COMP 4331 Tut 2

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Outline

- Brief introduction to anaconda
- How to install anaconda in AWS server
- Brief introduction to Jupter Notebook
- How to install Jupter Notebook in AWS server

What is Anaconda

Anaconda is a Python distribution that is particularly popular for data analysis and scientific computing

- Open source project developed by Continuum Analytics, Inc
- Available for Windows, Mac OS X and Linux
- Includes many popular packages: NumPy, SciPy, Matplotlib, Pandas, IPython, Cython
- Includes Spyder, a Python development environment
- Includes conda, a platform-independent package manager

Why do we need Anaconda

Simplifies installation of Python packages

- Platform-independent package manager
- Doesn’t require administrative privileges
- Installs non-Python library dependencies (MKL, HDF5, Boost)
- Provides ”virtual environment” capabilities
- Many channels exist that support additional packages

For more information, you can refer to: https://www.anaconda.com/

How to install anaconda in AWS server

- Connect to the server via ssh (ssh -i ”your own key file“ ubuntu@ec2-[your own address].us-east-2.compute.amazonaws.com)
- Download the anaconda file (curl -O https://repo.anaconda.com/archive/Anaconda3-5.2.0-Linux-x86_64.sh)
- Check the downloaded file (sha256sum Anaconda3-5.2.0-Linux-x86_64.sh)
- Install the anaconda (bash Anaconda3-5.2.0-Linux-x86_64.sh)

Follow the instructions, choose yes for all the choices except the last one. (we do not need to install the VS code)

How to use Anaconda

- Create a new environment (conda create -n comp4331 python=3.6)
- Activate the environment (source activate comp4331)
- Install any package you want (e.g., pip install pandas/torch)
- Deactivate the environment when you finish (source deactivate)

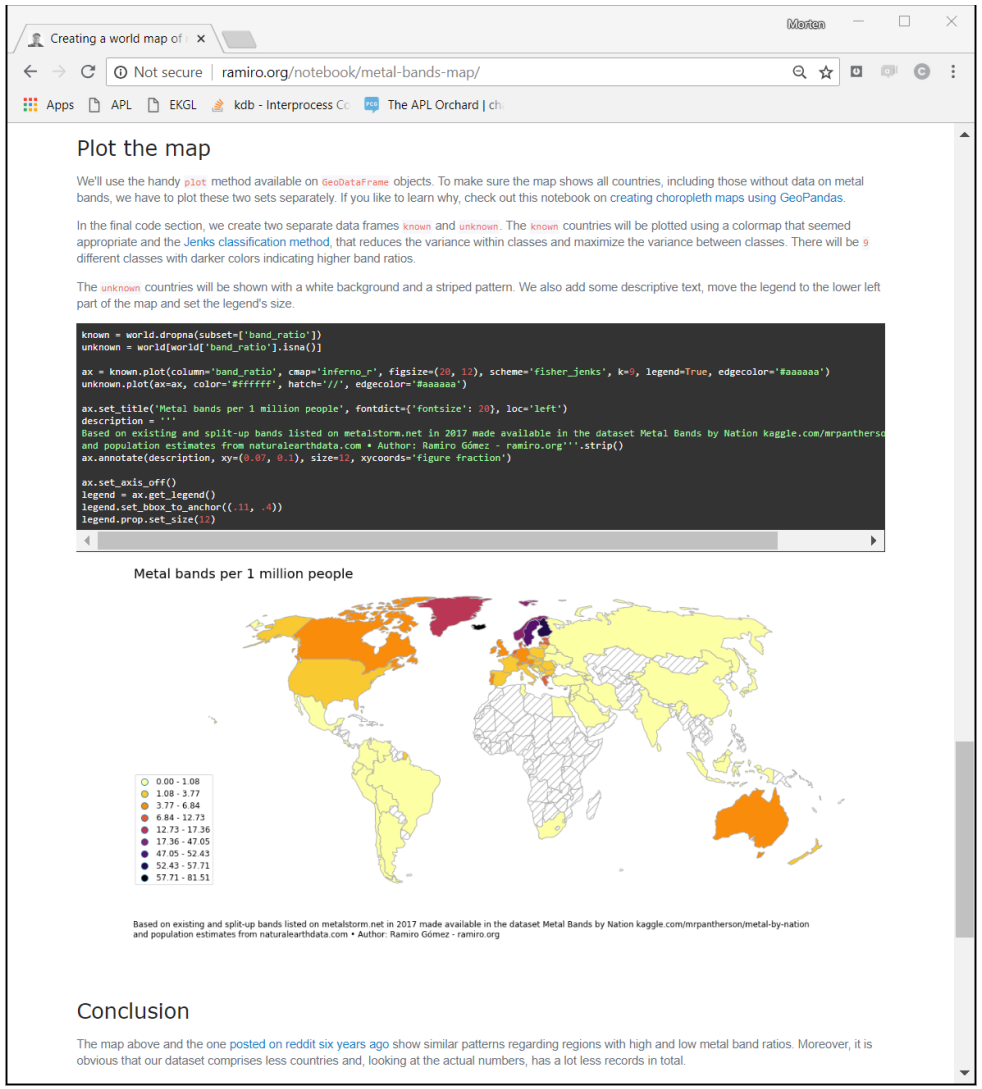
For more information, you can refer to:
https://docs.conda.io/projects/conda/en/latest/user-guide/tasks/manage-environments.html

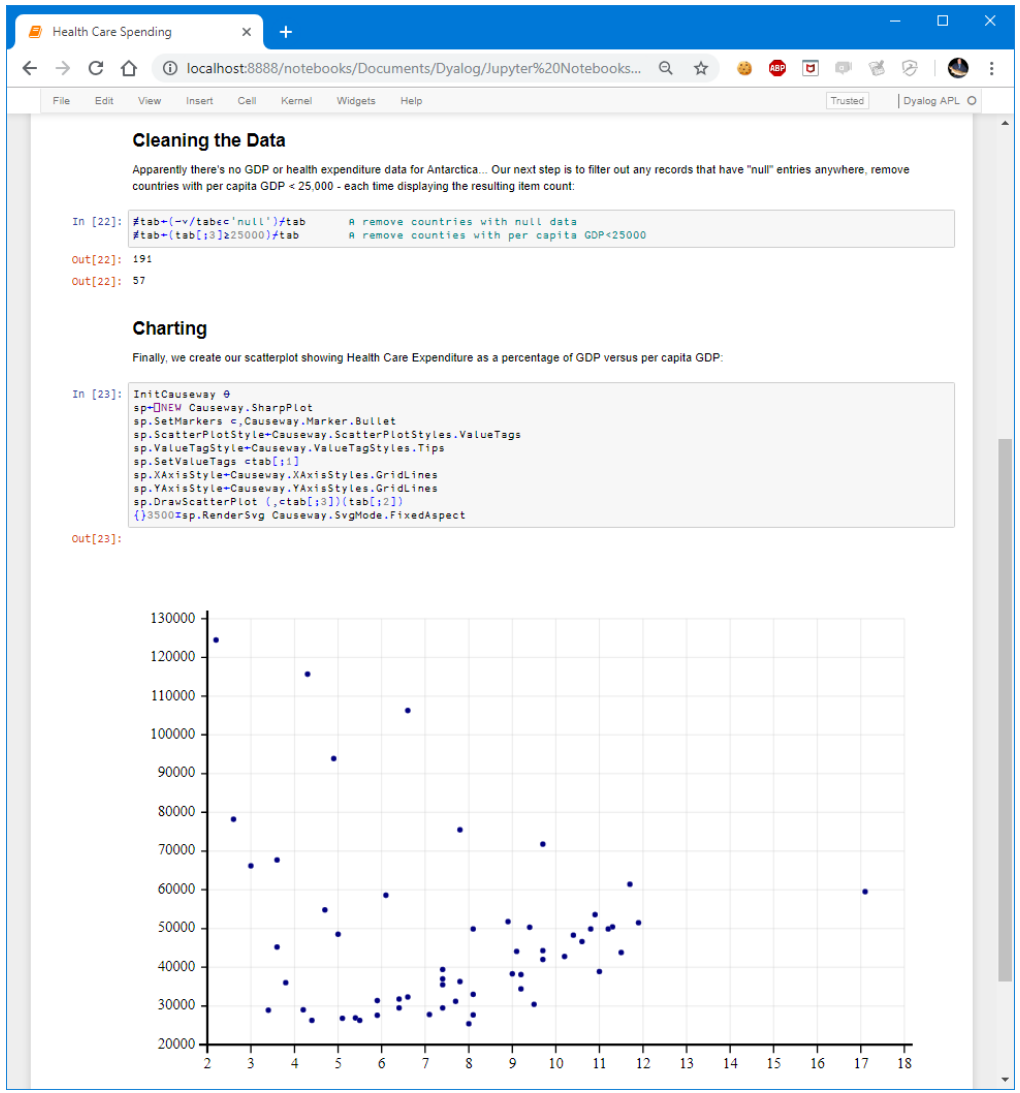
What is Jupyter Notebook

A notebook combines the functionality of

- a word processor — handles formatted text
- a "shell" or "kernel" — executes statements in a programming language and includes output inline
- a rendering engine — renders HTML in addition to plain text

Jupyter Notebook Example





How to install it in aws

- SSH to the server like we did before (ssh -i ”your own key file“ ubuntu@ec2-[your own address].us-east-2.compute.amazonaws.com)
- Enter the python terminal (ipython)
- Generate your own key (from IPython.lib import passwd; passwd()) and **save** the generated key to you local PC.
- Exit the python terminal (exit())

How to install it in aws

Generate the config file

- jupyter notebook --generate-config
- mkdir certs
- cd certs
- openssl req -x509 -nodes -days 365 -newkey rsa:1024 -keyout mycert.pem -out mycert.pem
- cd ~/.jupyter/

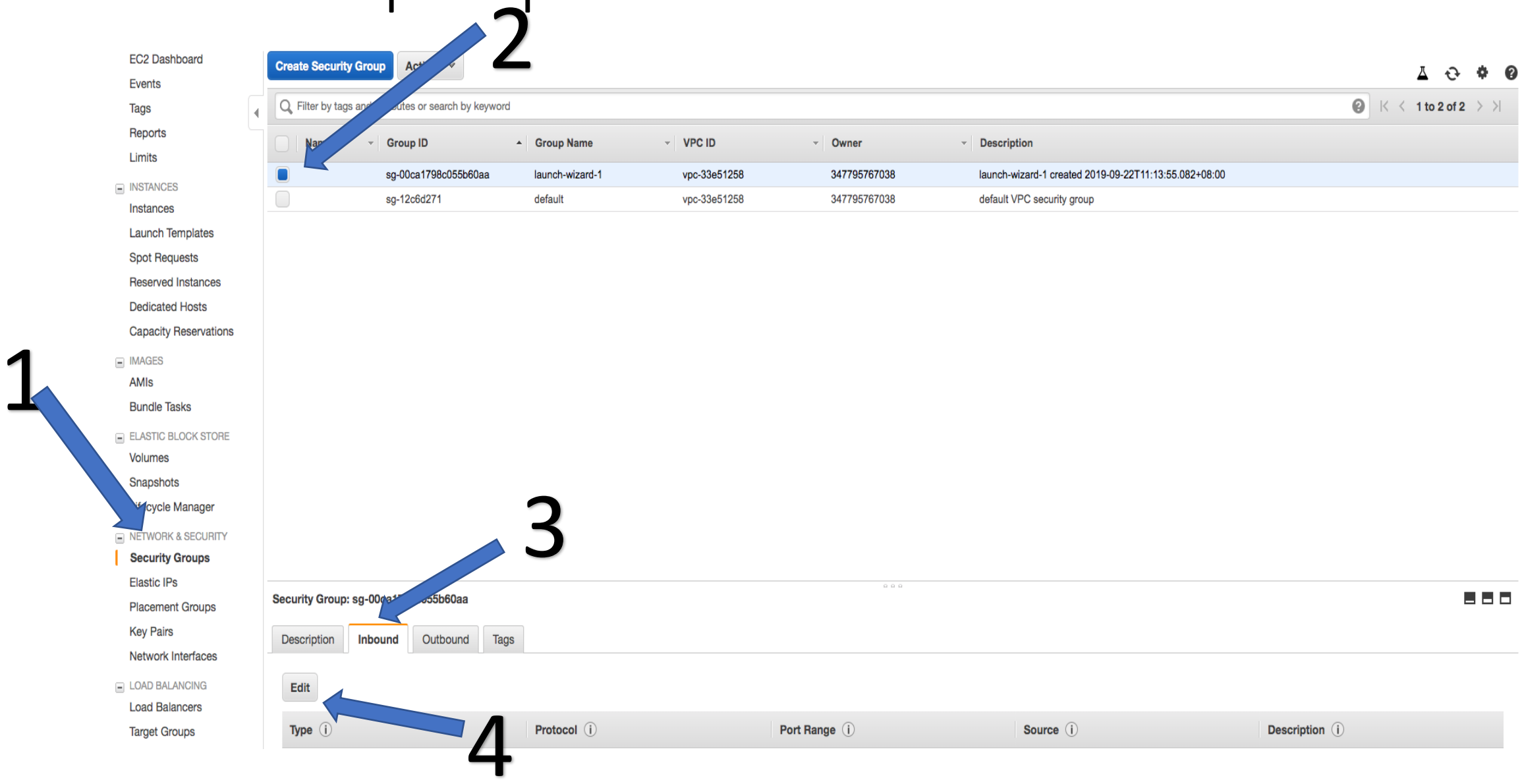
How to install it in aws

Modify the config file by (vim jupyter_notebook_config.py), Copy the following text and paste them to the front of the config file.

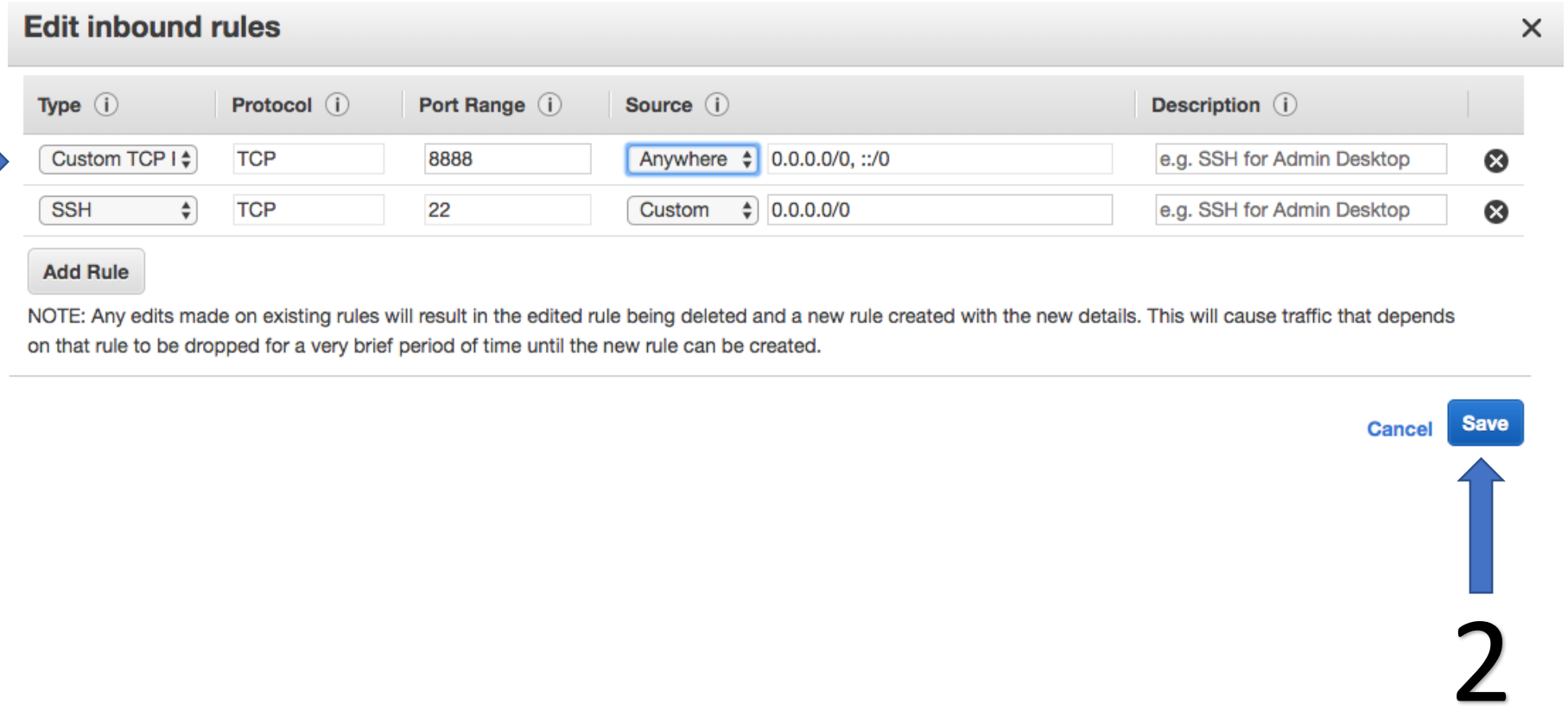
```
c = get_config()
c.IPKernelApp.pylab = 'inline’
c.NotebookApp.certfile = u'/home/ubuntu/certs/mycert.pem'c.NotebookApp.ip = '*’
c.NotebookApp.open_browser = False
# Your password below will be whatever you copied earlier
c.NotebookApp.password = u’[the key you just saved]’
c.NotebookApp.port = 8888
```

How to operate in Vim: (1) type ‘i’; (2) paste all the above staff; (3) type ‘Esc’ to enter the control mode; (4) type ‘:wq’ to save the modification and exit.

How to open port 8888 in aws



How to open port 8888 in aws



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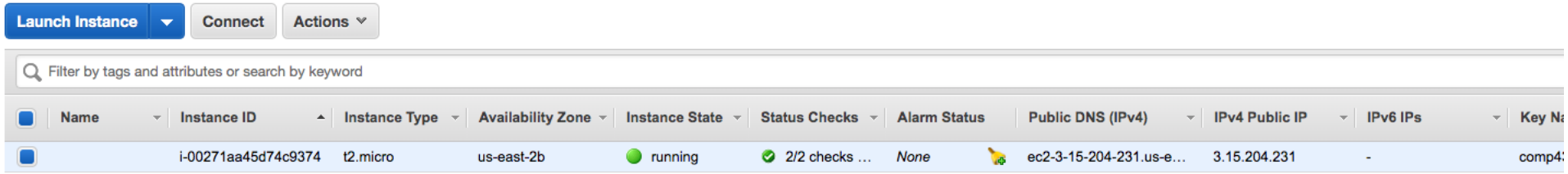
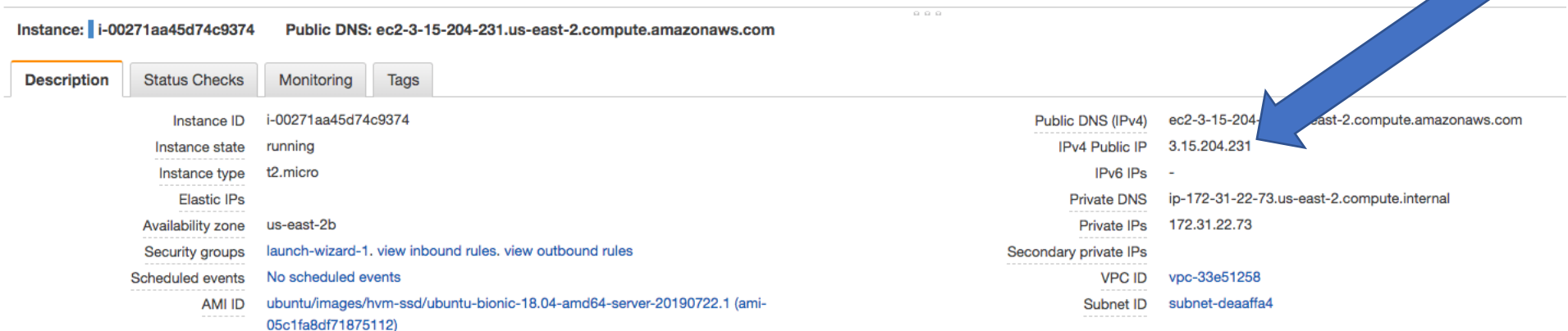
Start the server

- In the terminal (jupyter notebook)
- In your own browser (https://[your ip address]:8888/)



The IP address of your aws server



The end

After typing your password, you should get something like this.

For more information, you can refer to:
https://medium.com/@GalarnykMichael/aws-ec2-part-4-starting-a-jupyter-ipython-notebook-server-on-aws-549d87a55ba9#.ylckaikgc

PS: the only difference between my instruction with this blog is that I didn't use sudo for the openssl command. Do it following me instead of the blog. This is important.

Practice (optional for this tutorial)

Kaggle Titanic competition

Competition Description

The sinking of the RMS Titanic is one of the most infamous shipwrecks in history. On April 15, 1912, during her maiden voyage, the Titanic sank after colliding with an iceberg, killing 1502 out of 2224 passengers and crew. This sensational tragedy shocked the international community and led to better safety regulations for ships.

One of the reasons that the shipwreck led to such loss of life was that there were not enough lifeboats for the passengers and crew. Although there was some element of luck involved in surviving the sinking, some groups of people were more likely to survive than others, such as women, children, and the upper-class.

In this challenge, we ask you to complete the analysis of what sorts of people were likely to survive. In particular, we ask you to apply the tools of machine learning to predict which passengers survived the tragedy.

You can download the dataset and see the full code here:
https://www.kaggle.com/dmilla/introduction-to-decision-trees-titanic-dataset

Load data

```
# Imports needed for the script
import numpy as np
import pandas as pd
import re
import xgboost as xgb
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline

import plotly.offline as py
py.init_notebook_mode(connected=True)
import plotly.graph_objs as go
import plotly.tools as tls

from sklearn import tree
from sklearn.metrics import accuracy_score
from sklearn.model_selection import KFold
from sklearn.model_selection import cross_val_score
from IPython.display import Image as PImage
from subprocess import check_call
from PIL import Image, ImageDraw, ImageFont

# Loading the data
train = pd.read_csv('../input/train.csv')
test = pd.read_csv('../input/test.csv')

# Store our test passenger IDs for easy access
PassengerId = test['PassengerId']

# Showing overview of the train dataset
train.head(3)
```

Get a decision tree model

```
cv = KFold(n_splits=10)            # Desired number of Cross Validation folds
accuracies = list()
max_attributes = len(list(test))
depth_range = range(1, max_attributes + 1)

# Testing max_depths from 1 to max attributes
# Uncomment prints for details about each Cross Validation pass
for depth in depth_range:
    fold_accuracy = []
    tree_model = tree.DecisionTreeClassifier(max_depth = depth)
    # print("Current max depth: ", depth, "\n")
    for train_fold, valid_fold in cv.split(train):
        f_train = train.loc[train_fold] # Extract train data with cv indices
        f_valid = train.loc[valid_fold] # Extract valid data with cv indices

        model = tree_model.fit(X = f_train.drop(['Survived'], axis=1),
                               y = f_train["Survived"]) # We fit the model with the fold train d
ata
        valid_acc = model.score(X = f_valid.drop(['Survived'], axis=1),
                                y = f_valid["Survived"])# We calculate accuracy with the fold va
lidation data
        fold_accuracy.append(valid_acc)

    avg = sum(fold_accuracy)/len(fold_accuracy)
    accuracies.append(avg)
    # print("Accuracy per fold: ", fold_accuracy, "\n")
    # print("Average accuracy: ", avg)
    # print("\n")

# Just to show results conveniently
df = pd.DataFrame({"Max Depth": depth_range, "Average Accuracy": accuracies})
df = df[["Max Depth", "Average Accuracy"]]
print(df.to_string(index=False))
```