

Google Cloud Tutorial

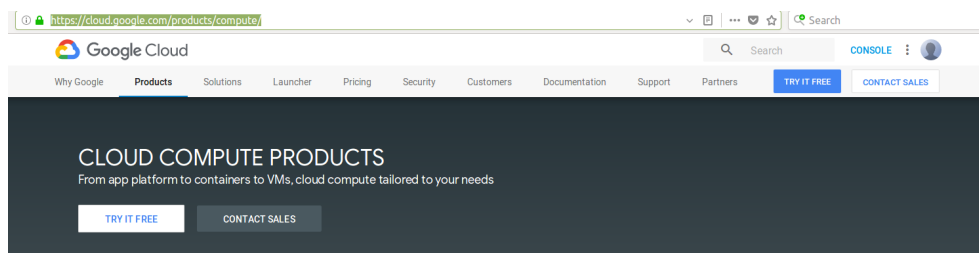
This tutorial shows you the necessary steps for setting up a computing instance with GPU using the Google Cloud Platform (GCP) for your assignments and project tasks. After you sign up for the first time GCP gives you 300\$ credits for free for 12 month. We assume that it is enough for your project and assignments. Keep in mind that you may need the free computing instance for future projects, e.g. in one of the advanced deep learning lectures.

Attention

Be aware that you always have to stop your instances manually. Otherwise they will continually consume your free credits. We only provide you with these guidelines but will not compensate you for any kind of additional costs. The usage of the GCP happens at your own risk!

1 Create an Account for the Google Cloud Platform

First, visit [this website](https://cloud.google.com/products/compute) and click on the **TRY IT FREE** button. It requires you to sign up with your Google account. If you don't already have one, please register.



After that fill out the agreement form and accept the terms and conditions.

Try Cloud Platform for free
Google

Country

Germany

Acceptances


Please email me updates regarding feature announcements, performance suggestions, feedback surveys and special offers.

☐ Yes ☒ No


I agree that my use of any [services and related APIs](#) is subject to my compliance with the applicable [Terms of Service](#). I have also read and agree to the [Google Cloud Platform Free Trial Terms of Service](#).

☒ Yes ☐ No


Agree and continue


Access to all Cloud Platform Products

Get everything you need to build and run your apps, websites and services, including Firebase and the Google Maps API.


\$300 credit for free

Sign up and get \$300 to spend on Google Cloud Platform over the next 12 months.


No autocharge after free trial ends

We ask you for your credit card to make sure you are not a robot. You won't be charged unless you manually upgrade to a paid account.

On the next page you have to enter your personal contact and payment information. Make sure you select **Individual** as account type.

Try Cloud Platform for free
Google

Customer info

Account type ⓘ ✎


Individual

Tax information


Tax status: Personal

Name and address ⓘ


Name


Access to all Cloud Platform Products

Get everything you need to build and run your apps, websites and services, including Firebase and the Google Maps API.

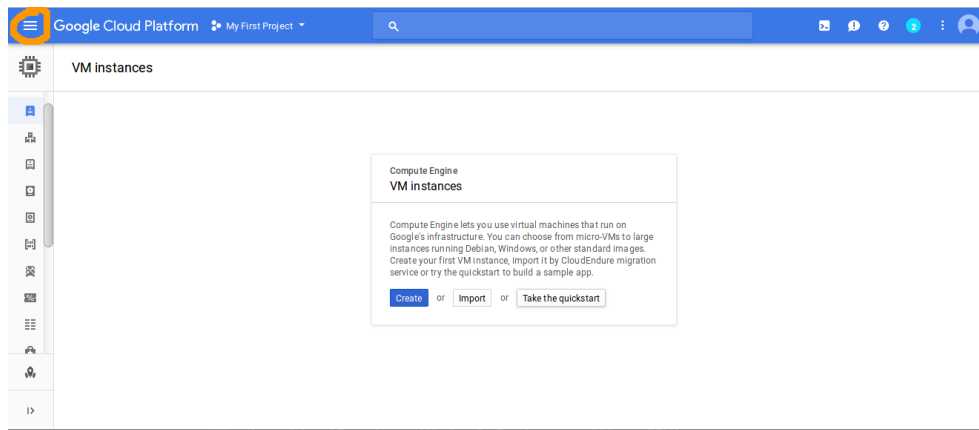

\$300 credit for free

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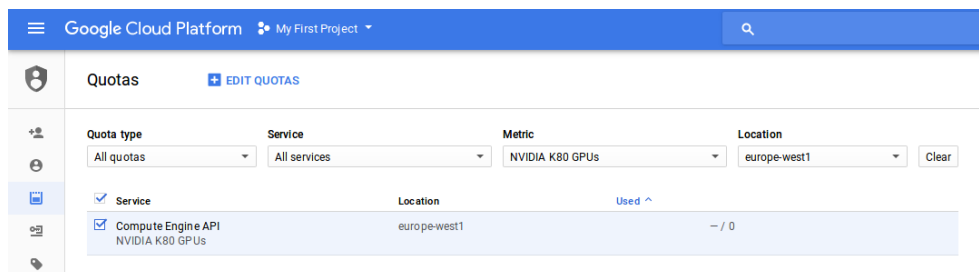
We ask you for your credit card to make sure you are not a robot. You won't be charged unless you manually upgrade to a paid account.

The next page should look like the following screenshot. You find the **Menu** in the upper left corner (highlighted).



2 Create a Virtual Instance with a GPU

Don't create a virtual machine (VM) right away. Free trial accounts do not receive GPU quota by default. You need to request a quota increase. In order to do that go to **Menu > IAM & Admin > Quotas**. Filter the quotas by location to see only European quotas and filter the metric for **NVIDIA Tesla K80 GPUs**.



Google should prompt you at this point that you have to upgrade your free trial account. Unfortunately that is necessary. You have to provide billing information and you are no longer protected from being automatically charged after your credits are all used up. **Google might changed their policies so check the conditions carefully!** Next click on **Edit Quotas** at the the top of the page and fill in the information in the form appearing on the right. We recommend to order just a single GPU. After you send the request you will receive an email approving your quota increase. This may take up to several hours or even days! Once your quota is approved you can create an instance with a GPU. Be aware that you can only create VM instances with GPUs of the same type as of your quota.

To initiate a virtual instance go to **Menu > Compute Engine > VM instances** and click on **Create**. Name your instance and select the zone that corresponds to your GPU quota. In the **Machine type** section select **Customize**. Pick as many virtual CPU cores and memory as you like but note that more resources consume more credits. Because most of the training will happen on the GPU we recommend to use only 2-4 cores. Memory is more important, so pick at least 12 GB. Finally expand the GPU section set the number of GPUs to 1 NVIDIA Tesla K80. The upper part of the form should look like this now:

Google Cloud Platform My First Project

Create an instance

Name *i2dl-exercises*

Zone *europe-west1-b*

Machine type
Customize to select cores, memory and GPUs.

Cores *Basic view*
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

[Less](#)
[Choosing a machine type](#)

Container
☐ Deploy a container image to this VM instance. [Learn more](#)

\$357.69 per month estimated
Effective hourly rate \$0.49 (730 hours per month)
[Details](#)

In the **Boot disk** section click on **Change**, choose **OS images** and check **Ubuntu 16.04 LTS**. We recommend to increase the size of the hard disk, e.g. to 50 GB or more (hard disk memory is cheap).

Boot disk

Select an image or snapshot to create a boot disk; or attach an existing disk

OS images Application images Custom images Snapshots Existing disks

- ☐ amd64-usr published on 2018-05-09
- ☐ CoreOS beta 1745.2.0
amd64-usr published on 2018-05-09
- ☐ CoreOS stable 1688.5.3
amd64-usr published on 2018-04-03
- ☐ Ubuntu 14.04 LTS
amd64 trusty image built on 2018-05-09
- ☒ Ubuntu 16.04 LTS
amd64 xenial image built on 2018-05-09
- ☐ Ubuntu 17.10
amd64 artful image built on 2018-05-09
- ☐ Ubuntu 18.04 LTS
amd64 bionic image built on 2018-04-26
- ☐ Container-Optimized OS 67-10575.32.0 beta
Kernel: ChromiumOS-4.14.33 Kubernetes: 1.10.0 Docker: 17.03.2

Can't find what you're looking for? Explore hundreds of VM solutions in [Cloud Launcher](#)

Boot disk type ?

Size (GB) ?

Standard persistent disk ▼

50

Select

Cancel

Under **Firewall** check the **Allow HTTP traffic** and **Allow HTTPS traffic** options. Expand the **Management, disks, networking, SSH keys** menu, switch to **Disks** and **uncheck Delete boot disk when instance is deleted**. After you carefully reviewed everything (see screenshot below) you are ready to click **Create**.

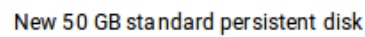


Create an instance

Container ?

☐ Deploy a container image to this VM instance. [Learn more](#)

Boot disk ?



Ubuntu 16.04 LTS

Change

Identity and API access

Service account ?

Compute Engine default service account

Access scopes

- ☒ Allow default access
- ☐ Allow full access to all Cloud APIs
- ☐ Set access for each API

Firewall ?

Add tags and firewall rules to allow specific network traffic from the Internet

- ☒ Allow HTTP traffic
- ☒ Allow HTTPS traffic

Management **Disks** Networking SSH Keys

Deletion rule

- ☐
- Delete boot disk when instance is deleted

Encryption ?

Automatic (recommended)

Additional disks ? (Optional)

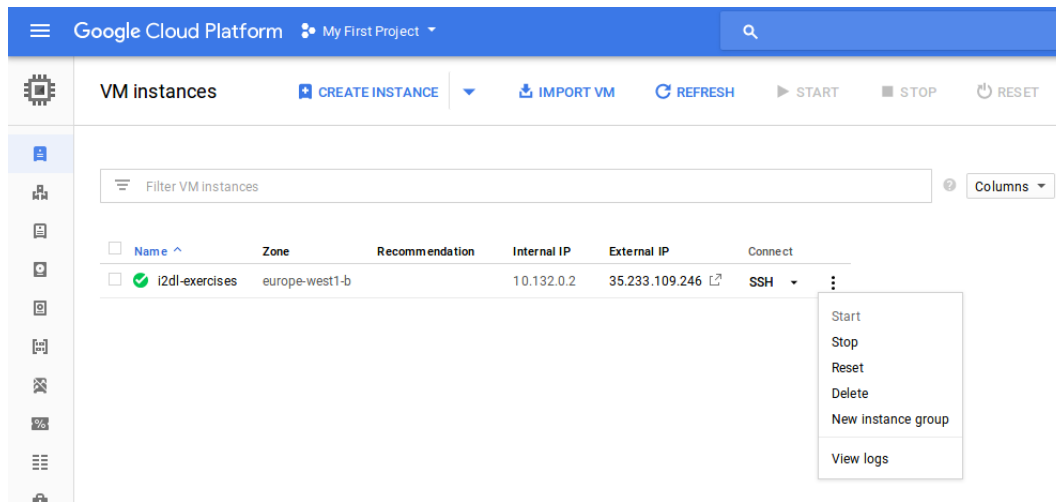
[+ Add item](#)

⤴ Less

You will be billed for this instance. [Learn more](#)

Create Cancel

After that you should be redirected to a page that looks like the following screenshot. You can access this page later via **Menu > Compute Engine > VM instances**. You see your instance listed with some network information. The green symbol on the left signals that your instance is currently running and **consuming credits**. You can stop and start your instance by clicking on the three dots to the right of your instance. A stopped instance shows a grey icon. Don't reset or delete it except you know what you are doing!



3 Connecting to the Instance via SSH

There are two ways to connect to the instance. Google offers a very useful command line interface which you can use to manage your instances and to connect to them. You find a comprehensive documentation [here](#).

Alternatively you can set up the SSH connection manually. Create or choose an existing private-public key pair. For a Unix system you can type:

```
cd ~/.ssh
ssh-keygen -t rsa -b 4096 -C "youremail(at)example.com"
```

For Windows systems have look at [PuTTY](#). After you got your key pair, do the following:

1. Go to **Menu > Compute Engine > VM instances**.
2. If it is running, stop the instance.
3. Click on the name of your instance to enter the **VM instance details** window.
4. Click the **EDIT** button.

5. Scroll down to the **SSH Keys** and expand **Show and edit**.
6. Copy the content of your **public** key into the field. The automatically generated name to the right of your key will be your ssh login **username**.
7. Save and start the instance.

Your **external IP** is shown in the overview of your instance. Now you should be able to ssh onto your machine by executing:

```
ssh username@external_ip
```

or by using PuTTY.

4 Install GPU drivers

The instance is preinstalled with most of the common packages and drivers. Nevertheless we found it was necessary to execute the following setup steps. Note that this will not install the latest CUDA Toolkit that is available.

1. Start your machine and establish a SSH connection.
2. On your instance execute:
3. Restart (stop and start) your machine from the GCP web interface.
4. SSH to your machine and check the available GPUs with

```
nvidia-smi
```

```
Fri May 18 12:11:28 2018
```

+-----+ Driver Version: 384.111 +-----+											
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+											
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	30C	P8	27W / 149W	16MiB / 11439MiB	0%	Default					
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+											
+-----+ Processes: +-----+											
GPU	PID	Type	Process name	GPU Memory							
=====+=====+=====+=====+=====+=====+=====+=====+=====+											
0	1632	G	/usr/lib/xorg/Xorg	15MiB							
+-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+ +-----+											