

# Python, Numpy and Google Cloud Tutorial

Sagie Benaim and Tomer Galanti

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## 1 Python and Numpy

For the first part of the tutorial, we'll learn about Python, Numpy and useful associated libraries. We recommend using a Linux distribution. To run the tutorial notebook you'll need to have the following installed:

- Python 3 (default in most linux distributions)
- Jupyter: <https://jupyter.org/install>
- Conda: Download from <https://conda.io/miniconda.html> (for Python 3) and follow instruction on: <https://conda.io/docs/user-guide/install/index.html>

Download the tutorial1 folder from moodle. From the command line, unzip the file (unzip tutorial1.zip), enter tutorial1 directory and start the tutorial with: jupyter notebook tutorial1-Python\_Numpy.ipynb.

I recommend playing with Numpy by yourself as much as you can to get a better understanding. There is plenty more material online. For example:

- <http://cs231n.github.io/python-numpy-tutorial/>
- <https://github.com/gertingold/euroscipy-numpy-tutorial>

## 2 Google Cloud

In this course, you'll be required to code some exercises that will use GPU resources. We were kindly given 50\$ of credit for each student by Google Cloud. Please follow this link to get a coupon:

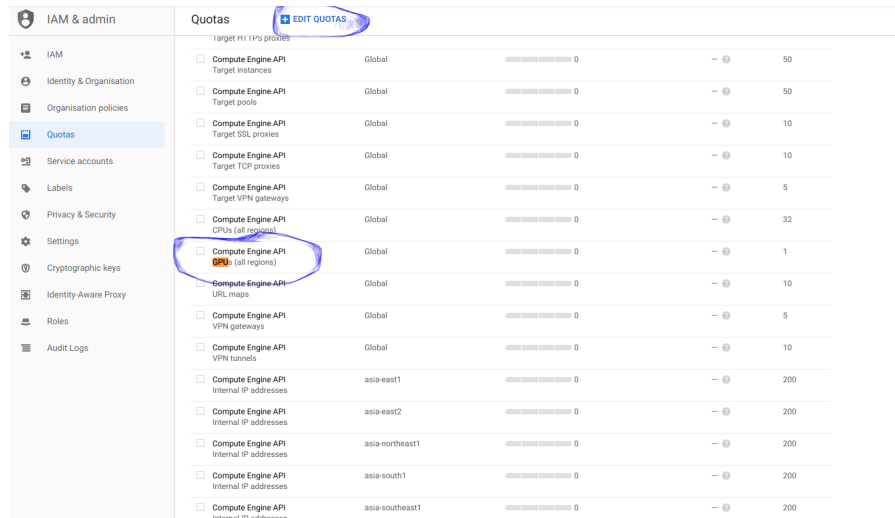
<https://google.secure.force.com/GCPEDU?cid=%2FmxGxHwtDn%2FKzRwvBYWzds5RLs0DR2Zok%2B7W68C0t9a%2F%2FkxrVdqtj7s2r6mEKU1z>

Note that you must provide a @mail.tau.ac.il email address. If this is the first time you use Google Cloud you can also get a free coupon for 300\$!

To set up Google Cloud, please follow the steps in this link noting the steps below: [https://cloud.google.com/deep-learning-vm/docs/pytorch\\_start\\_instance](https://cloud.google.com/deep-learning-vm/docs/pytorch_start_instance)

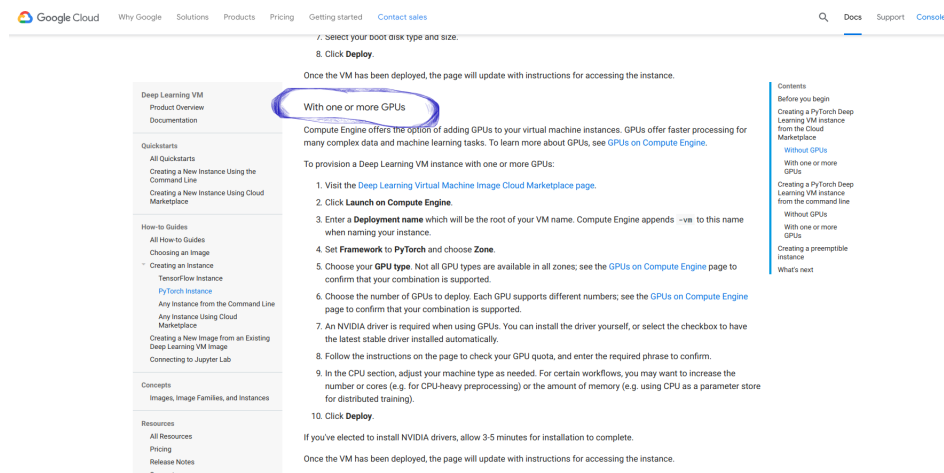
Steps to Notes:

- Verify you have enough quota by selecting 'Edit Quotas' on 'Compute Engine API GPU (All Regions)' and request 1 GPU.



IAM & admin		Quotas	<a href="#">EDIT QUOTAS</a>
Target H1 TPS probes			
<input type="checkbox"/>	Compute Engine API Target instances	Global	0 / 50
<input type="checkbox"/>	Compute Engine API Target pools	Global	0 / 50
<input type="checkbox"/>	Compute Engine API Target SSL proxies	Global	0 / 10
<input type="checkbox"/>	Compute Engine API Target TCP proxies	Global	0 / 10
<input type="checkbox"/>	Compute Engine API Target VPN gateways	Global	0 / 5
<input type="checkbox"/>	Compute Engine API CPUs (all regions)	Global	0 / 32
<input type="checkbox"/>	<b>Compute Engine API GPU (all regions)</b>	Global	0 / 1
<input type="checkbox"/>	Compute Engine API URL maps	Global	0 / 10
<input type="checkbox"/>	Compute Engine API VPN gateways	Global	0 / 5
<input type="checkbox"/>	Compute Engine API VPN tunnels	Global	0 / 10
<input type="checkbox"/>	Compute Engine API Internal IP addresses	asia-east1	0 / 200
<input type="checkbox"/>	Compute Engine API Internal IP addresses	asia-east2	0 / 200
<input type="checkbox"/>	Compute Engine API Internal IP addresses	asia-northeast1	0 / 200
<input type="checkbox"/>	Compute Engine API Internal IP addresses	asia-south1	0 / 200
<input type="checkbox"/>	Compute Engine API Internal IP addresses	asia-southeast1	0 / 200

- Follow the instructions of "With One of more GPUs"



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7. select your boot disk type and size.  
8. Click **Deploy**.

Once the VM has been deployed, the page will update with instructions for accessing the instance.

### With one or more GPUs

Compute Engine offers the option of adding GPUs to your virtual machine instances. GPUs offer faster processing for many complex data and machine learning tasks. To learn more about GPUs, see [GPUs on Compute Engine](#).

To provision a Deep Learning VM instance with one or more GPUs:

1. Visit the [Deep Learning Virtual Machine Image Cloud Marketplace](#) page.
2. Click **Launch on Compute Engine**.
3. Enter a **Deployment name** which will be the root of your VM name. Compute Engine appends `-vm` to this name when naming your instance.
4. Set **Framework** to **PyTorch** and choose **Zone**.
5. Choose your **GPU type**. Not all GPU types are available in all zones; see the [GPUs on Compute Engine](#) page to confirm that your combination is supported.
6. Choose the number of GPUs to deploy. Each GPU supports different numbers; see the [GPUs on Compute Engine](#) page to confirm that your combination is supported.
7. An NVIDIA driver is required when using GPUs. You can install the driver yourself, or select the checkbox to have the latest stable driver installed automatically.
8. Follow the instructions on the page to check your GPU quota, and enter the required phrase to confirm.
9. In the CPU section, adjust your machine type as needed. For certain workflows, you may want to increase the number of cores (e.g. for CPU-heavy preprocessing) or the amount of memory (e.g. using CPU as a parameter store for distributed training).
10. Click **Deploy**.

If you've elected to install NVIDIA drivers, allow 3-5 minutes for installation to complete.

Once the VM has been deployed, the page will update with instructions for accessing the instance.

**Contents**

- Before you begin
- Creating a PyTorch Deep Learning VM instance from the Cloud Marketplace
- Without GPUs
- With one or more GPUs
- Creating a PyTorch Deep Learning VM instance from the command line
- Without GPUs
- With one or more GPUs
- Creating a preemptible instance
- What's next

- When asked, make sure to use Pytorch Framework and select box that asks to install NVIDIA drivers. Also select 30GB for disk space.

Google Cloud Platform My First Project

### New Deep Learning VM deployment

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 cannot migrate on host maintenance**

**Framework**  
Choose the primary machine learning framework you will be using. If the library you would like to use is not listed, choose the base image, which provides core packages.  
PyTorch 1.0 + fastai 1.0 (CUDA 10.0)

**Access to the Jupyter Lab**  
☒ Beta. Enable access via URL instead of SSH  
Enabling this Beta feature allows you to access your JupyterLab instance using a URL. Anyone who is in the Editor or Owner role in your GCP project can access this URL. This feature is available only in the US, EU and Asia.

**GPU**  
☒ Install NVIDIA GPU driver automatically on first startup?  
I want to use NVIDIA GPUs with this image. Please fetch NVIDIA GPU drivers from a third-party location and install them on my behalf (requires internet access on the VM).

**Boot Disk**  
**Boot disk type** Standard Persistent Disk  
**Boot disk size in GB** 30

**Networking**  
**Network** default  
**Subnetwork** default (10.138.0.0/20)

[More](#)

**Documentation**  
[Official Documentation](#)  
[StackOverflow: Deep Learning VM](#)  
[Google Group: Deep Learning VM](#)

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Google is providing this software or service 'as-is' and will not perform any ongoing maintenance. Ongoing upgrades and maintenance are your responsibility.

- **Most important:** When you finish running your program with the GPU, make sure to stop your program and VM instance, by pressing STOP. Otherwise you will lose all your credit.
- The following guide may be of help but is slightly different from the one we follow: <http://cs231n.github.io/gce-tutorial/>

Lastly, make sure you can run a small python program on your VM instance.