thead>
<tr>
<th>Instance Type</th>
<th>CPU</th>
<th>Memory (GiB)</th>
<th>Storage (GiB)</th>
<th>EBS-Optimized Available</th>
<th>Network Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>cc2.8xlarge</td>
<td>32</td>
<td>60.5</td>
<td>4 x 8Gi</td>
<td>-</td>
<td>10 Gigabit</td>
</tr>
</tbody>
</table>
```

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1g. Launch Spot Instance - Pick .pem keys

If you don’t specify a key pair, you can’t login to the instance!
1g. Launch Spot Instance - Wait for fulfillment

If your spot request is fulfilled, it will take about 5-10 minutes to launch

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2. Installing & Configuring Python/IPython Using Anaconda

FULL INSTRUCTIONS:
HTTP://IPYTHON.ORG/IPYTHON-DOC/DEV/INTERACTIVE/PUBLIC_SERVER.HTML#NOTEBOOK-PUBLIC-SERVER
2a. Installing IPython - SSH into EC2 Instance

SSH into EC2 instance, create /temp directory, then download Anaconda (64-bit, Linux). 
http://continuum.io/downloads

Run script after downloading to install Anaconda: bash Anaconda-1.8.0-Linux-x86_64.sh

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2b. Installing IPython – Generate Password

In IPython REPL, use the IPython.lib passwd() feature to create a password. Copy password to a text editor for later use.

(No, this is not a real password to use on my EC2 instance!)

```
ubuntu@ip-10-178-132-244:~$ ipython
Python 2.7.5 |Anaconda 1.8.0 (64-bit)| (default, Nov 4 2013, 15:30:26)
Type "copyright", "credits" or "license" for more information.

IPython 1.1.0 — An enhanced Interactive Python.
?  → Introduction and overview of IPython's features.
%quickref  → Quick reference.
help  → Python's own help system.
object?  → Details about 'object', use 'object??' for extra details.

In [1]: from IPython.lib import passwd

In [2]: passwd()
Enter password: 
Verify password: 
Passwords do not match. 
Enter password: Verify password: 
Out[2]: 'sha1:694bff492f56:e06ae3083855a56269446d2a386a557fb538ff6f'

In [3]: 
```
2c. Installing IPython – Create nbserver profile

Create an IPython profile called ‘nbserver’, which we will use as our profile to create the public Notebook server

```
ubuntu@ip-10-178-132-244:~$ ipython profile create nbserver
[ProfileCreate] Generating default config file: u'/home/ubuntu/.ipython/profile_nbserver/ipython_config.py'
[ProfileCreate] Generating default config file: u'/home/ubuntu/.ipython/profile_nbserver/ipython_notebook_config.py'
[ProfileCreate] Generating default config file: u'/home/ubuntu/.ipython/profile_nbserver/ipython_nbconvert_config.py'
ubuntu@ip-10-178-132-244:~$ 
```
2d. Installing IPython – Generate SSL certificate

Create a self-signed SSL certificate so that we can use HTTPS on the IPython Notebook

```
$ mkdir certificates
$ cd certificates/
$ openssl req -x509 -nodes -days 365 -newkey rsa:1024 -keyout mycert.pem -out mycert.pem
Generating a 1024 bit RSA private key
..........................................................+++++
writing new private key to 'mycert.pem'

You are about to be asked to enter information that will be incorporated into your certificate request.
What you are about to enter is what is called a Distinguished Name or a DN.
There are quite a few fields but you can leave some blank
For some fields there will be a default value,
If you enter '.', the field will be left blank.

Country Name (2 letter code) [AU]:US
State or Province Name (full name) [Some-State]:PA
Locality Name (eg, city) [Ambler]:
Organization Name (eg, company) [Internet Widgits Pty Ltd]:COMPANY
Organizational Unit Name (eg, section) []:COMPANY
Common Name (e.g. server FQDN or YOUR name) []:COMPANY
Email Address []:COMPANY@COMPANY.COM
```

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2e. Installing IPython – Modify nbserver profile

Navigate to the profile_nbserver directory, then modify the ipython_notebook_config.py file with your certificate location and password.

Place these commands at the top of the file; you don’t need to uncomment any of the lines generated when nbserver profile was created.

```
# Configuration file for ipython-notebook.
c = get_config()

# Kernel config
C.IPKernelApp.pylab = 'inline'  # if you want plotting support always

# Notebook config
C.NotebookApp.certfile = u'~/home/ubuntu/certificates/mycert.pem'
c.NotebookApp.ip = '127.0.0.1'
c.NotebookApp.open_browser = False
C.NotebookApp.password = u'sha1:694b6f492f56:e066a308a555a56269446d2a396a557fb538ff6f'
# It is a good idea to put it on a known, fixed port
C.NotebookApp.port = 8888
```

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2f. Installing IPython – Launch IPython Notebook

Launch IPython Notebook with the `nbserver` profile. At this point, we can now access IPython Notebook from our local browser!
3. Using IPython Notebook from Local Browser
3a. Accessing IPython Notebook – SSL Warning

Use any modern browser to access the public DNS of your EC2 image. It is expected to see a warning, as we’re using a self-signed SSL certificate.

Ex: https://ec2-54-205-25-4.compute-1.amazonaws.com:8888
3b. Accessing IPython Notebook – Enter Password

Sign in using password that you set during the prior step (the actual password, not the SHA1 version)
3c. Accessing IPython Notebook – Success!

At this point, you’ve got a fully functional Python cluster environment running on EC2, which you are accessing from your local browser.
3c. Accessing IPython Notebook – Use 32 cores for ML

Running a toy example from Scikit-Learn, we can specify use of 32 cores for the ExtraTreesClassifier

![IPython Notebook](http://randyzwitch.com)