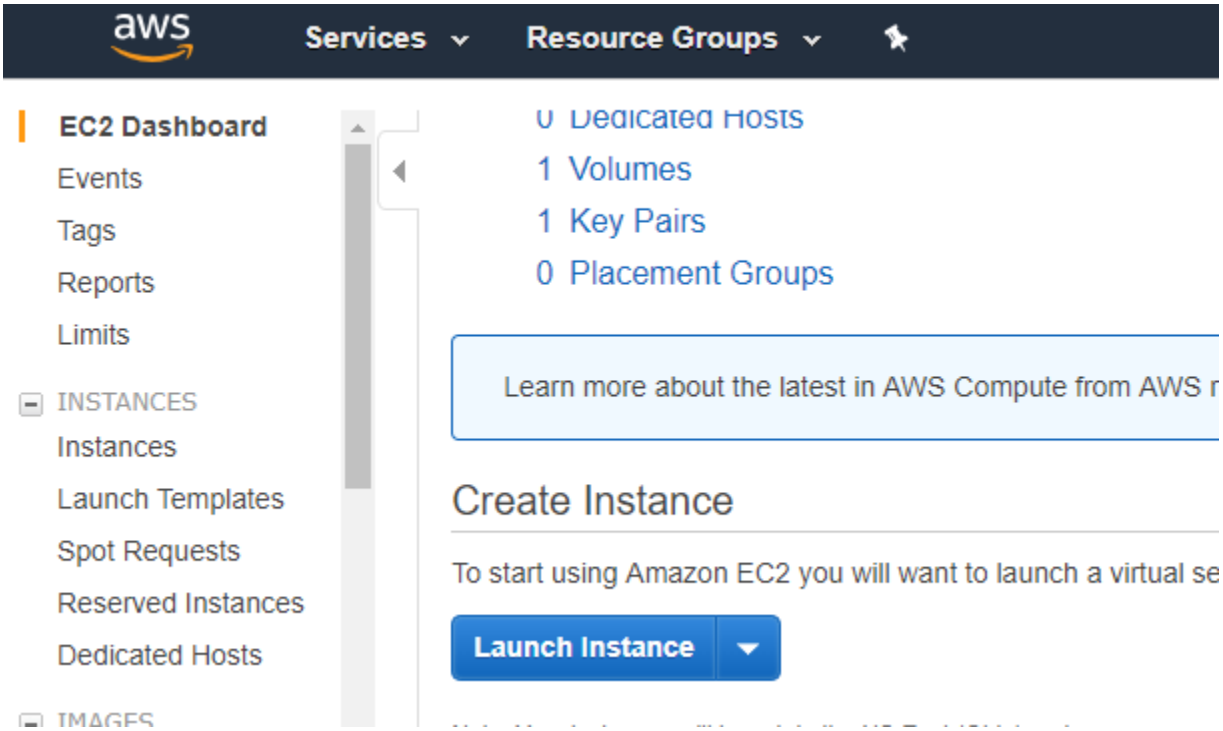
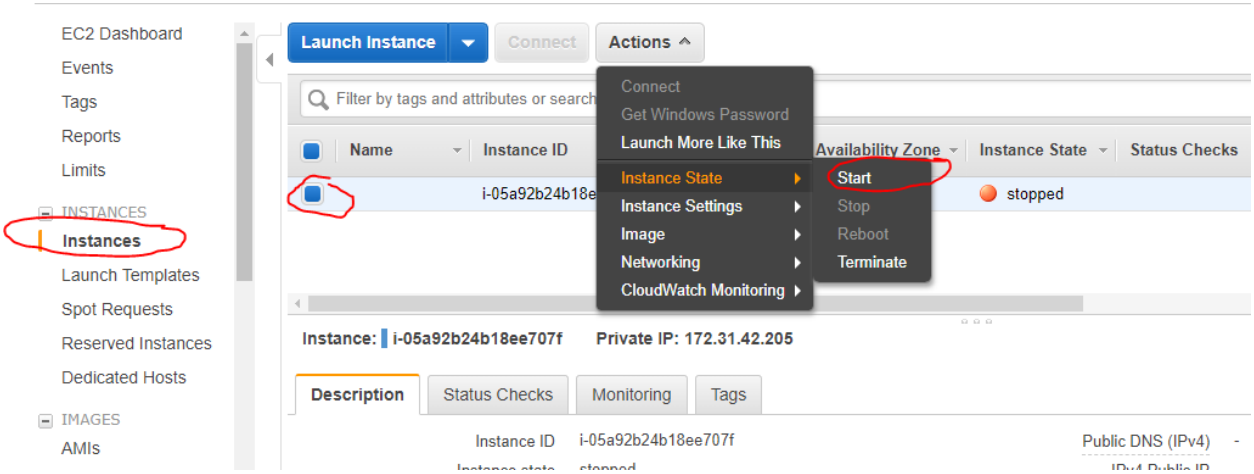
Running Jupyter Notebook in AWS instance

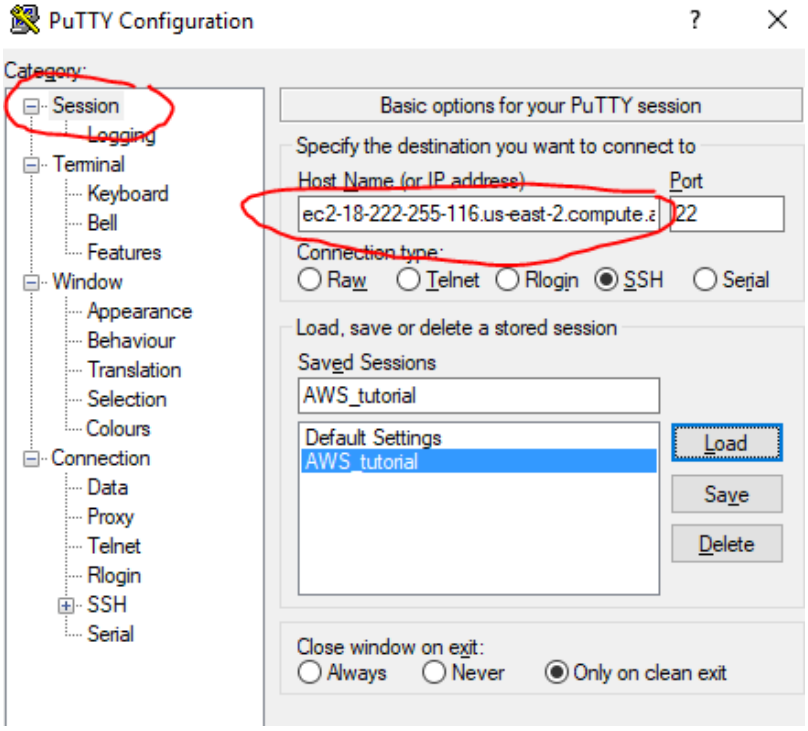
1. Go to EC2 site and launch instance



2. Relaunch the previous instance
    a. Click on Instances
    b. Select the previous instance, which is stopped
    c. Go to “Actions” and click on “Instance State” and “Start”



3. Use “PuTTY” to connect to AWS instance
    a. Open “Putty”
    b. Set up “Host Name/IP address” in “PuTTY”



Go to “Connect” in the instance and copy instance address to PuTTY

To access your instance:

1. Open an SSH client. (find out how to connect using PuTTY)
2. Locate your private key file (AWS_tuturial.pem). The wizard automatically detects the key you used to launch the instance.
3. Your key must not be publicly viewable for SSH to work. Use this command if needed:

```
chmod 400 AWS_tuturial.pem
```

4. Connect to your instance using its Public DNS:

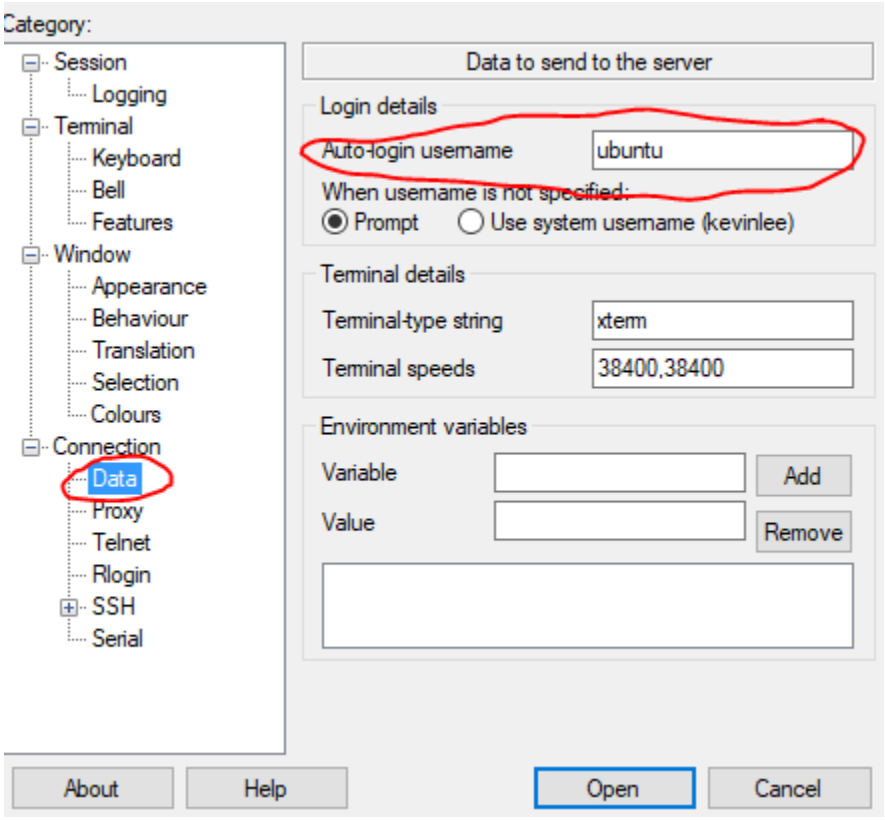
```
ec2-52-14-169-206.us-east-2.compute.amazonaws.com
```

Example:

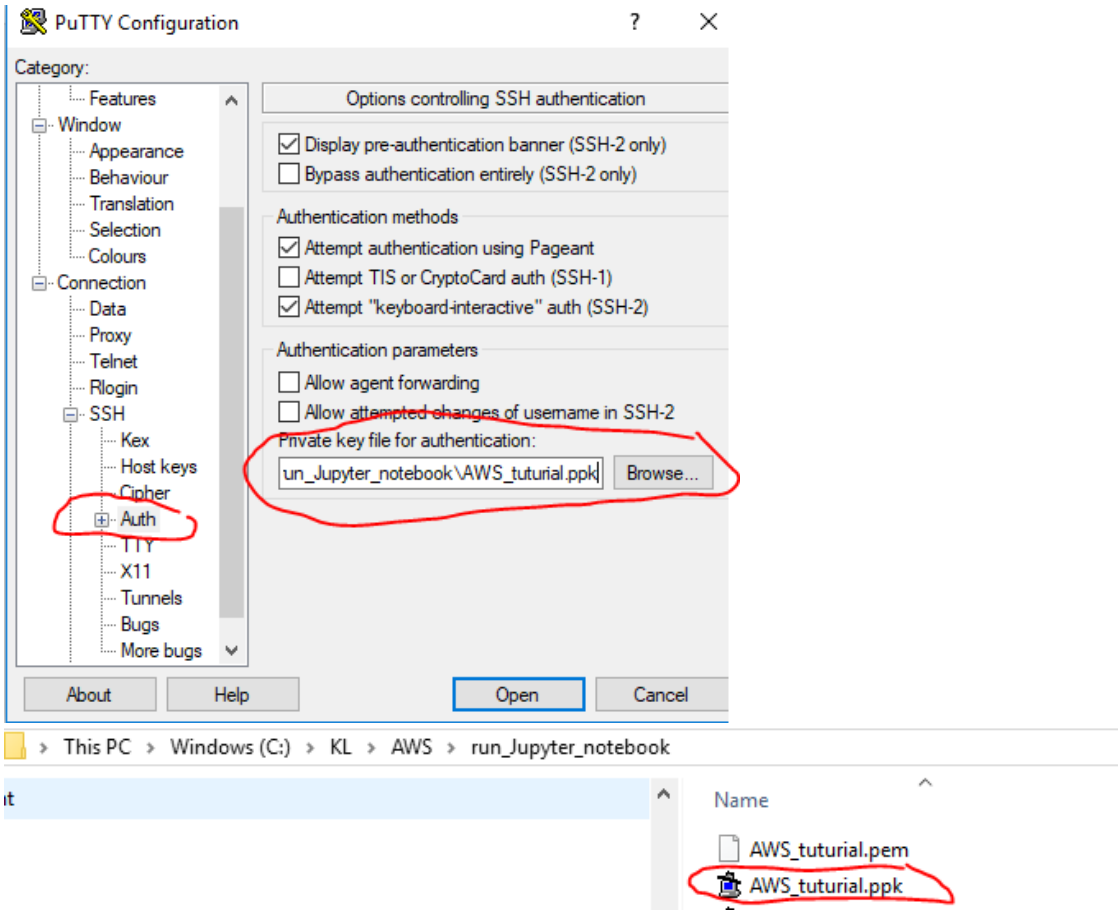
```
ssh -i "AWS_tuturial.pem" ubuntu@ec2-52-14-169-206.us-east-2.compute.amazonaws.com
```

Please note that in most cases the username above will be correct, however please ensure that you read your AMI usage instructions to ensure that the AMI owner has not changed the default AMI username.

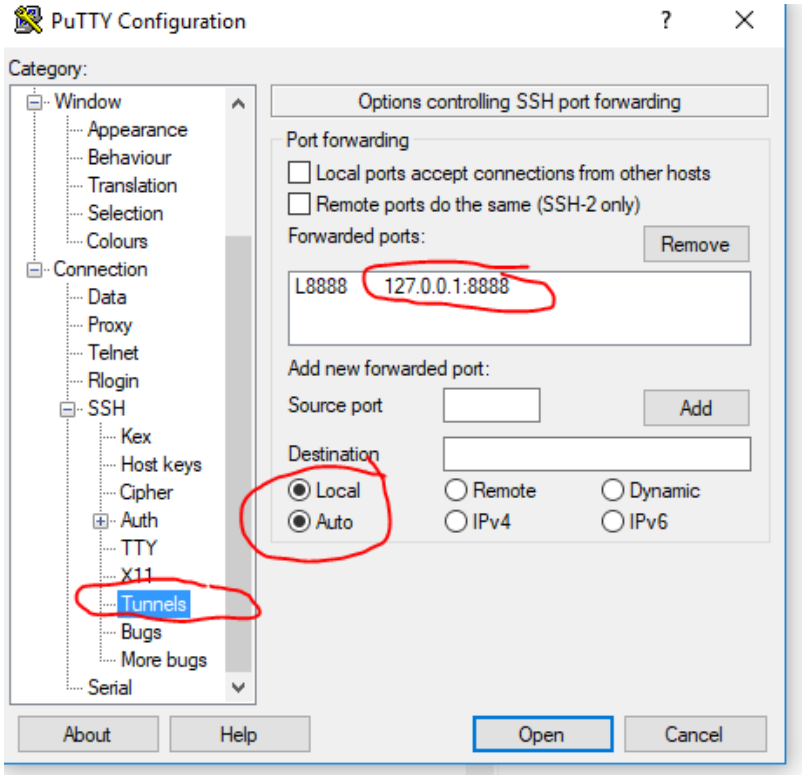
c. Set up “Username”. It should be same as AWS Instance username



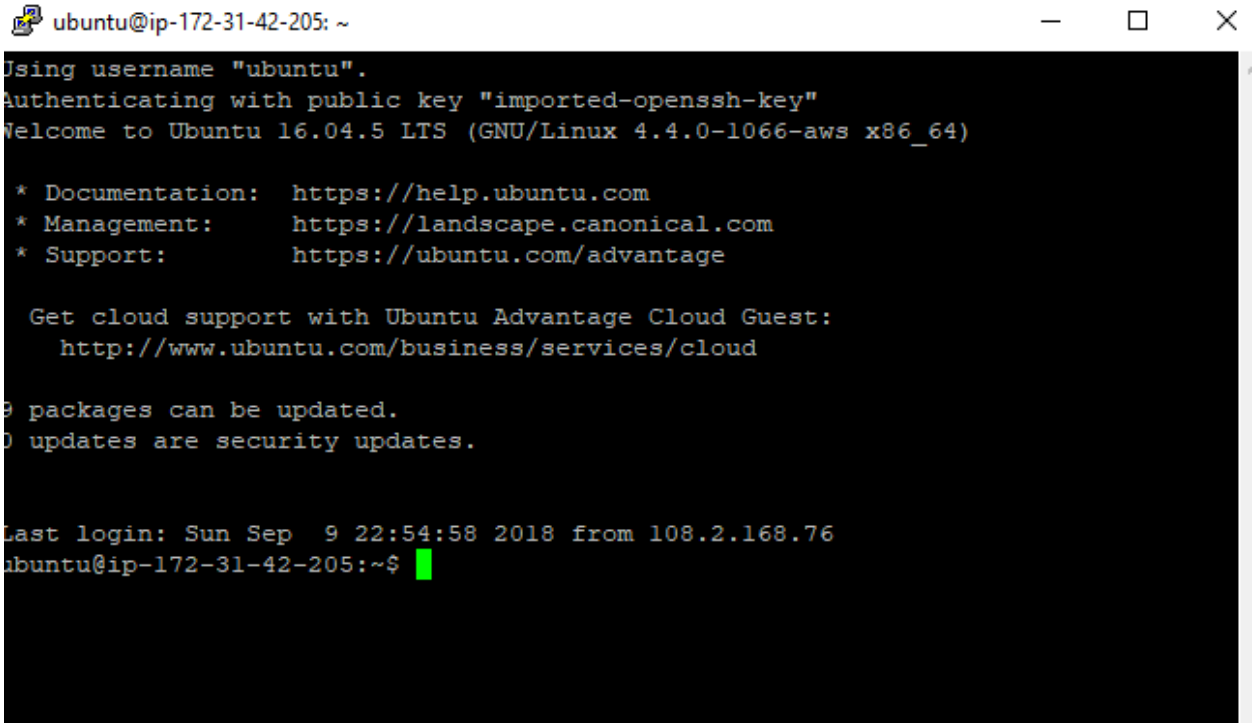
d. Set up Authentication by picking key term of “AWS_tutorial”



e. Set up “Tunnels” and local host. Here the local host will be 127.0.0.1:8888. When using browser, http://localhost:8888/?token... Here localhost is 127.0.0.1. Since the local host is set up in PuTTY, you don’t need to manually type it on web-browser.



f. Click “Open” to connect and it will show command line

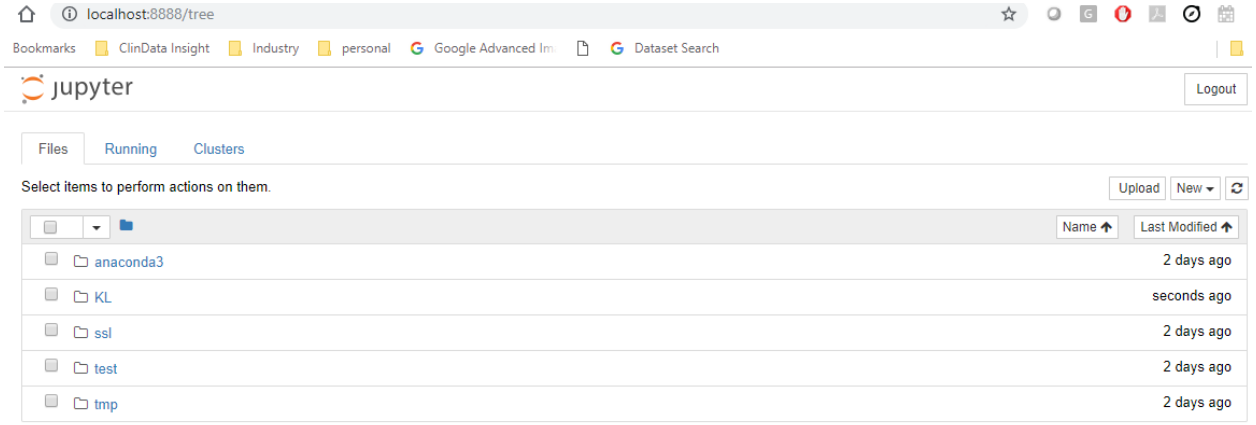


g. For further information on how to use “PuTTY” to connect to AWS instance, see https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/putty.html?icmpid=docs_ec2_console.

4. Run Jupyter Notebook
    a. In “PuTTY”, list already-installed packages
    b. In “PuTTY”, run “jupyter notebook”

```
Using username "ubuntu".
Authenticating with public key "imported-openssh-key"
Welcome to Ubuntu 16.04.5 LTS (GNU/Linux 4.4.0-1066-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

  Get cloud support with Ubuntu Advantage Cloud Guest:
    http://www.ubuntu.com/business/services/cloud

9 packages can be updated.
0 updates are security updates.


Last login: Sun Sep  9 22:54:58 2018 from 108.2.168.76
ubuntu@ip-172-31-42-205:~$ ls
anaconda3  ssl  test  tmp
ubuntu@ip-172-31-42-205:~$ jupyter notebook
[I 15:54:57.674 NotebookApp] Writing notebook server cookie secret to /run/user/
1000/jupyter/notebook_cookie_secret
[I 15:54:57.754 NotebookApp] JupyterLab alpha preview extension loaded from /hom
e/ubuntu/anaconda3/lib/python3.6/site-packages/jupyterlab
JupyterLab v0.27.0
Known labextensions:
[I 15:54:57.757 NotebookApp] Running the core application with no additional ext
ensions or settings
[I 15:54:57.762 NotebookApp] Serving notebooks from local directory: /home/ubunt
u
[I 15:54:57.762 NotebookApp] 0 active kernels
[I 15:54:57.762 NotebookApp] The Jupyter Notebook is running at: http://localhos
t:8888/?token=0a3cff2c2ae582b5bd2fa10a41f647ee66c75a5e9e95d8d9
[I 15:54:57.762 NotebookApp] Use Control-C to stop this server and shut down all
 kernels (twice to skip confirmation).
[W 15:54:57.762 NotebookApp] No web browser found: could not locate runnable bro
wser.
[C 15:54:57.763 NotebookApp]

    Copy/paste this URL into your browser when you connect for the first time,
    to login with a token:
        http://localhost:8888/?token=0a3cff2c2ae582b5bd2fa10a41f647ee66c75a5e9e9
5d8d9
```

    c. Copy URL and paste in browser

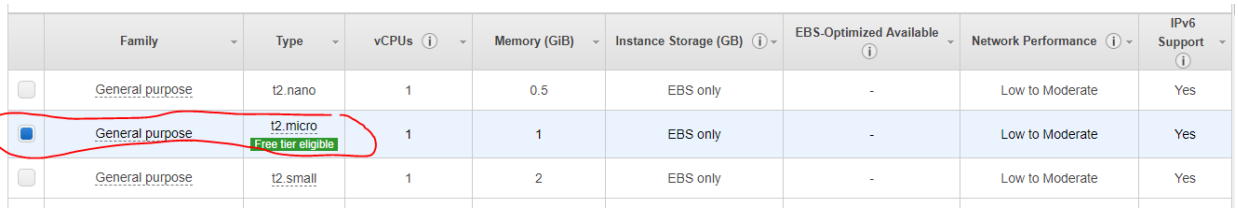


    d. You can upload files and run Jupyter Notebook

How to set up Deep Learning AWS instance and run Jupyter Notebook

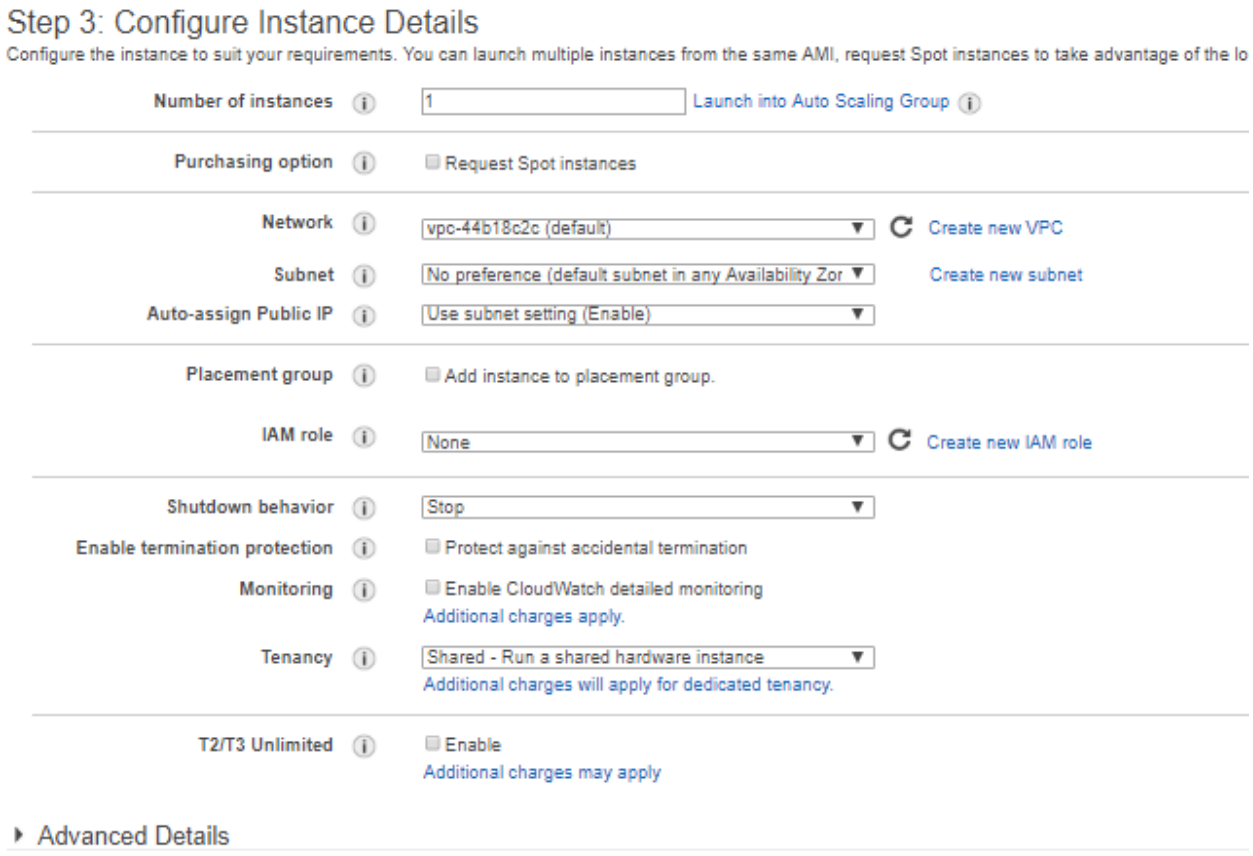
1. Choose Amazon Machine Image on “Deep Learning AMI(Ubuntu)”

2. Select Instance Type on “ t2.micro”. It is free-tier, but for better computing power, you can select more powerful instance.

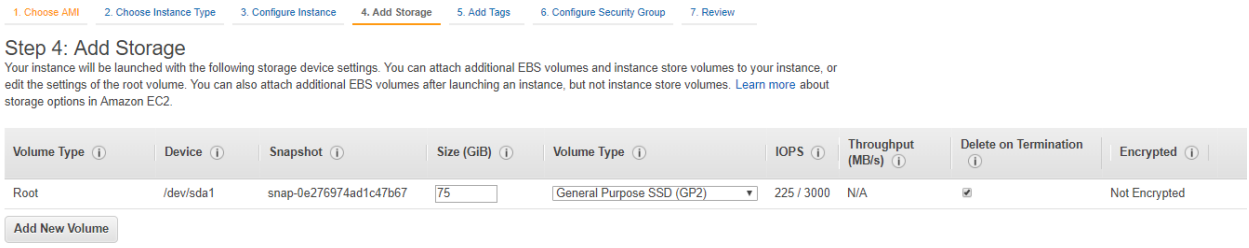


	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
☐	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
☑	General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
☐	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes

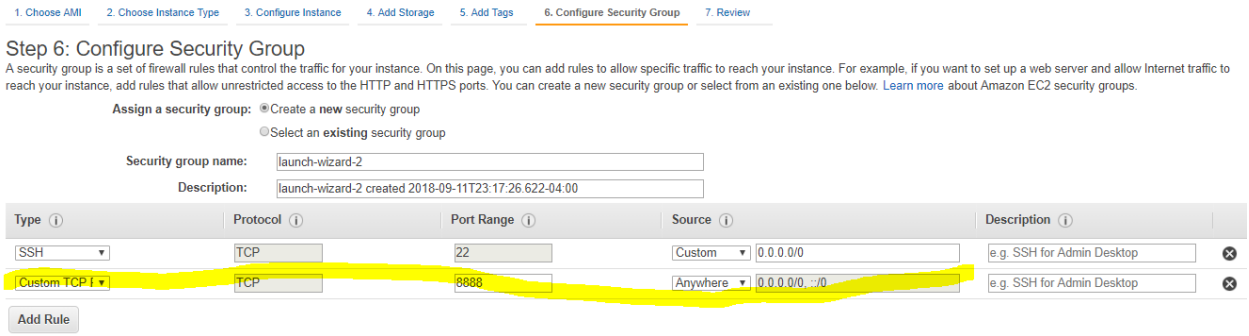
3. Keep the default setting of instance and go on to “Add storage”



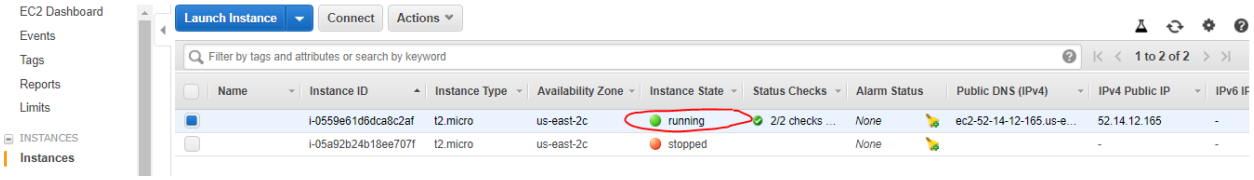
4. Keep the default of setting of storage



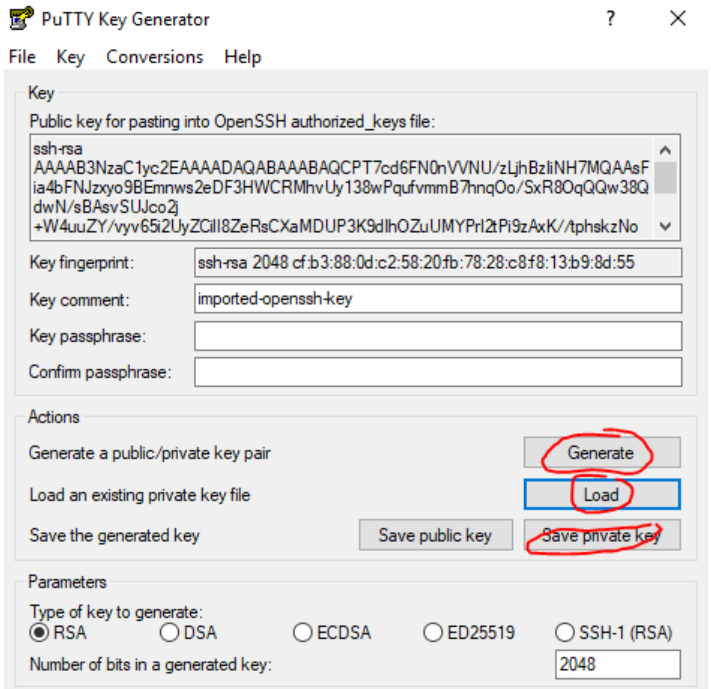
5. Create “Custom TCP Rule on port range 8888” (yell0-highlighted) that will talk to remote Jupyter Notebook using “Add Rule”



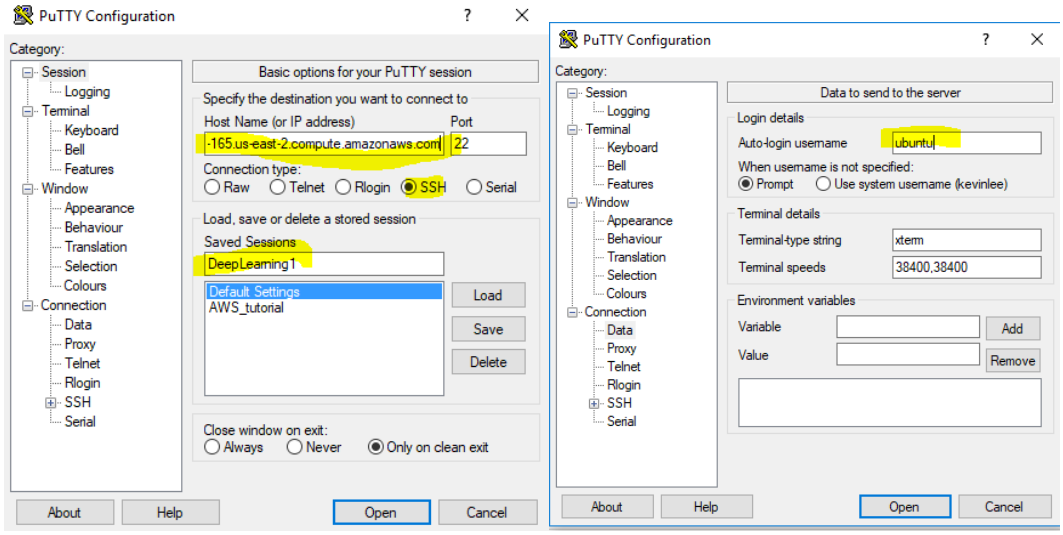
6. Download Key pair and launch DLAMI instance
7. Wait until your instance is running

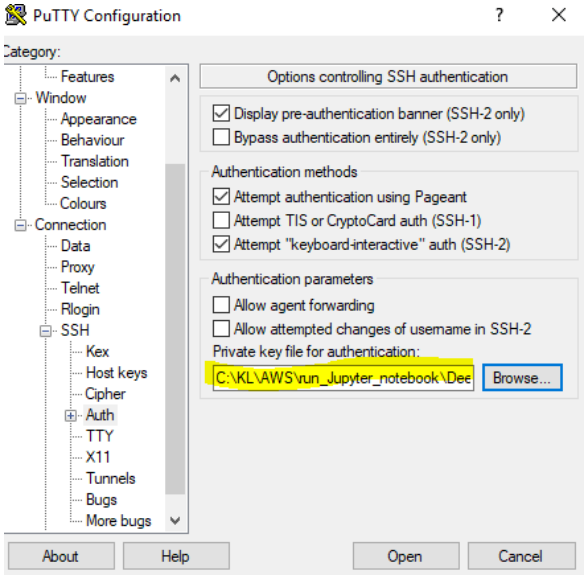


8. Open “PuTTYGen”, load existing private key (“DeepLearning_key.pem”), save private key and generate key pair (“DeepLearning_key.ppk”).

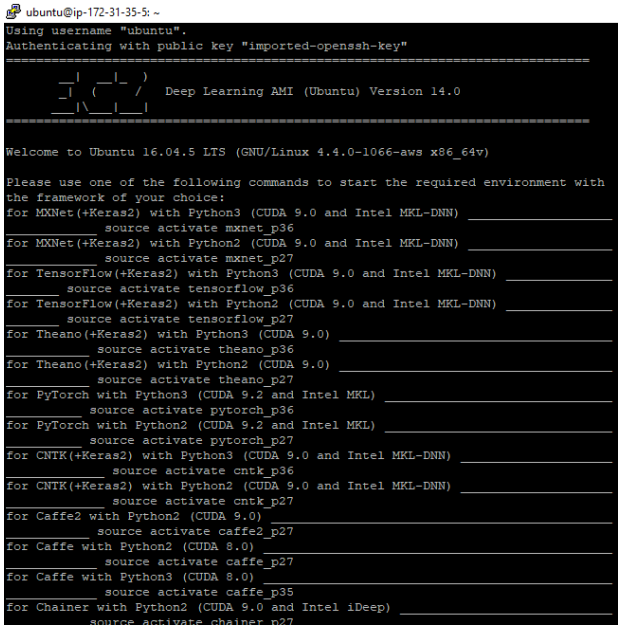


9. Open “PuTTY” and set up the necessary setting to connect to AWS instance





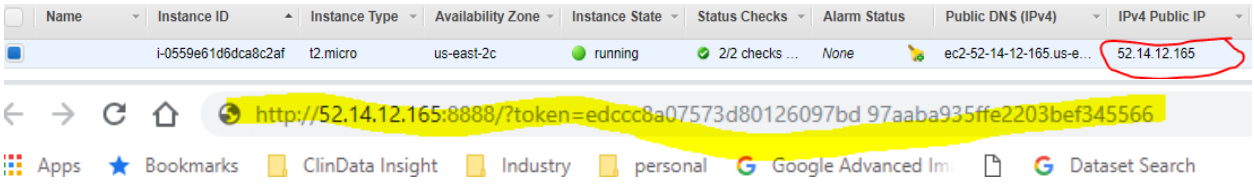
10. Open “PuTTY”



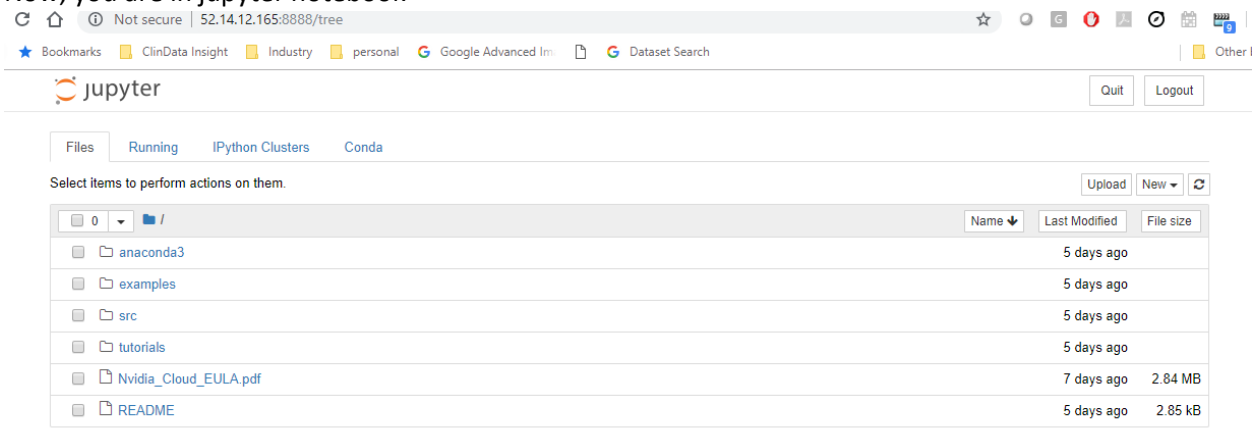
11. Run “jupyter notebook” in PuTTY

```
ubuntu@ip-172-31-35-5:~$ jupyter notebook --ip=0.0.0.0
[I 04:24:18.400 NotebookApp] Using EnvironmentKernelSpecManager...
[I 04:24:18.401 NotebookApp] Started periodic updates of the kernel list (every
3 minutes).
[I 04:24:18.604 NotebookApp] Loading IPython parallel extension
[I 04:24:18.628 NotebookApp] JupyterLab beta preview extension loaded from /home
/ubuntu/anaconda3/lib/python3.6/site-packages/jupyterlab
[I 04:24:18.628 NotebookApp] JupyterLab application directory is /home/ubuntu/an
aconda3/share/jupyter/lab
[I 04:24:18.790 NotebookApp] [nb_conda] enabled
[I 04:24:18.790 NotebookApp] Serving notebooks from local directory: /home/ubunt
u
[I 04:24:18.790 NotebookApp] The Jupyter Notebook is running at:
[I 04:24:18.790 NotebookApp] http://(ip-172-31-35-5 or 127.0.0.1):8888/?token=ed
ccc8a07573d80126097bd97aaba935ffe2203bef345566
[I 04:24:18.791 NotebookApp] Use Control-C to stop this server and shut down all
 kernels (twice to skip confirmation).
[W 04:24:18.791 NotebookApp] No web browser found: could not locate runnable bro
wser.
[C 04:24:18.791 NotebookApp]

    Copy/paste this URL into your browser when you connect for the first time,
    to login with a token:
        http://(ip-172-31-35-5 or 127.0.0.1):8888/?token=edccc8a07573d80126097bd
97aaba935ffe2203bef345566
[I 04:24:18.791 NotebookApp] Starting initial scan of virtual environments...
[I 04:24:20.566 NotebookApp] Found new kernels in environments: conda_tensorflow
_p36, conda_caffe_p27, conda_theano_p36, conda_cntk_p27, conda_python3, conda_ch
ainer_p36, conda_caffe2_p27, conda_python2, conda_pytorch_p36, conda_theano_p27,
 conda_cntk_p36, conda_mxnet_p27, conda_mxnet_p36, conda_anaconda3, conda_chaine
r_p27, conda_caffe_p35, conda_pytorch_p27, conda_tensorflow_p27
^C[I 04:24:29.622 NotebookApp] interrupted
Serving notebooks from local directory: /home/ubuntu
0 active kernels
The Jupyter Notebook is running at:
http://(ip-172-31-35-5 or 127.0.0.1):8888/?token=edccc8a07573d80126097bd97aaba9
5ffe2203bef345566
Shutdown this notebook server (y/[n])? n
resuming operation...
[I 04:26:06.992 NotebookApp] 302 GET /?token=edccc8a07573d80126097bd97aaba935ffe
2203bef345566 (108.2.168.76) 0.72ms
```

12. Copy and paste link to web browser and replace IP address with “IPv4 Public IP address” in DLAMI instance.



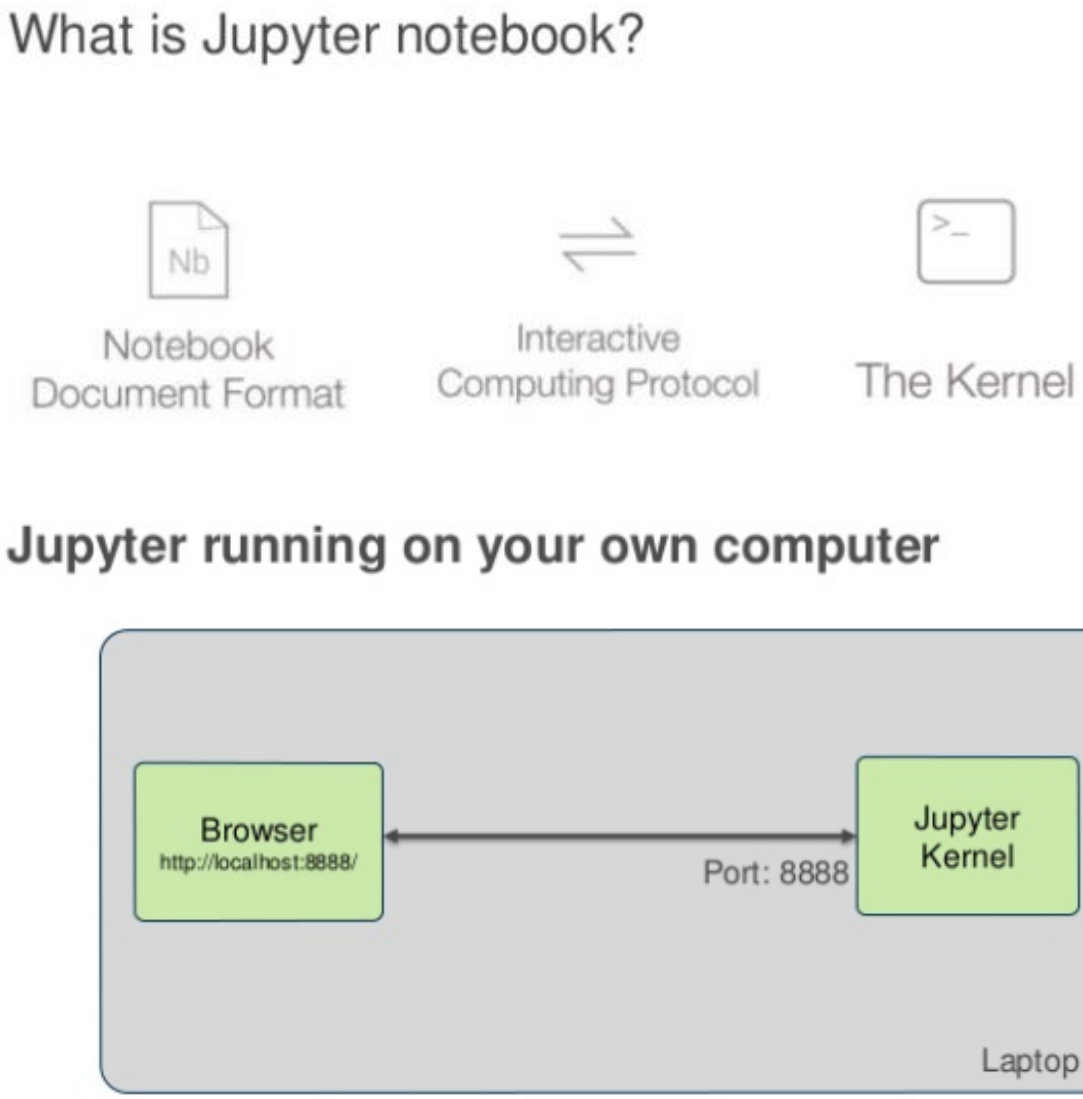
13. Now, you are in jupyter notebook



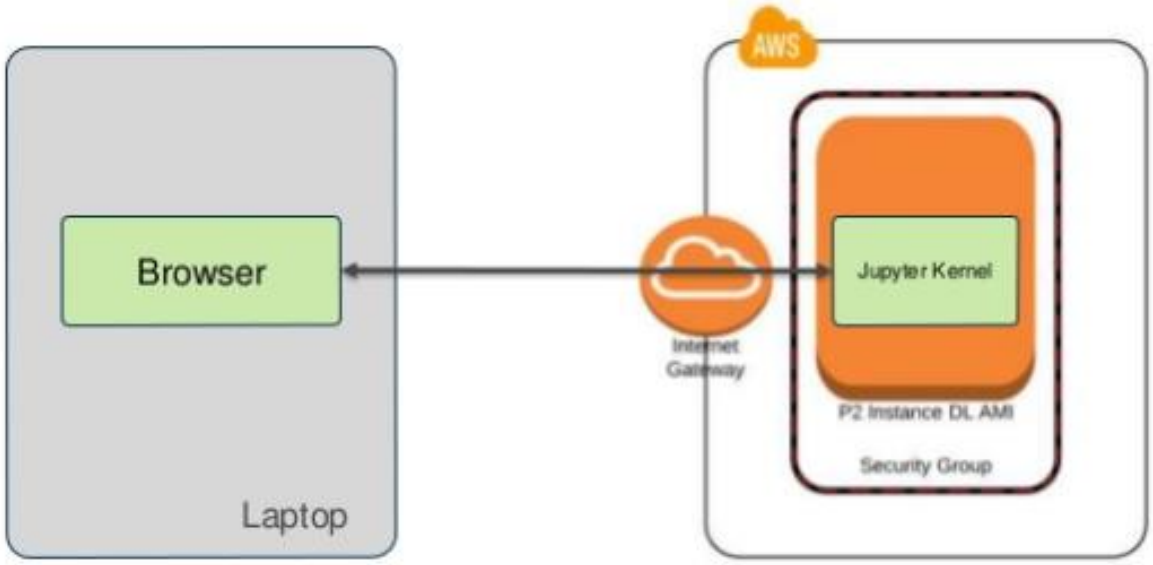
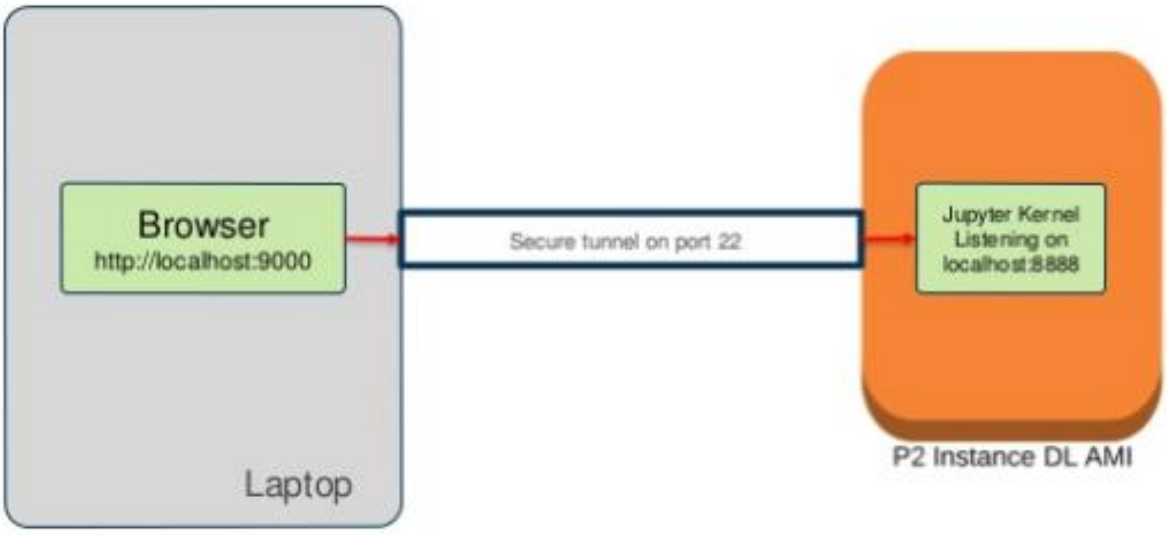
14. If you want to use tensorflow, type source tensorflow_p36 in PuTTY and go into Jupyter notebook

```
ubuntu@ip-172-31-35-5:~$ source activate tensorflow_p36
WARNING: First activation might take some time (1+ min).
Installing TensorFlow optimized for your Amazon EC2 instance......
Env where framework will be re-installed: tensorflow_p36
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100     8  100     8    0     0    800      0 --:--:-- --:--:-- --:--:--   800
Uninstalling tensorflow-gpu-1.10.0:
  Successfully uninstalled tensorflow-gpu-1.10.0
Instance t2.micro is identified as a CPU instance, uninstalling tensorflow-cpu,
installing optimized version of the Deep Learning framework.
Processing ./.dl_binaries/tensorflow/cpu_3.6/tensorflow-1.10.0-cp36-cp36m-linux_
x86_64.whl
Requirement already satisfied: numpy<=1.14.5,>=1.13.3 in ./anaconda3/envs/tensor
flow_p36/lib/python3.6/site-packages (from tensorflow==1.10.0->-r /home/ubuntu/.
dl_binaries/tensorflow/cpu_3.6/file_with_whl_file_name_for_pip (line 1)) (1.14.5
)
Requirement already satisfied: wheel>=0.26 in ./anaconda3/envs/tensorflow_p36/li
b/python3.6/site-packages (from tensorflow==1.10.0->-r /home/ubuntu/.dl_binaries
/tensorflow/cpu_3.6/file_with_whl_file_name_for_pip (line 1)) (0.31.1)
Requirement already satisfied: absl-py>=0.1.6 in ./anaconda3/envs/tensorflow_p36
/lib/python3.6/site-packages (from tensorflow==1.10.0->-r /home/ubuntu/.dl_binar
ies/tensorflow/cpu_3.6/file_with_whl_file_name_for_pip (line 1)) (0.4.1)
Requirement already satisfied: six>=1.10.0 in ./anaconda3/envs/tensorflow_p36/li
b/python3.6/site-packages (from tensorflow==1.10.0->-r /home/ubuntu/.dl_binaries
/tensorflow/cpu_3.6/file_with_whl_file_name_for_pip (line 1)) (1.11.0)
Requirement already satisfied: astor>=0.6.0 in ./anaconda3/envs/tensorflow_p36/l
ib/python3.6/site-packages (from tensorflow==1.10.0->-r /home/ubuntu/.dl_binarie
```

Introduction of Jupyter Notebook Architecture



Architecture - Jupyter on single instance



SSH tunnel explained