

AI Deep Learning with TensorFlow on Google Cloud Platform (GCP) SSH to Remote Virtual Machine Using GCLOUD SDK

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IMPORTANT NOTES:

- > It is assumed that the GCP deep learning virtual machine (VM) has been set up successfully as discussed in the document “HOWTO_GCP_setup_deep_learning_vm.pdf.”
- > It is assumed that the GCLOUD SDK has been successfully installed in the user’s local computer.

1. GCP Virtual Machine Based on GCP Deep Learning Image

Google Cloud Platform now provides machine learning images designed for deep learning practitioners. The users can conveniently set up GCP deep learning virtual machine based on these images.

The Google Deep Learning images are a set of prepackaged VM images with a deep learning framework ready to be run out of the box. Currently, there are images supporting TensorFlow, PyTorch, and generic high-performance computing, with versions for both CPU-only and GPU-enabled workflows.

IMPORTANT NOTES:

- > As discussed in the document “HOWTO_GCP_setup_deep_learning_vm.pdf,” it is recommended that the user should use the CPU-ONLY version to avoid high cost of GPU-enabled ones.

All the GCP deep learning images are based on Debian, a popular Linux OS version.

All images come with **python 2.7/3.5** with pre-installed core packages:

- **numpy**
- **sklearn**
- **scipy**
- **pandas**

Additionally, **Jupyter Notebook** is also a built-in core package available in the images. It means that the user can run Jupyter Notebook server in the remote VM and connect to it from the local computer.

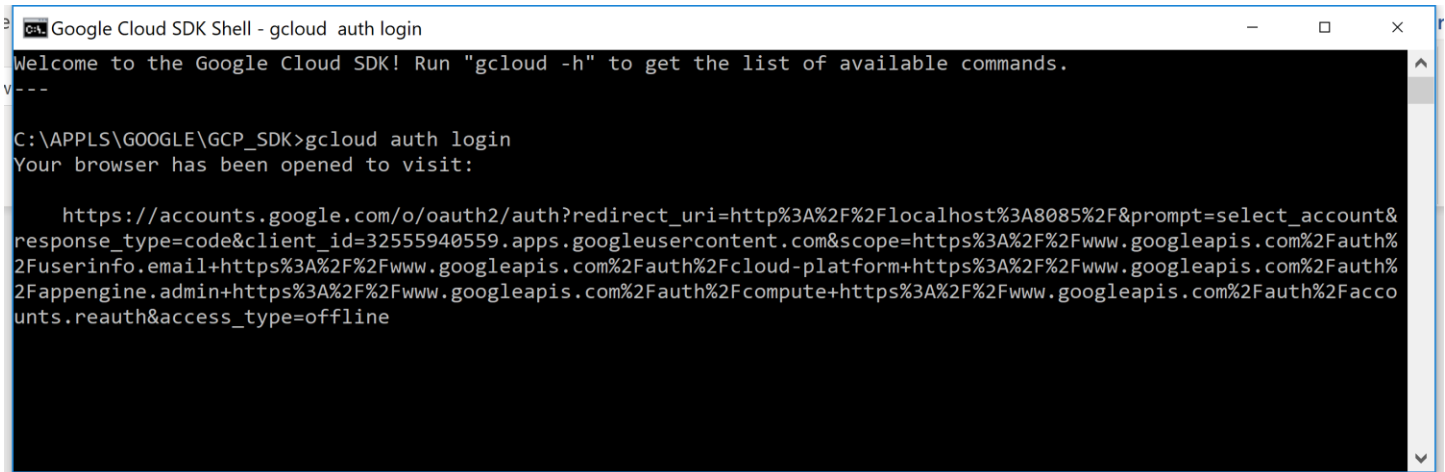
2. GCLOUD SDK: Authentication

2.1 Authentication

Before running command lines on GCLOUD SDK to work with some remote VM, the user needs to authenticate his/her Google account.

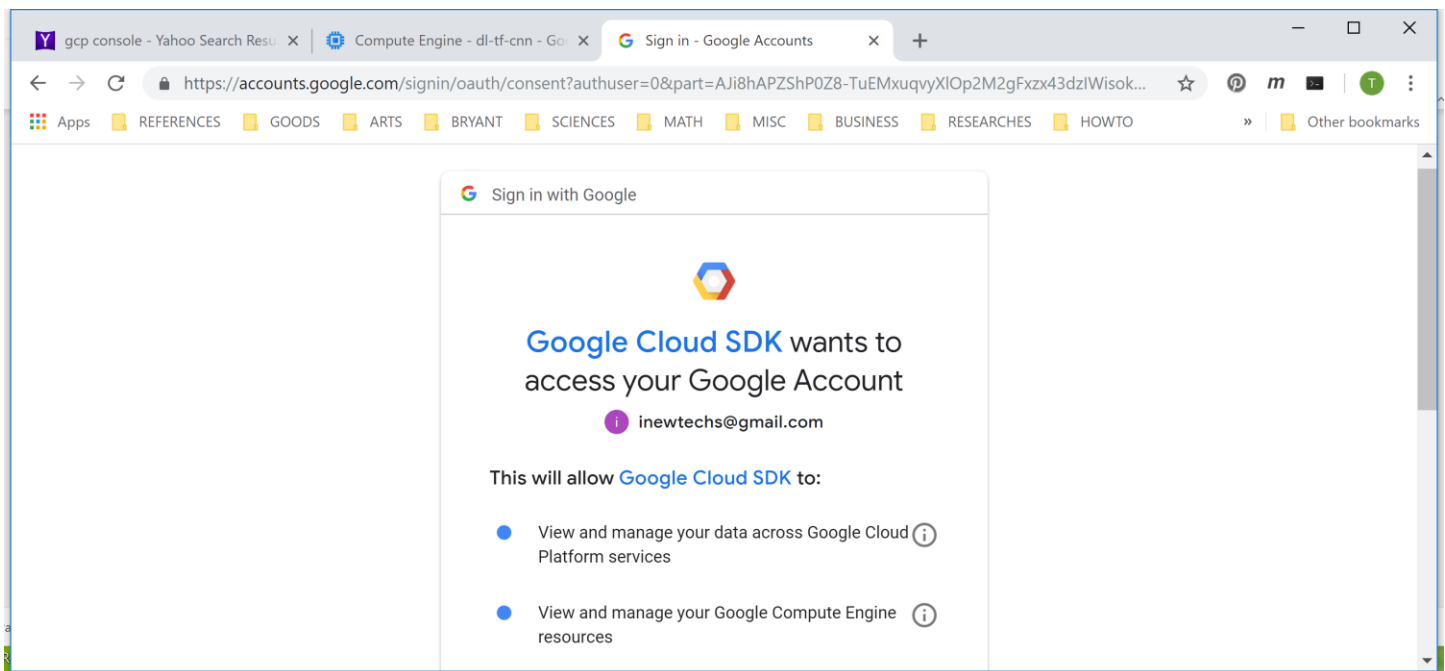
Start GCLOUD SDK and run this command line:

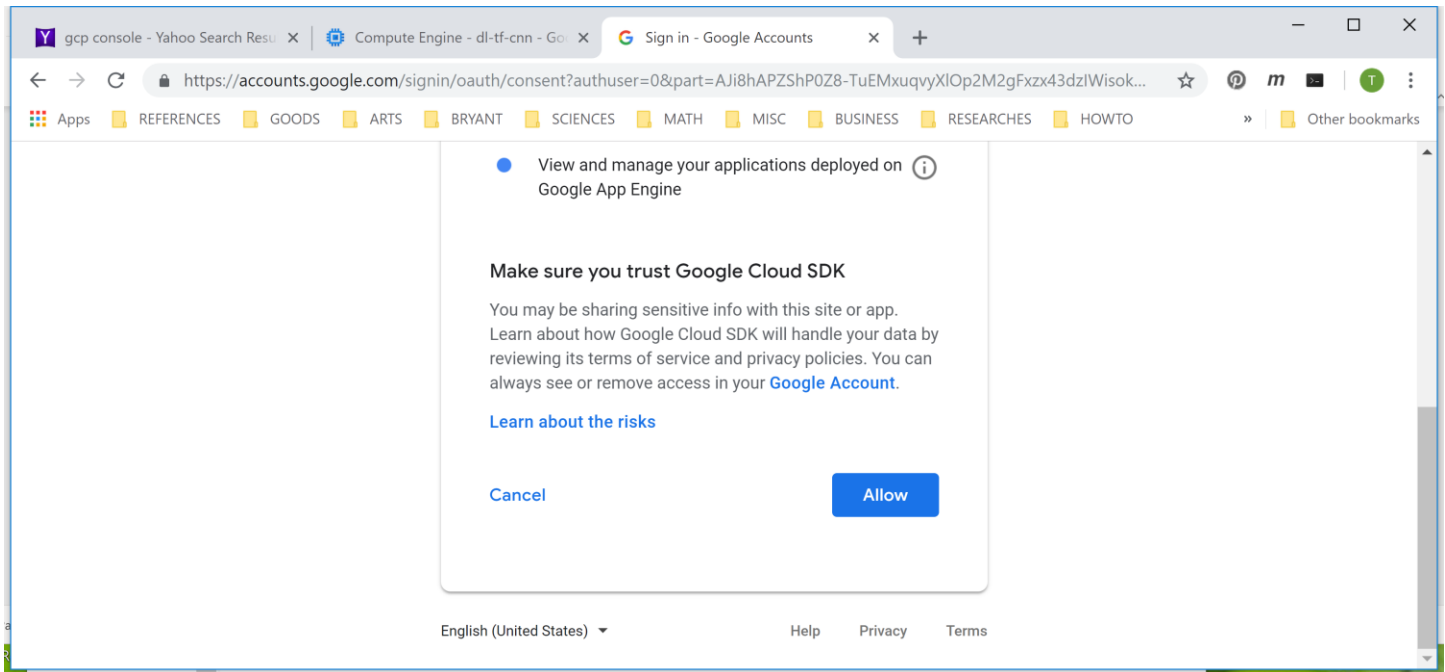
- > **gcloud auth login**



```
Google Cloud SDK Shell - gcloud auth login
Welcome to the Google Cloud SDK! Run "gcloud -h" to get the list of available commands.
v ---
C:\APPLS\GOOGLE\GCP_SDK>gcloud auth login
Your browser has been opened to visit:

  https://accounts.google.com/o/oauth2/auth?redirect_uri=http%3A%2F%2Flocalhost%3A8085%2F&prompt=select_account&
response_type=code&client_id=32555940559.apps.googleusercontent.com&scope=https%3A%2F%2Fwww.googleapis.com%2Fauth%
2Fuserinfo.email+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcloud-platform+https%3A%2F%2Fwww.googleapis.com%2Fauth%
2Fappengine.admin+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcompute+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Facco
unts.reauth&access_type=offline
```





- Click Allow

```
C:\APPLS\GOOGLE\GCP_SDK>gcloud auth login
Your browser has been opened to visit:
https://accounts.google.com/o/oauth2/auth?redirect_uri=http%3A%2F%2Flocalhost%3A8085%2F&prompt=select_account
&response_type=code&client_id=32555940559.apps.googleusercontent.com&scope=https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fuserinfo.email+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcloud-platform+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fappengine.admin+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Fcompute+https%3A%2F%2Fwww.googleapis.com%2Fauth%2Faccounts.reauth&access_type=offline

WARNING: `gcloud auth login` no longer writes application default credentials.
If you need to use ADC, see:
  gcloud auth application-default --help

You are now logged in as [inewtechs@gmail.com].
Your current project is [dl-tf-cnn]. You can change this setting by running:
  $ gcloud config set project PROJECT_ID

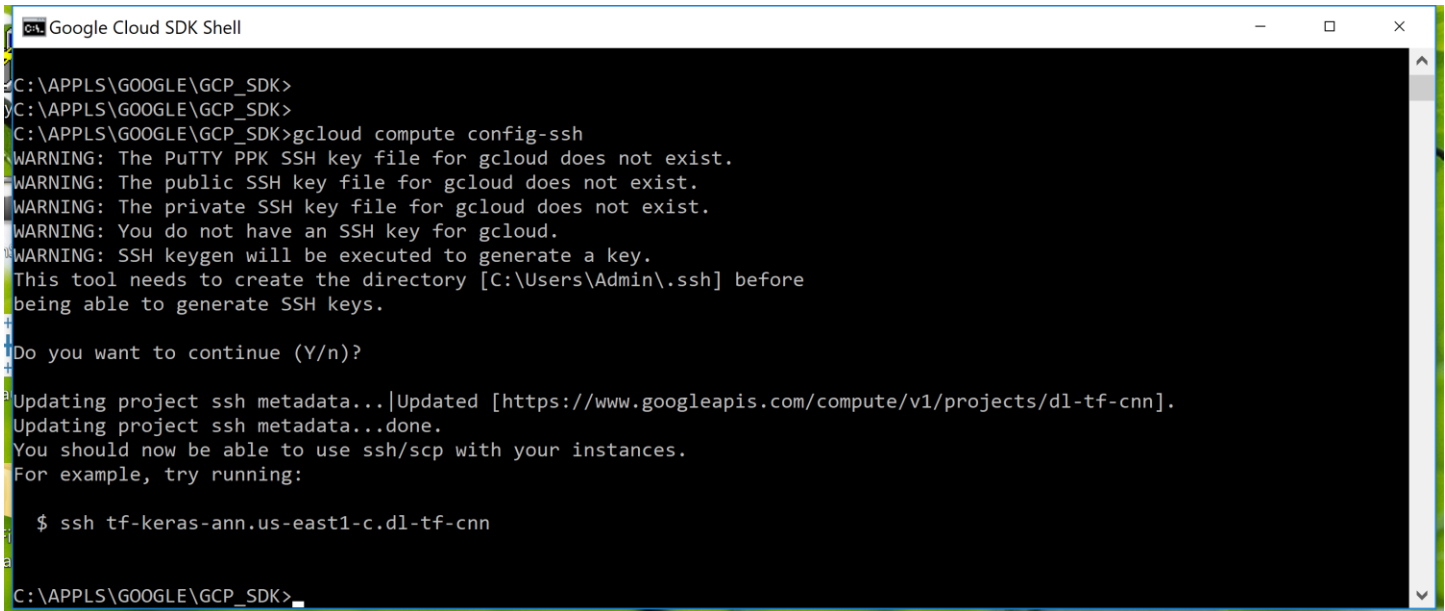
C:\APPLS\GOOGLE\GCP_SDK>
```

3. GCLOUD: Configure SSH (First Time Using GCLOUD SDK)

If the user starts using GCLOUD SDK for the first time, he/she needs to configure the SSH environment that will be used to connect to the remote GCP VM.

Run this command line:

- `$ gcloud compute config-ssh`

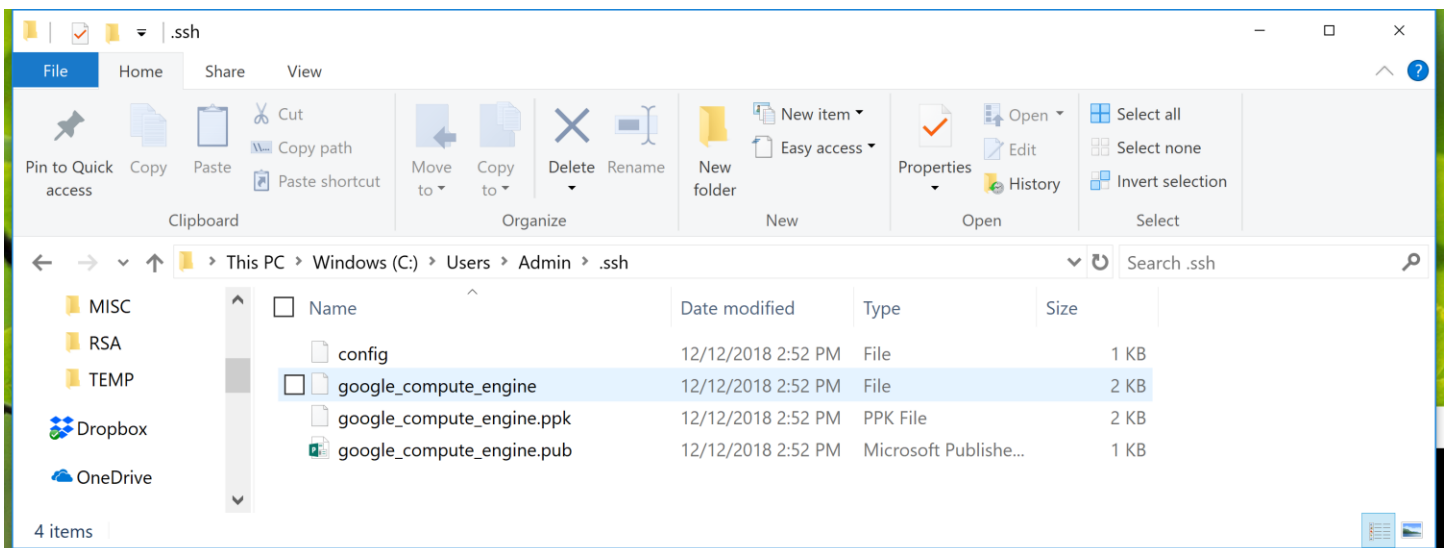


```
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>gcloud compute config-ssh
WARNING: The PUTTY PPK SSH key file for gcloud does not exist.
WARNING: The public SSH key file for gcloud does not exist.
WARNING: The private SSH key file for gcloud does not exist.
WARNING: You do not have an SSH key for gcloud.
WARNING: SSH keygen will be executed to generate a key.
This tool needs to create the directory [C:\Users\Admin\.ssh] before
being able to generate SSH keys.

Do you want to continue (Y/n)?
Updating project ssh metadata...Updated [https://www.googleapis.com/compute/v1/projects/dl-tf-cnn].
Updating project ssh metadata...done.
You should now be able to use ssh/scp with your instances.
For example, try running:

$ ssh tf-keras-ann.us-east1-c.dl-tf-cnn

C:\APPLS\GOOGLE\GCP_SDK>
```



IMPORTANT NOTES:

--> Running the command:

- The directory .ssh is created
- Four files are created:
 - config
 - RSA key file: google_compute_engine
 - Default RSA private key file .ppk: google_compute_engine.ppk
 - Default RSA public key file .pub: google_compute_engine.pub

IMPORTANT NOTES:

--> GCP automatically creates these RSA key files for the users when the command line is run.

4. GCLOUD: SSH Command

4.1 SSH: Specify a User of Remote Instance, i.e. /home/<some user>

- \$ gcloud compute ssh USER@Instance_Name
--project [PROJECT_ID]
--zone [ZONE]
 - USER: User name of the google account or the gmail account
 - E.g.: john@gmail.com → john: USER
 - Instance_Name: The name of the instance
 - E.g.: gcpVM1 → john@gcpVM1
 - PROJECT_ID: The project name
 - ZONE: the region and zone

For example:

```
$ gcloud compute ssh john@gcpVM1 --project aProjName -- zone us-east1-c
```

IMPORTANT NOTES:

--> The instance name (gcpVM1) is used only as an example. The student **must use the real name** of his/her instance in the command line: The same for project ID and zone ID.

```
Google Cloud SDK Shell - gcloud compute ssh inewtechs@tf-keras-ann --project dl-tf-cnn --zone us-east1-c
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>gcloud --help compute ssh
Command killed by keyboard interrupt
Terminate batch job (Y/N)? Y
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>
C:\APPLS\GOOGLE\GCP_SDK>gcloud compute ssh inewtechs@tf-keras-ann --project dl-tf-cnn --zone us-east1-c
Updating project ssh metadata...Updated [https://www.googleapis.com/compute/v1/projects/dl-tf-cnn].
Updating project ssh metadata...done.
Waiting for SSH key to propagate.
```

```
inewtechs@tf-keras-ann: ~
ons/tagged/google-dl-platform
* Google Cloud Documentation: https://cloud.google.com/deep-learning-vm
* Google Group: https://groups.google.com/forum/#!forum/google-dl-platform

To reinstall Nvidia driver (if needed) run:
sudo /opt/deeplearning/install-driver.sh
TensorFlow comes pre-installed with this image. To install TensorFlow binaries in
a virtualenv (or conda env),
please use the binaries that are pre-built for this image. You can find the bina
ries at
/opt/deeplearning/binaries/tensorflow/
If you need to install a different version of Tensorflow manually, use the commo
n Deep Learning image with the
right version of CUDA

Linux tf-keras-ann 4.9.0-8-amd64 #1 SMP Debian 4.9.130-2 (2018-10-27) x86_64

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
inewtechs@tf-keras-ann:~$
```

SUCCESSFULLY SSH TO THE INSTANCE!