

Build and Deploy an Machine Learning model using AWS and APIs.

Steps:

1. Build a model on your local box (Amazon Fine Food reviews) and store the model and other key model related variables in .pkl files
2. Launch a micro instance on AWS.
3. Connect to the AWS box [ssh]
4. Move the files to an AWS EC2 instance/box [scp]
5. Install all packages needed on the AWS box.
6. Run app.py on the AWS box.
7. Check the output in the browser.

Software needed:

1. Anaconda:

a. Windows 64 bit: https://repo.continuum.io/archive/Anaconda3-5.2.0-Windows-x86_64.exe

b. Windows 32 bit: <https://repo.continuum.io/archive/Anaconda3-5.2.0-Windows-x86.exe>

c. Mac : https://repo.continuum.io/archive/Anaconda3-5.2.0-MacOSX-x86_64.sh

d. Linux 64 bit: https://repo.continuum.io/archive/Anaconda3-5.2.0-Linux-x86_64.sh

e. Linux 32 bit: <https://repo.continuum.io/archive/Anaconda3-5.2.0-Linux-x86.sh>

f. Check the previous Archives of Anaconda:
<https://repo.continuum.io/archive/>

2. Packages needed:

1. pip3
2. pandas

3. numpy

4. sklearn

7. flask

you can copy all these packages and try like this:

<https://stackoverflow.com/a/15593865/4084039>

[1] Code on local box

Anaconda Prompt:

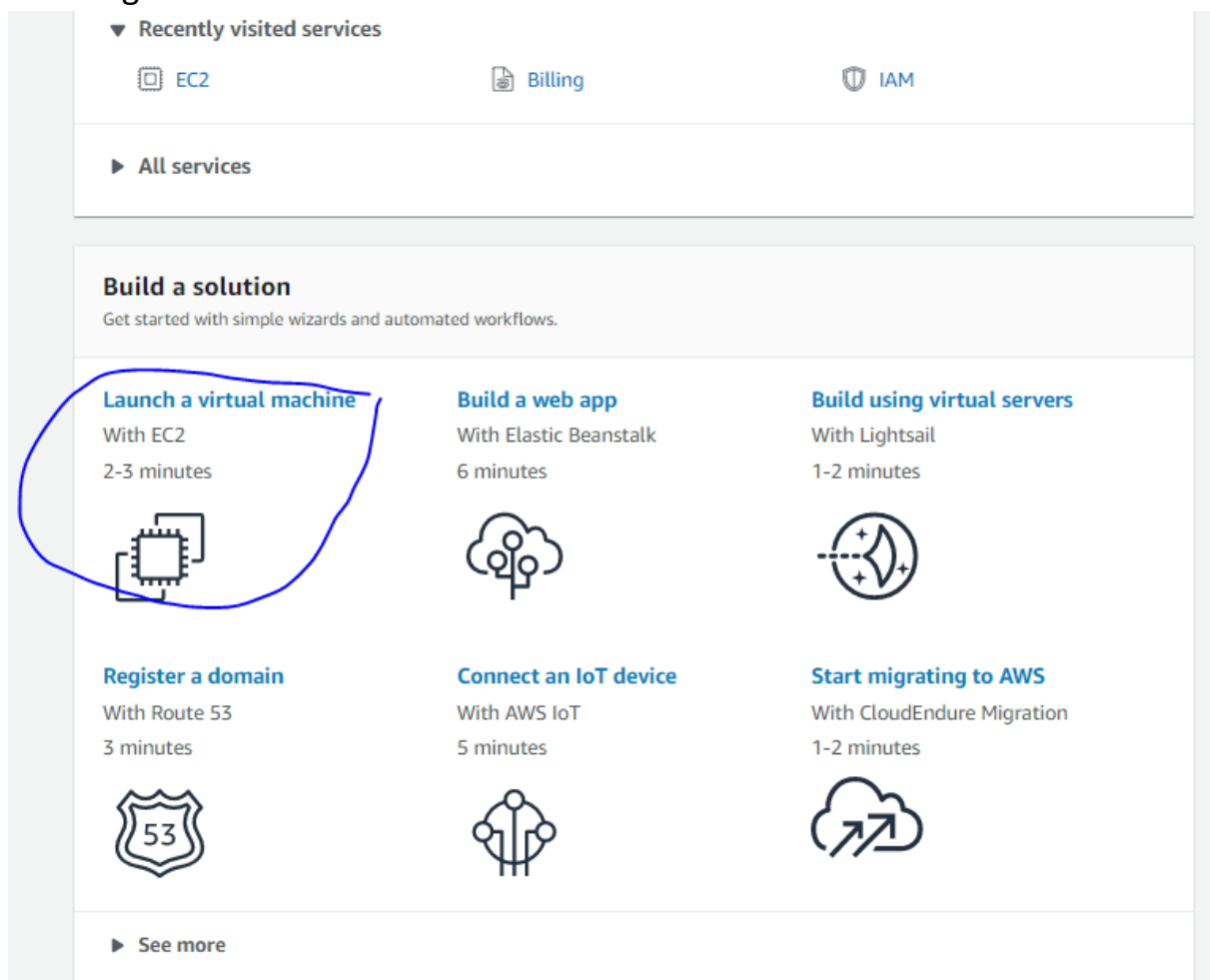
1. Change to the code directory.
2. Run "python3 app.py"
3. Browser: <http://localhost:8080/index>

[2] Launch a micro instance on AWS

Creating an instance:

1. Create an AWS account <https://aws.amazon.com>,
<https://portal.aws.amazon.com/billing/signup#/start>
2. Login: <https://console.aws.amazon.com>

After login:



Launch the EC2 instance

3. Choose the ubuntu free tire

Step 1: Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Quick Start

My AMIs

AWS Marketplace

Community AMIs

☐ Free tier only

Amazon Linux

Free tier eligible

Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-0e01ce4ee18447327 (64-bit x86) / ami-03201f374ab66a26e (64-bit Arm)

Amazon Linux 2 comes with five years support. It provides Linux kernel 4.14 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages through extras.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

Select

64-bit (x86)
64-bit (Arm)

Amazon Linux

Free tier eligible

Amazon Linux AMI 2018.03.0 (HVM), SSD Volume Type - ami-01b01bbd08f24c7a8

The Amazon Linux AMI is an EBS-backed, AWS-supported image. The default image includes AWS command line tools, Python, Ruby, Perl, and Java. The repositories include Docker, PHP, MySQL, PostgreSQL, and other packages.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

Select

64-bit (x86)

Red Hat

Free tier eligible

Red Hat Enterprise Linux 8 (HVM), SSD Volume Type - ami-0520e698dd500b1d1 (64-bit x86) / ami-0099847d600887c9f (64-bit Arm)

Red Hat Enterprise Linux version 8 (HVM), EBS General Purpose (SSD) Volume Type

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

Select

64-bit (x86)
64-bit (Arm)

SUSE Linux

Free tier eligible

SUSE Linux Enterprise Server 15 SP1 (HVM), SSD Volume Type - ami-04c5bab51cc146925 (64-bit x86) / ami-02e73902018018171 (64-bit Arm)

SUSE Linux Enterprise Server 15 Service Pack 1 (HVM), EBS General Purpose (SSD) Volume Type. Public Cloud, Advanced Systems Management, Web and Scripting, and Legacy modules enabled.

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

Select

64-bit (x86)
64-bit (Arm)

Ubuntu

Free tier eligible

Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-0fc20dd1da406780b (64-bit x86) / ami-0959e8feedaf156bf (64-bit Arm)

Ubuntu Server 18.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>)

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

Select

64-bit (x86)
64-bit (Arm)

Click on select

4. Choose t2.micro free tier eligible

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about instance types and how they can meet your computing needs.

Filter by: All Instance types Current generation Show/Hide Columns

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance	IPv6 Support
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input checked="" type="checkbox"/>	General purpose	t2.micro Free tier eligible	1	1	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t3a.nano	2	0.5	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	General purpose	t3a.micro	2	1	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	General purpose	t3a.small	2	2	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	General purpose	t3a.medium	2	4	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	General purpose	t3a.large	2	8	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	General purpose	t3a.xlarge	4	16	EBS only	Yes	Up to 5 Gigabit	Yes

Cancel Previous Review and Launch Next: Configure Instance Details

Click on review and launch

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

Step 7: Review Instance Launch

Please review your instance launch details. You can go back to edit changes for each section. Click **Launch** to assign a key pair to your instance and complete the launch process.

AMI Details

[Edit AMI](#)

Free tier eligible **Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-0fc20dd1da406780b**
Ubuntu Server 18.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).
Root Device Type: ebs Virtualization type: hvm

Instance Type

[Edit instance type](#)

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
t2.micro	Variable	1	1	EBS only	-	Low to Moderate

Security Groups

[Edit security groups](#)

Security group name: launch-wizard-2
Description: launch-wizard-2 created 2020-04-06T09:36:36.475+05:30

Type	Protocol	Port Range	Source	Description
------	----------	------------	--------	-------------

This security group has no rules

Instance Details

[Edit instance details](#)

Storage

[Edit storage](#)

Tags

[Edit tags](#)

[Cancel](#) [Previous](#) **Launch**

Click on launch

6.

Server 18.04 LTS (HVM), SSD Volume Type - ami-0fc20dd1da406780b
Server 18.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).
Root Device Type: ebs Virtualization type: hvm

ECUs	vCPUs	Memory (GiB)	Instance Storage (GB)	EBS-Optimized Available	Network Performance
Variable	1	1	EBS only	-	Low to Moderate

Security group name: launch-wizard-2
Description: launch-wizard-2 created 2020-04-06T09:36:36.475+05:30

Type	Protocol	Port Range	Source	Description
------	----------	------------	--------	-------------

This security group has no rules

Select an existing key pair or create a new key pair

A key pair consists of a **public key** that AWS stores, and a **private key file** that you store. Together, they allow you to connect to your instance securely. For Windows AMIs, the private key file is required to obtain the password used to log into your instance. For Linux AMIs, the private key file allows you to securely SSH into your instance.

Note: The selected key pair will be added to the set of keys authorized for this instance. Learn more about [removing existing key pairs from a public AMI](#).

Create a new key pair

Key pair name: demo2

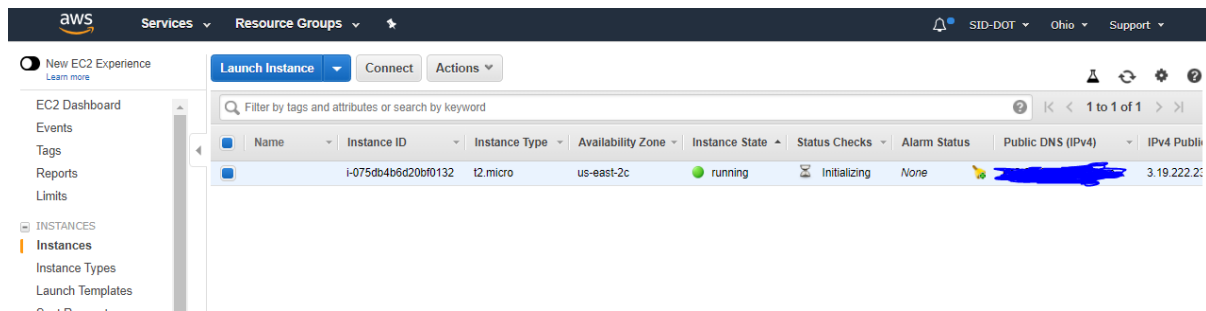
Download Key Pair

You have to download the private key file (*.pem file) before you can continue. Store it in a secure and accessible location. You will not be able to download the file again after it's created.

[Cancel](#) [Launch Instances](#)

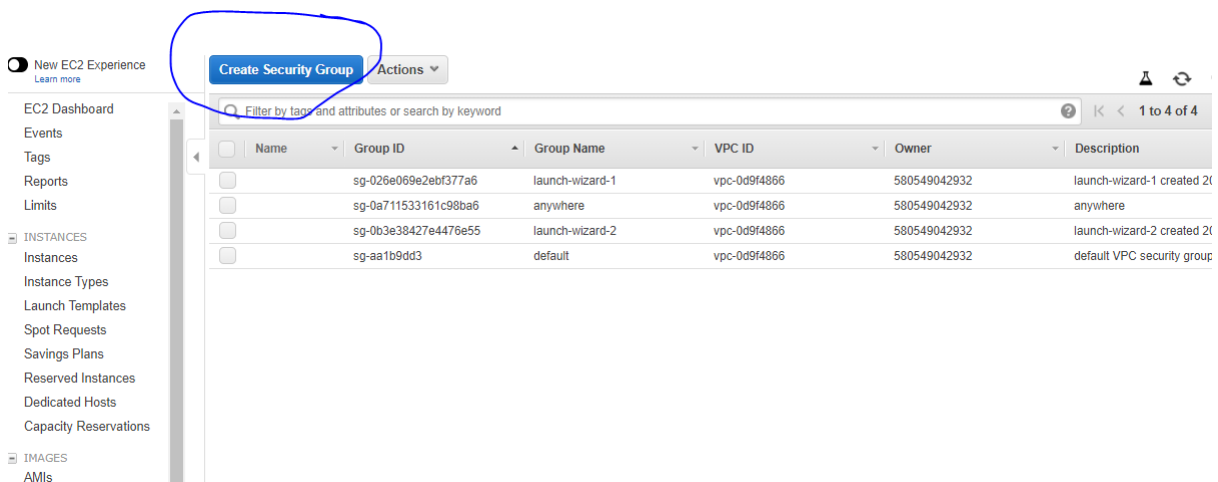
Click on “Download Key Pair” and save the .pem file then click on “Launch Instance”

7.



You will see this screen, you have successfully launched the an EC2 instance, now we need to launch an flask api in it

8. Final step:



Select the “Network & security” -> Security groups and then click “Create Security Group”

Create Security Group

Security group name ⓘ anywhere

Description ⓘ anywhere

VPC ⓘ vpc-0d9f4866 (default) ⌵

Security group rules:

Inbound

Outbound

Type ⓘ	Protocol ⓘ	Port Range ⓘ	Source ⓘ	Description ⓘ
All traffic ⌵	All	0 - 65535	Anywhere ⌵ 0.0.0.0/0, ::/0	e.g. SSH for Admin C

Add Rule

Cancel

Create

Then add the specific security group to network interface

EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts

Capacity Reservations

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

Lifecycle Manager

NETWORK & SECURITY

Security Groups

Elastic IPs

Placement Groups

Key Pairs

Network Interfaces

Filter by tags and attributes or search by keyword

Name	Network interf	Subnet ID	VPC ID	Zone	Security groups	Description	Instance ID
eni-0471c4e...	Attach		vpc-0d9f4866	us-east-2c	launch-wizard-2		i-075db4b6d20bf01...

Network Interface: eni-0471c4ea9b469a31e

Details | Flow Logs | Tags

Network interface ID	eni-0471c4ea9b469a31e	Subnet ID	subnet-3777ea7b
VPC ID	vpc-0d9f4866	Availability Zone	us-east-2c
MAC address	0a:7c:18:14:be:ea	Description	-
Security groups	launch-wizard-2. view inbound rules . view	Network interface owner	580549042932

Security groups* sg-01d02526a659eaa5e sg-0b3e38427e4476e55

Filter by attributes or search by keyword

1 to 4 of 4

Group ID	Group name	Description
sg-01d02526a...	anywhere	anywhere
sg-026e069e2...	launch-wizard-1	launch-wizard-1 created 2020-04-06T06:30:23.093+05:30
sg-0b3e38427...	launch-wizard-2	launch-wizard-2 created 2020-04-06T09:36:36.475+05:30
sg-aa1b9dd3	default	default VPC security group

[3] Connect to the AWS box

Connect to your instance



Connection method

- ☒ A standalone SSH client
- ☐ Session Manager
- ☐ EC2 Instance Connect (browser-based SSH connection)

To access your instance:

1. Open an SSH client. (find out how to [connect using PuTTY](#))
2. Locate your private key file (demo2.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 demo2.pem
```

4. Connect to your instance using its Public DNS:

```
ec2-3-19-222-232.us-east-2.compute.amazonaws.com
```

Example:

```
ssh -i "demo2.pem" ubuntu@ec2-3-19-222-232.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.

If you need any assistance connecting to your instance, please see our [connection documentation](#).

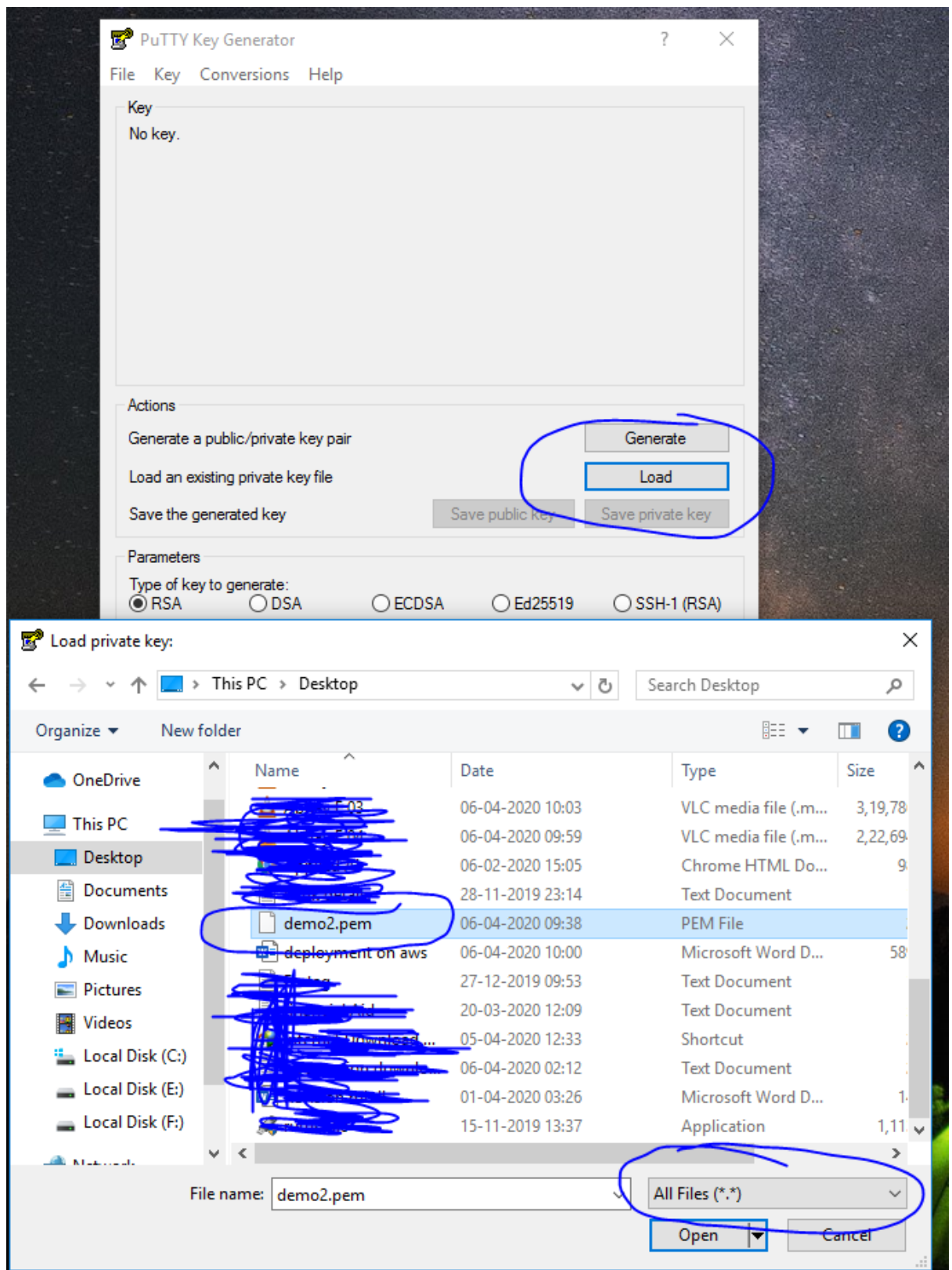
Close

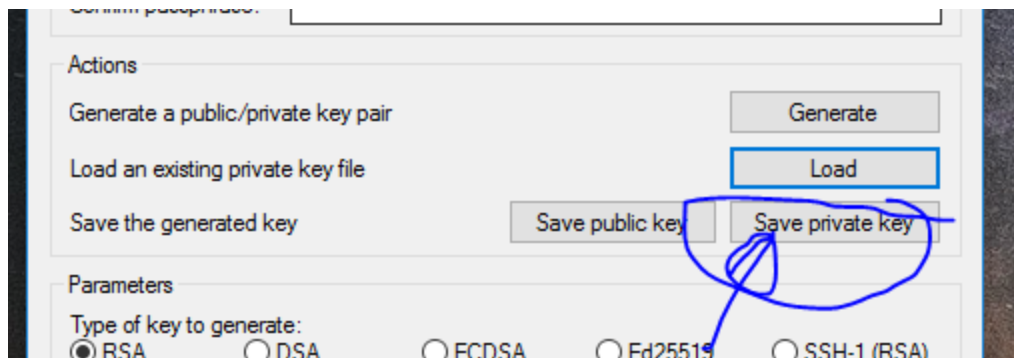
Private DNS ip-172-31-33-127.us-east-2.compute.internal
Private IPs 172.31.33.127

Availability zone us-east-2c
Security groups launch-wiz

Download putty for windows.

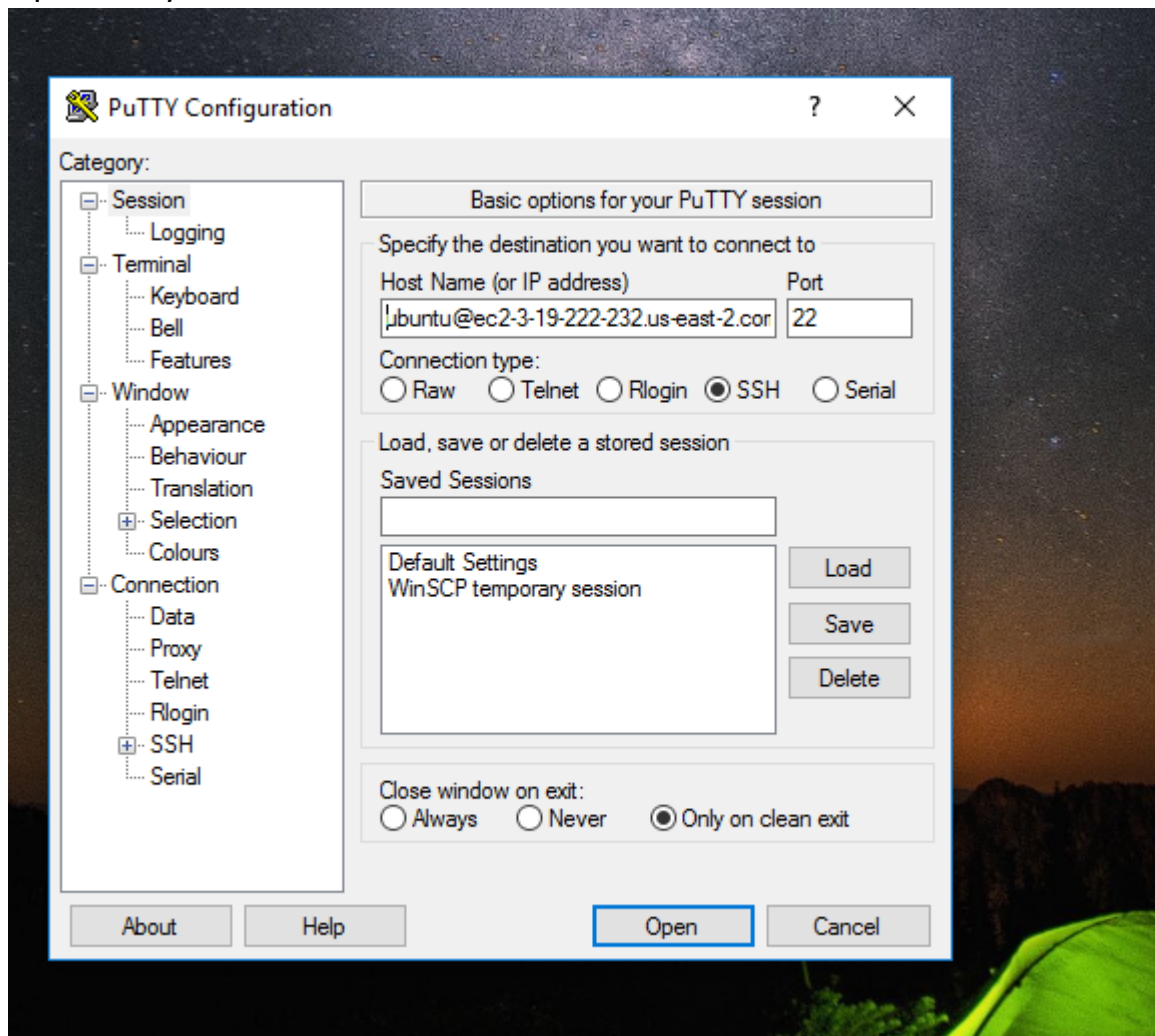
1. Open puttygen (to convert .pem key to .ppk)
Steps to do that.



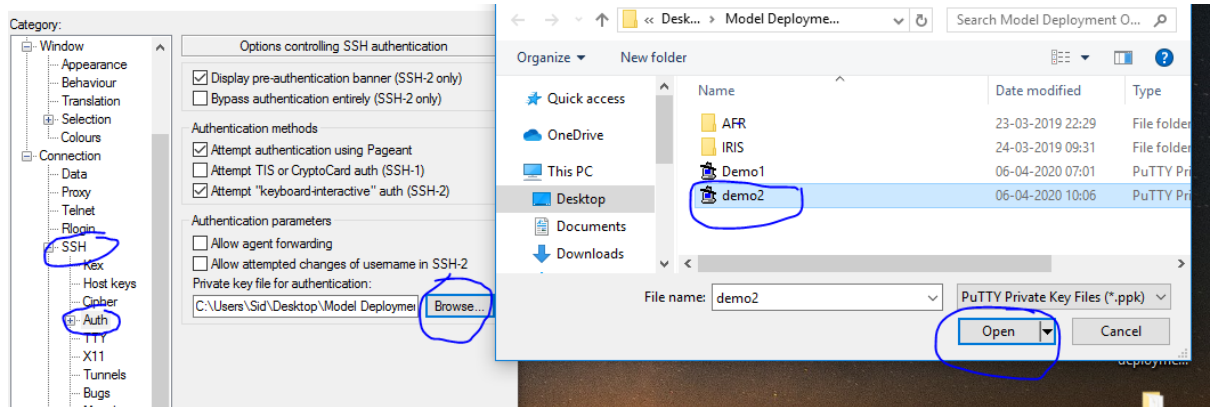


Save the private key.

2. Open Putty.



Enter Host Name: for ubuntu --→ the default username is ubuntu@{Followed by public dns}.



Set the Auth key.

Click on Open.

Now you are in the ubuntu shell.

[4] Move the files to an AWS EC2 instance/box []

Command line to copy files

C:\Users\Asus\OneDrive\Desktop>scp -r -i "demo2.pem" ./AFR

ubuntu@ec2-13-59-191-237.us-east-2.compute.amazonaws.com:~/

[5] Install all packages needed on the AWS box.

sudo apt-get install python3-pip

pip3 install <each of the following packages>

packages needed:

pip3

pandas

numpy

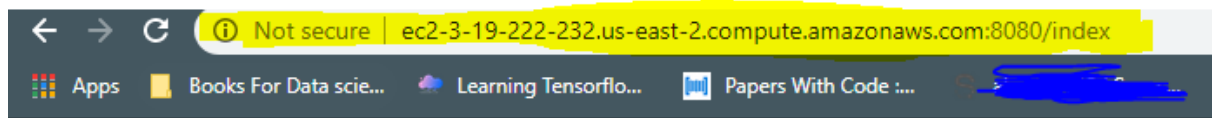
sklearn

flask

6] Run app.py on the AWS box.

```
ubuntu@ip-172-31-33-127:~$ cd IRIS/
ubuntu@ip-172-31-33-127:~/IRIS$ ls
app.py iris.csv model.pkl model.py templates
ubuntu@ip-172-31-33-127:~/IRIS$ python3 app.py
/home/ubuntu/.local/lib/python3.6/site-packages/sklearn/externals/joblib/_init_.py:15: FutureWarning
sklearn.externals.joblib is deprecated in 0.21 and will be removed in 0.23. Please import this func
nality directly from joblib, which can be installed with: pip install joblib. If this warning is rai
when loading pickled models, you may need to re-serialize those models with scikit-learn 0.21+.
warnings.warn(msg, category=FutureWarning)
* Serving Flask app "app" (lazy loading)
* Environment: production
  WARNING: This is a development server. Do not use it in a production deployment.
  Use a production WSGI server instead.
* Debug mode: off
* Running on http://0.0.0.0:8080/ (Press CTRL+C to quit)
```

Now app.py is running on my aws box.



Iris Data Prediction

sepal_length
sepal_width
petal_length
petal_width

Done

Finally, Model is Deployed on AWS Ec2 Instance.

Deployment Document by:
Siddhant Jain