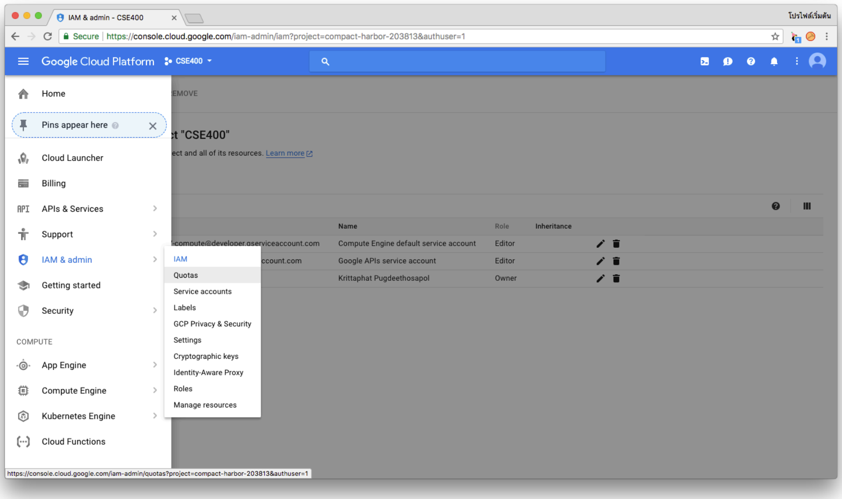
1. Login to **console.cloud.google.com** with your account (username@g.syr.edu)
2. Select IAM & admin → Quotas

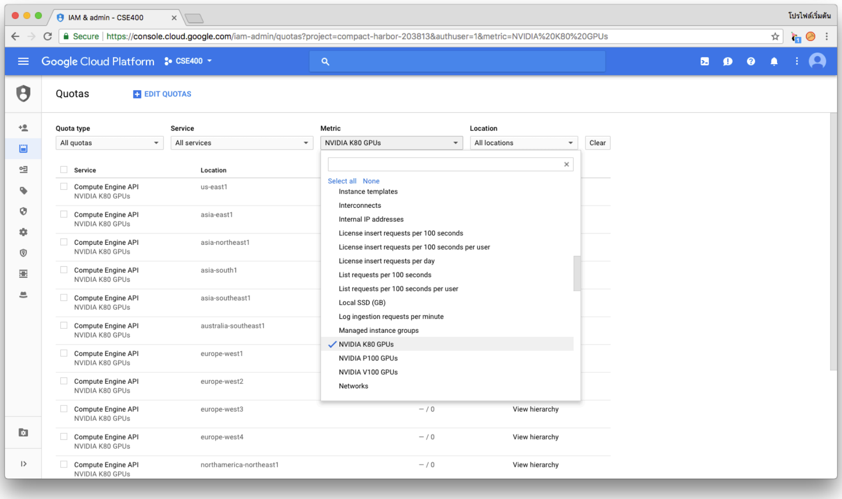


https://console.cloud.google.com/iam-admin/iam?project=compact-harbor-203813&authuser=1

	Name	Role	Inheritance
-compute@developer.gserviceaccount.com	Compute Engine default service account	Editor	
ccount.com	Google APIs service account	Editor	
	Krittaphat Pugdeethosapol	Owner	

https://console.cloud.google.com/iam-admin/quotas?project=compact-harbor-203813&authuser=1

3. Choose NVIDIA K80 GPUs

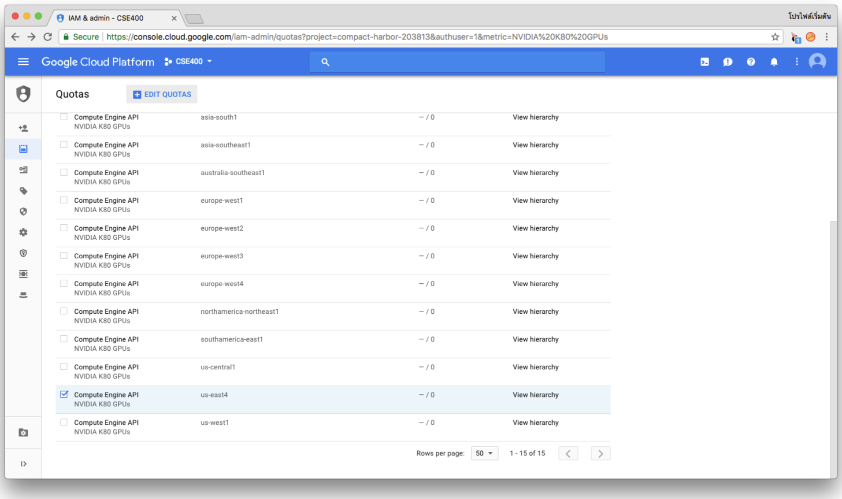


https://console.cloud.google.com/iam-admin/quotas?project=compact-harbor-203813&authuser=1&metric=NVIDIA%20K80%20GPUs

Quota type: All quotas
Service: All services
Metric: ✓ NVIDIA K80 GPUs
Location: All locations

	Service	Location		
□	Compute Engine API NVIDIA K80 GPUs	us-east1		
□	Compute Engine API NVIDIA K80 GPUs	asia-east1		
□	Compute Engine API NVIDIA K80 GPUs	asia-northeast1		
□	Compute Engine API NVIDIA K80 GPUs	asia-south1		
□	Compute Engine API NVIDIA K80 GPUs	asia-southeast1		
□	Compute Engine API NVIDIA K80 GPUs	australia-southeast1		
□	Compute Engine API NVIDIA K80 GPUs	europe-west1		
□	Compute Engine API NVIDIA K80 GPUs	europe-west2		
□	Compute Engine API NVIDIA K80 GPUs	europe-west3	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	europe-west4	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	northamerica-northeast1	– / 0	View hierarchy

4. Select row that has location start with us-east → Select EDIT QUOTAS

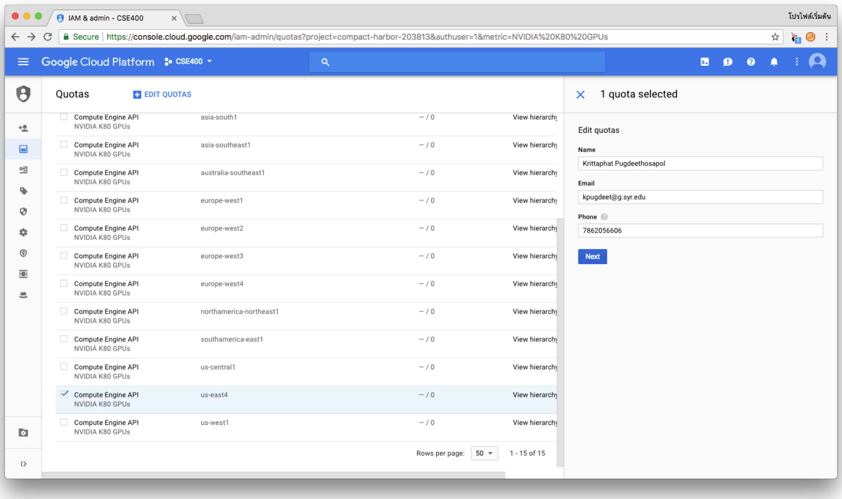


https://console.cloud.google.com/iam-admin/quotas?project=compact-harbor-203813&authuser=1&metric=NVIDIA%20K80%20GPUs

□	Compute Engine API NVIDIA K80 GPUs	asia-south1	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	asia-southeast1	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	australia-southeast1	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	europe-west1	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	europe-west2	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	europe-west3	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	europe-west4	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	northamerica-northeast1	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	southamerica-east1	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	us-central1	– / 0	View hierarchy
☑	Compute Engine API NVIDIA K80 GPUs	us-east4	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	us-west1	– / 0	View hierarchy

Rows per page: 50 1 - 15 of 15

5. Fill your information → Click Next


IAM & admin - CSE400
โปรไฟล์เริ่มต้น
Secure | https://console.cloud.google.com/iam-admin/quotas?project=compact-harbor-203813&authuser=1&metric=NVIDIA%20K80%20GPUs
Google Cloud Platform
CSE400
Quotas
EDIT QUOTAS
1 quota selected

	Service / Metric	Location	Usage / Limit	
□	Compute Engine API NVIDIA K80 GPUs	asia-south1	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	asia-southeast1	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	australia-southeast1	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	europe-west1	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	europe-west2	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	europe-west3	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	europe-west4	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	northamerica-northeast1	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	southamerica-east1	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	us-central1	– / 0	View hierarchy
☑	Compute Engine API NVIDIA K80 GPUs	us-east4	– / 0	View hierarchy
□	Compute Engine API NVIDIA K80 GPUs	us-west1	– / 0	View hierarchy

Rows per page: 50 ▾ 1 - 15 of 15

Edit quotas

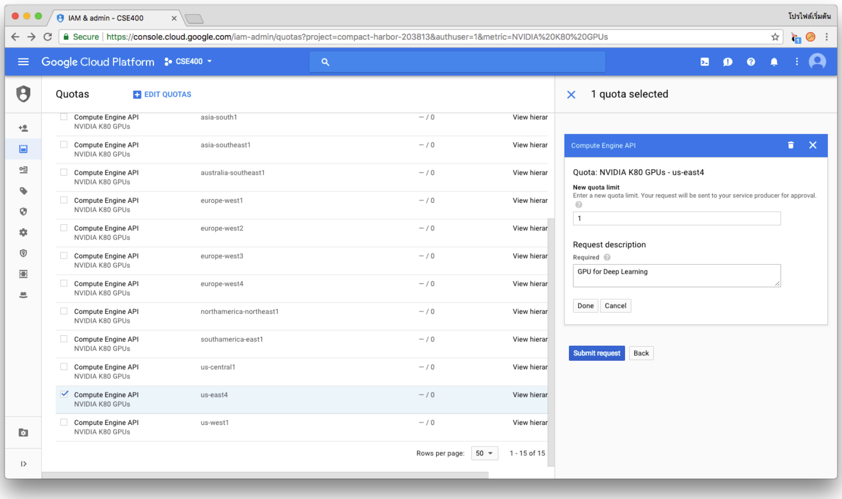
Name: Krittaphat Pugdeethosapol

Email: kpugdeet@g.syr.edu

Phone: 7862056606

Next

6. Fill your information → Click Submit Request


IAM & admin - CSE400
โปรไฟล์เริ่มต้น
Secure | https://console.cloud.google.com/iam-admin/quotas?project=compact-harbor-203813&authuser=1&metric=NVIDIA%20K80%20GPUs
Google Cloud Platform
CSE400
Quotas
EDIT QUOTAS
1 quota selected

	Service / Metric	Location	Usage / Limit	
□	Compute Engine API NVIDIA K80 GPUs	asia-south1	– / 0	View hierar
□	Compute Engine API NVIDIA K80 GPUs	asia-southeast1	– / 0	View hierar
□	Compute Engine API NVIDIA K80 GPUs	australia-southeast1	– / 0	View hierar
□	Compute Engine API NVIDIA K80 GPUs	europe-west1	– / 0	View hierar
□	Compute Engine API NVIDIA K80 GPUs	europe-west2	– / 0	View hierar
□	Compute Engine API NVIDIA K80 GPUs	europe-west3	– / 0	View hierar
□	Compute Engine API NVIDIA K80 GPUs	europe-west4	– / 0	View hierar
□	Compute Engine API NVIDIA K80 GPUs	northamerica-northeast1	– / 0	View hierar
□	Compute Engine API NVIDIA K80 GPUs	southamerica-east1	– / 0	View hierar
□	Compute Engine API NVIDIA K80 GPUs	us-central1	– / 0	View hierar
☑	Compute Engine API NVIDIA K80 GPUs	us-east4	– / 0	View hierar
□	Compute Engine API NVIDIA K80 GPUs	us-west1	– / 0	View hierar

Rows per page: 50 ▾ 1 - 15 of 15

Compute Engine API

Quota: NVIDIA K80 GPUs - us-east4

New quota limit

Enter a new quota limit. Your request will be sent to your service producer for approval.

1

Request description

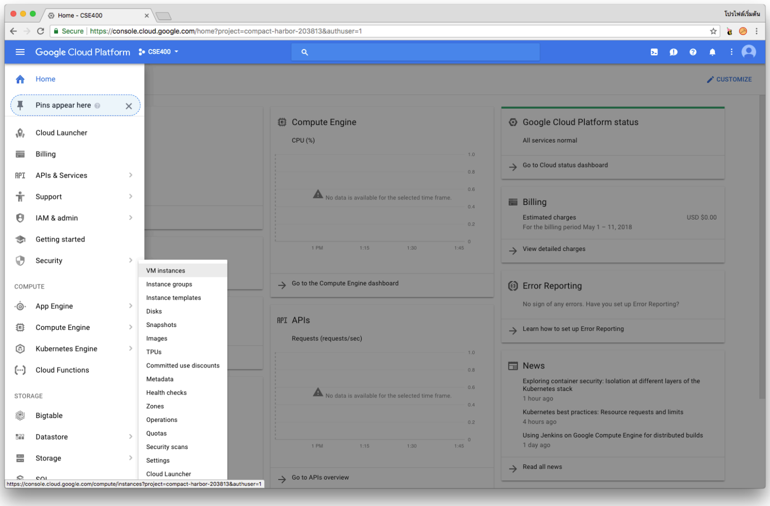
Required

GPU for Deep Learning

Done Cancel

Submit request Back

7. Once your request has been approved, you can create GPU instance
8. Select Compute Engine → VM Instance



Compute Engine

No data is available for the selected time frame.

Go to the Compute Engine dashboard

APIs

No data is available for the selected time frame.

Go to APIs overview

Google Cloud Platform status

All services normal

Go to Cloud status dashboard

Billing

Estimated charges USD $0.00

For the billing period May 1 – 11, 2018

View detailed charges

Error Reporting

No sign of any errors. Have you set up Error Reporting?

Learn how to set up Error Reporting

News

Exploring container security: Isolation at different layers of the Kubernetes stack

1 hour ago

Kubernetes best practices: Resource requests and limits

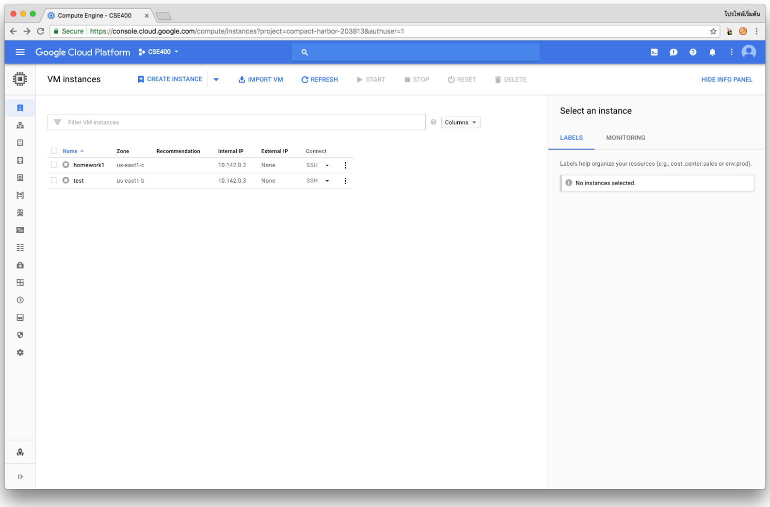
4 hours ago

Using Jenkins on Google Compute Engine for distributed builds

1 day ago

Read all news

9. Select CREATE INSTANCE

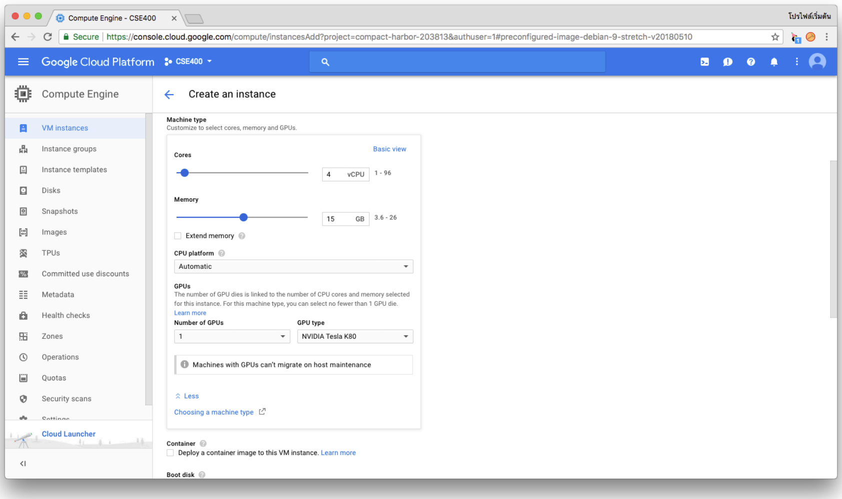


Name	Zone	Recommendation	Internal IP	External IP	Connect
homework1	us-east1-c		10.142.0.2	None	SSH
test	us-east1-b		10.142.0.3	None	SSH

Labels help organize your resources (e.g., cost_center:sales or env:prod).

No instances selected.

10. Specify Name, Machine type (same as figure below), then select Create. Note: you have to select Zone same as the one you requested.
    - Cores 4 vCPU
    - Memory 15 GB
    - 1 GPU NVIDIA Tesla K80
    - Ubuntu 16.04, 100 GB disk
    - Allow HTTP traffic
    - Allow HTTPS traffic



Create an instance

Machine type

Customize to select cores, memory and GPUs.

Cores: 4 vCPU 1 - 96

Memory: 15 GB 3.6 - 26

□ Extend memory

CPU platform: Automatic

GPUs

The number of GPU dies is linked to the number of CPU cores and memory selected for this instance. For this machine type, you can select no fewer than 1 GPU die. Learn more

Number of GPUs: 1

GPU type: NVIDIA Tesla K80

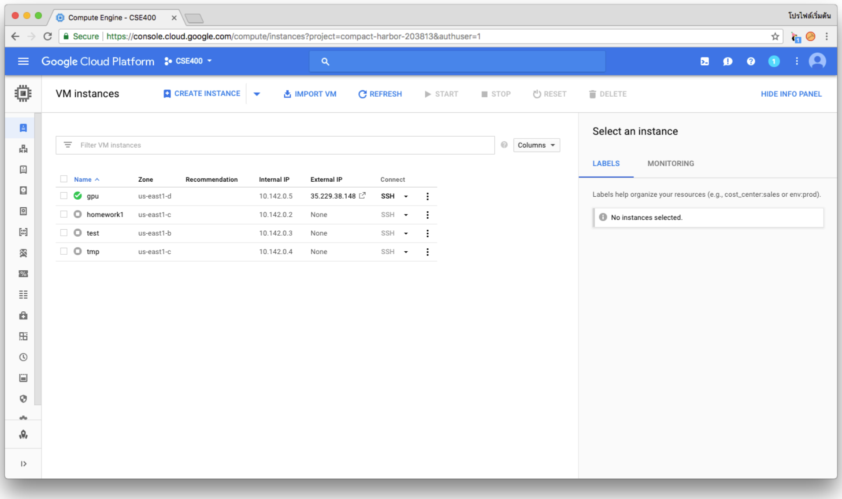
Machines with GPUs can't migrate on host maintenance

Container

□ Deploy a container image to this VM instance. Learn more

Boot disk

11. Once it complete, it will show on the machine list



Secure | https://console.cloud.google.com/compute/instances?project=compact-harbor-203813&authuser=1

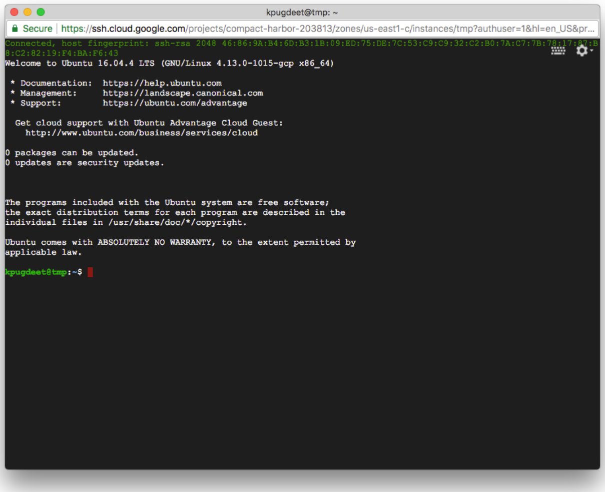
Name	Zone	Recommendation	Internal IP	External IP	Connect
gpu	us-east1-d		10.142.0.5	35.229.38.148	SSH
homework1	us-east1-c		10.142.0.2	None	SSH
test	us-east1-b		10.142.0.3	None	SSH
tmp	us-east1-c		10.142.0.4	None	SSH

Select an instance

Labels help organize your resources (e.g., cost_center:sales or env:prod).

No instances selected.

12. Select SSH to connect to your machine that you already created



Secure | https://ssh.cloud.google.com/projects/compact-harbor-203813/zones/us-east1-c/instances/tmp?authuser=1&hl=en_US&pr...

```
Connected, host fingerprint: ssh-rsa 2048 46:86:9A:B4:6D:B3:1B:09:ED:75:DE:7C:53:C9:C9:32:C2:B0:7A:C7:7B:78:17:87:B
8:C2:82:19:F4:BA:F6:43
Welcome to Ubuntu 16.04.4 LTS (GNU/Linux 4.13.0-1015-gcp 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

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



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

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

kpugdeet@tmp:~$
```

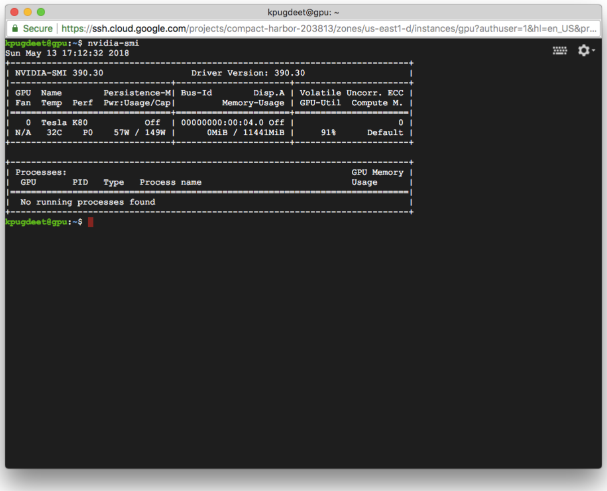
13. Run these command to update repository and install python3 pip

- sudo add-apt-repository main
- sudo add-apt-repository universe
- sudo add-apt-repository restricted
- sudo add-apt-repository multiverse
- sudo apt-get update
- sudo apt-get install python3-pip

14. Install CUDA driver

- curl -O http://developer.download.nvidia.com/compute/cuda/repos/ubuntu1604/x86_64/cuda-repo-ubuntu1604_9.0.176-1_amd64.deb
- sudo dpkg -i ./cuda-repo-ubuntu1604_9.0.176-1_amd64.deb
- sudo apt-key adv --fetch-keys http://developer.download.nvidia.com/compute/cuda/repos/ubuntu1604/x86_64/7fa2af80.pub
- sudo apt-get update
- sudo apt-get install cuda-9-0

- sudo nvidia-smi -pm 1
- nvidia-smi

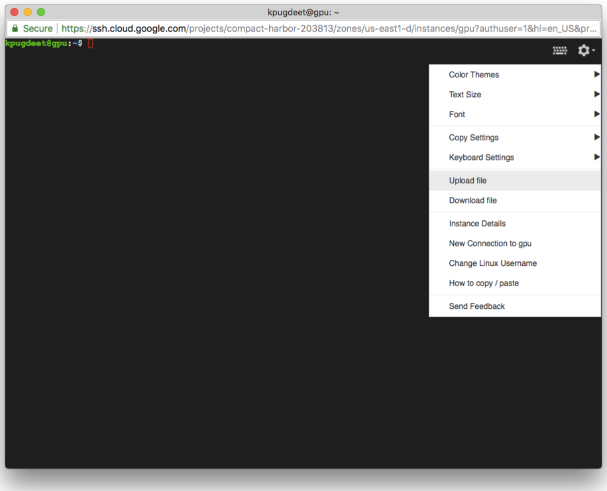

kpugdeet@gpu: ~
Secure | https://ssh.cloud.google.com/projects/compact-harbor-203813/zones/us-east1-d/instances/gpu?authuser=1&hl=en_US&pr...

```
kpugdeet@gpu:~$ nvidia-smi
Sun May 13 17:12:32 2018
+-----------------------------------------------------------------------------+
| NVIDIA-SMI 390.30                 Driver Version: 390.30                    |
|-------------------------------+----------------------+----------------------+
| GPU  Name        Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf  Pwr:Usage/Cap|         Memory-Usage | GPU-Util  Compute M. |
|===============================+======================+======================|
|   0  Tesla K80           Off  | 00000000:00:04.0 Off |                    0 |
| N/A   32C    P0    57W / 149W |      0MiB / 11441MiB |     91%      Default |
+-------------------------------+----------------------+----------------------+

+-----------------------------------------------------------------------------+
| Processes:                                                       GPU Memory |
|  GPU       PID   Type   Process name                             Usage      |
|=============================================================================|
|  No running processes found                                                 |
+-----------------------------------------------------------------------------+
kpugdeet@gpu:~$
```

15. Add PATH
    - echo 'export CUDA_HOME=/usr/local/cuda' >> ~/.bashrc
    - echo 'export PATH=$PATH:$CUDA_HOME/bin' >> ~/.bashrc
    - echo 'export LD_LIBRARY_PATH=$CUDA_HOME/lib64' >> ~/.bashrc
    - source ~/.bashrc

16. Install cuDNN
    - Download cuDNN version 7.1 for Ubuntu 16.04 https://developer.nvidia.com/cudnn. You need to sign up in order to download this file. (cuDNN v7.1.3 Library for Linux, cudnn-9.0-linux-x64-v7.1.tgz)
    - Upload file to server

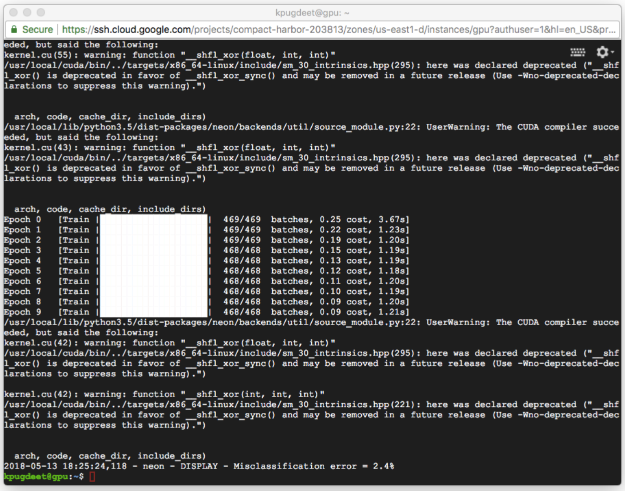


```
kpugdeet@gpu:~$
```

    - tar xvzf cudnn-9.0-linux-x64-v7.1.tgz
    - sudo cp cuda/lib64/* /usr/local/cuda/lib64/
    - sudo cp cuda/include/cudnn.h /usr/local/cuda/include/

17. Install Neon
    - sudo pip3 install nervananeon
    - sudo pip3 install --no-cache-dir ConfigArgParse\>\=0.10.0,\<0.13.0
    - sudo -s

- pip3 install pycuda
- pip3 install scikit-cuda
- pip3 install pytool
- exit
- git clone https://github.com/NervanaSystems/neon.git
- cd neon/examples
- python3 mnist_mlp.py -b gpu


kpugdeet@gpu: ~
Secure | https://ssh.cloud.google.com/projects/compact-harbor-203813/zones/us-east1-d/instances/gpu?authuser=1&hl=en_US&pr...

```
eded, but said the following:
kernel.cu(55): warning: function "__shfl_xor(float, int, int)"
/usr/local/cuda/bin/../targets/x86_64-linux/include/sm_30_intrinsics.hpp(295): here was declared deprecated ("__shf
l_xor() is deprecated in favor of __shfl_xor_sync() and may be removed in a future release (Use -Wno-deprecated-dec
larations to suppress this warning).")


  arch, code, cache_dir, include_dirs)
/usr/local/lib/python3.5/dist-packages/neon/backends/util/source_module.py:22: UserWarning: The CUDA compiler succe
eded, but said the following:
kernel.cu(43): warning: function "__shfl_xor(float, int, int)"
/usr/local/cuda/bin/../targets/x86_64-linux/include/sm_30_intrinsics.hpp(295): here was declared deprecated ("__shf
l_xor() is deprecated in favor of __shfl_xor_sync() and may be removed in a future release (Use -Wno-deprecated-dec
larations to suppress this warning).")


  arch, code, cache_dir, include_dirs)
Epoch 0   [Train |████████████████████|  469/469  batches, 0.25 cost, 3.67s]
Epoch 1   [Train |████████████████████|  469/469  batches, 0.22 cost, 1.23s]
Epoch 2   [Train |████████████████████|  469/469  batches, 0.19 cost, 1.20s]
Epoch 3   [Train |████████████████████|  468/468  batches, 0.15 cost, 1.19s]
Epoch 4   [Train |████████████████████|  468/468  batches, 0.13 cost, 1.19s]
Epoch 5   [Train |████████████████████|  468/468  batches, 0.12 cost, 1.18s]
Epoch 6   [Train |████████████████████|  468/468  batches, 0.11 cost, 1.20s]
Epoch 7   [Train |████████████████████|  468/468  batches, 0.10 cost, 1.19s]
Epoch 8   [Train |████████████████████|  468/468  batches, 0.09 cost, 1.20s]
Epoch 9   [Train |████████████████████|  468/468  batches, 0.09 cost, 1.21s]
/usr/local/lib/python3.5/dist-packages/neon/backends/util/source_module.py:22: UserWarning: The CUDA compiler succe
eded, but said the following:
kernel.cu(42): warning: function "__shfl_xor(float, int, int)"
/usr/local/cuda/bin/../targets/x86_64-linux/include/sm_30_intrinsics.hpp(295): here was declared deprecated ("__shf
l_xor() is deprecated in favor of __shfl_xor_sync() and may be removed in a future release (Use -Wno-deprecated-dec
larations to suppress this warning).")

kernel.cu(42): warning: function "__shfl_xor(int, int, int)"
/usr/local/cuda/bin/../targets/x86_64-linux/include/sm_30_intrinsics.hpp(221): here was declared deprecated ("__shf
l_xor() is deprecated in favor of __shfl_xor_sync() and may be removed in a future release (Use -Wno-deprecated-dec
larations to suppress this warning).")


  arch, code, cache_dir, include_dirs)
2018-05-13 18:25:24,118 - neon - DISPLAY - Misclassification error = 2.4%
kpugdeet@gpu:~$ 
```