Google Cloud Tutorial

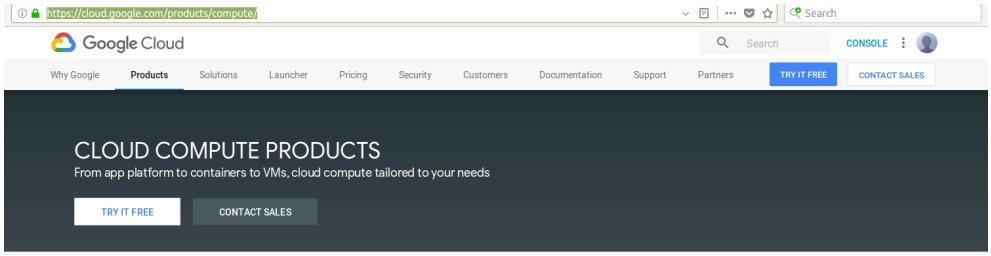
This tutorial shows you the necessary steps for setting up a computing instance with GPU using the Google Cloud Platform (GCP) for your assignments and project tasks. After you sign up for the first time GCP gives you 300$ credits for free for 12 month. We assume that it is enough for your project and 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

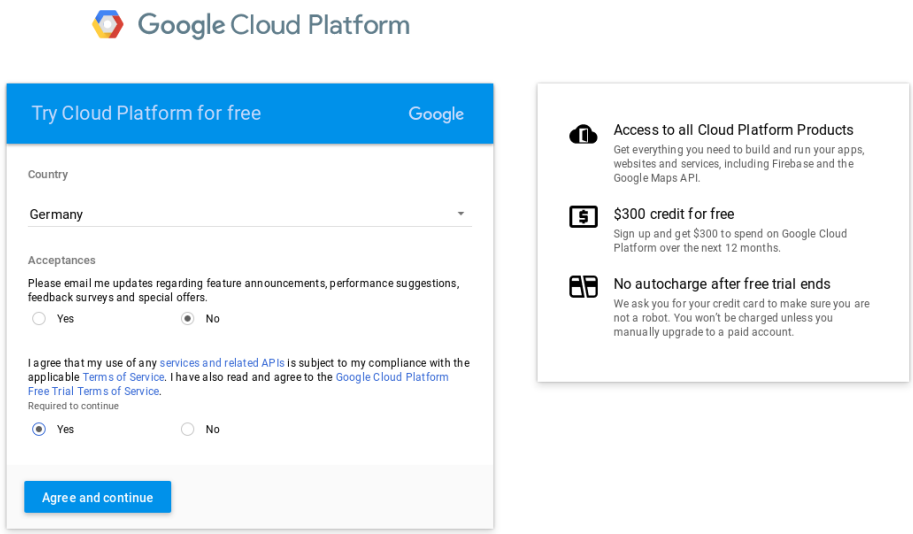
Be aware that you always have to stop your instances manually. Otherwise they will continually consume your free credits. We only provide you with these guidelines but will not compensate you for any kind of additional costs. The usage of the GCP happens at your own risk!

1 Create an Account for the Google Cloud Platform

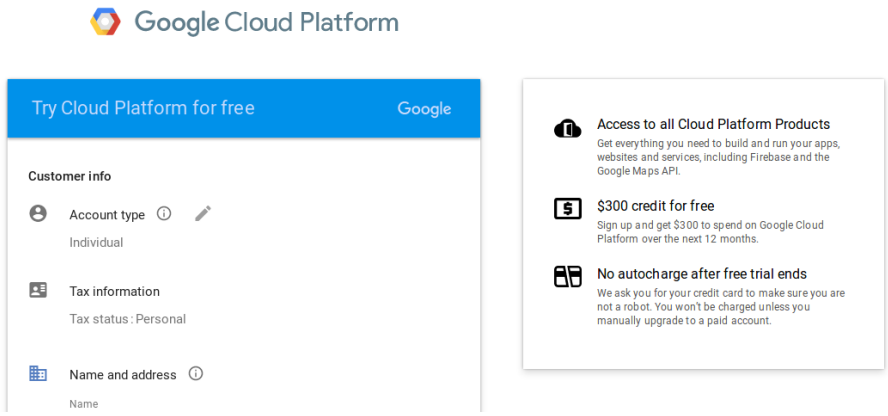
First, visit this website and click on the **TRY IT FREE** button. It requires you to sign up with your Google account. If you don't already have one, please register.



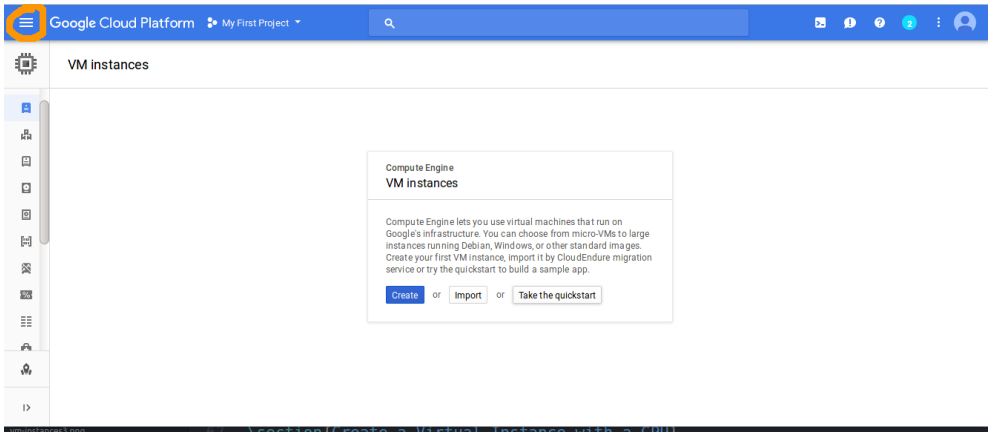
After that fill out the agreement form and accept the terms and conditions.



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

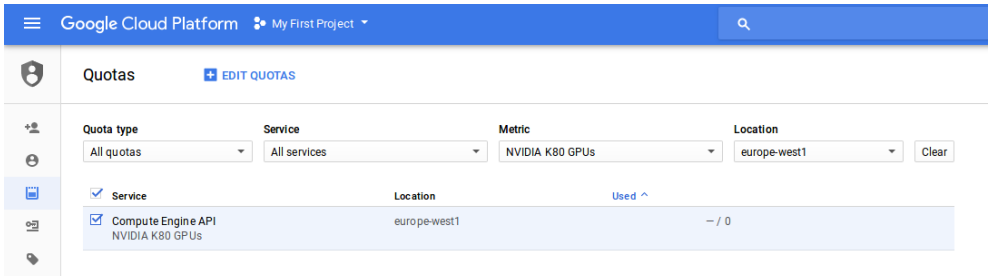


The next page should look like the following screenshot. You find the **Menu** in the upper left corner (highlighted).



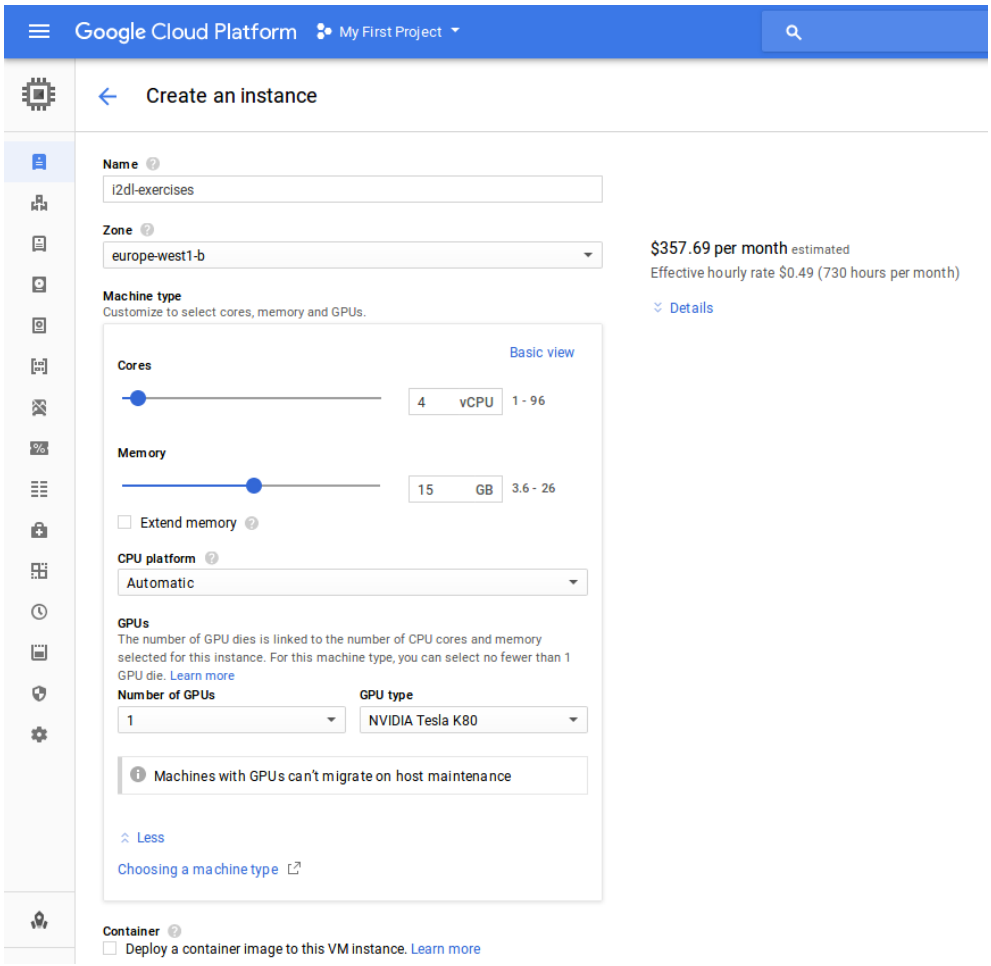
2 Create a Virtual Instance with a GPU

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.

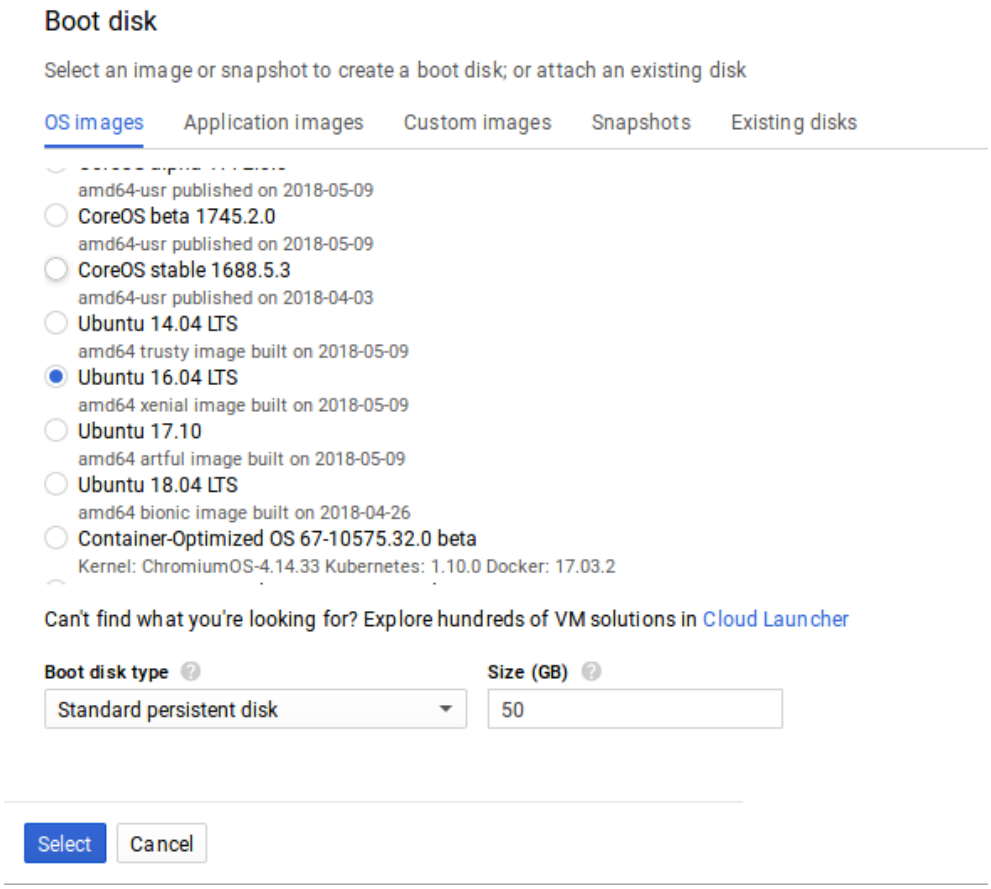


Google should prompt you at this point that you have to upgrade your free trial account. Unfortunately that is necessary. You have to provide billing information and you are no longer protected from being automatically charged after your credits are all used up. **Google might changed their policies 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.

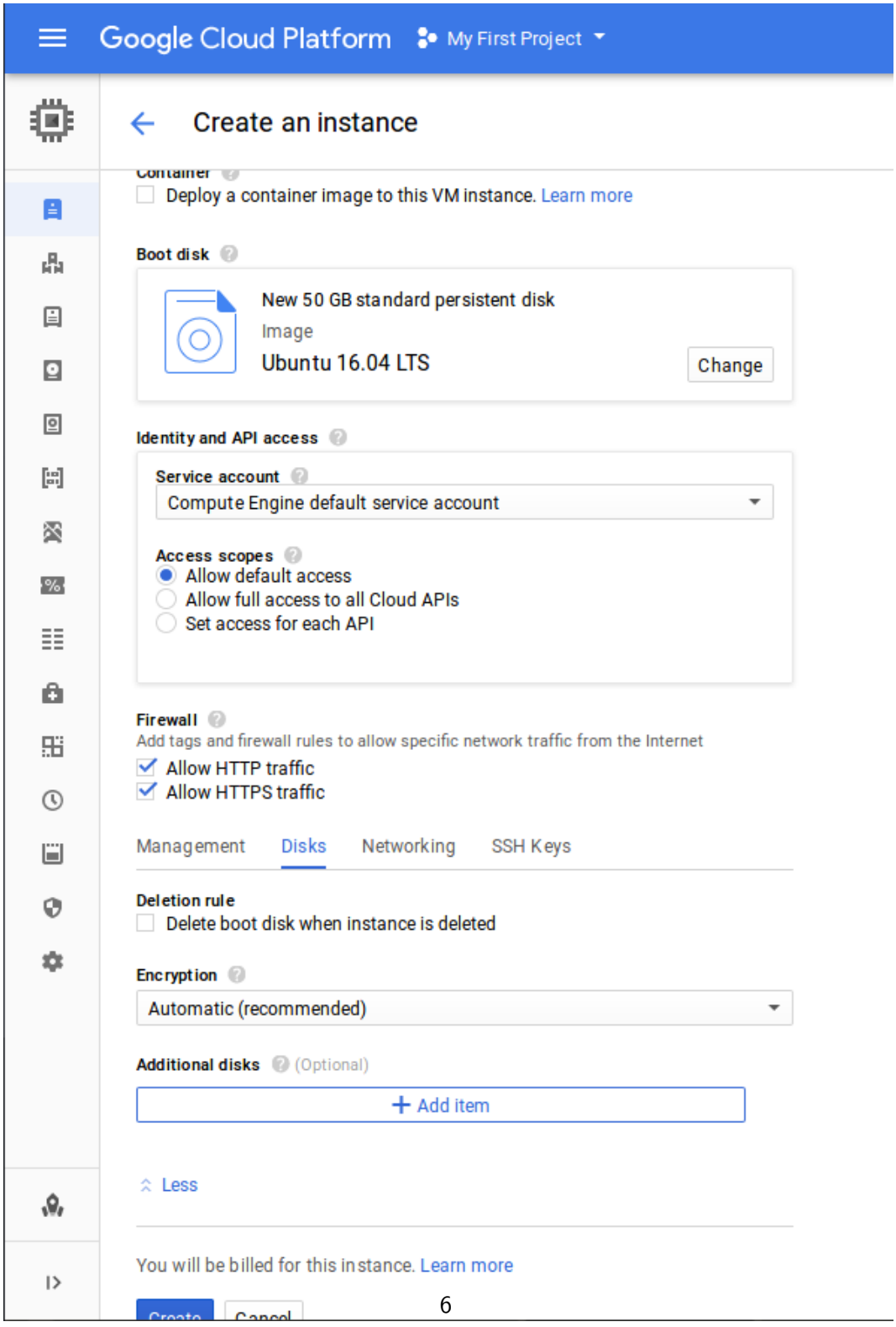
To initiate a virtual instance go to **Menu** > **Compute Engine** > **VM instances** and click on **Create**. Name your instance and select the zone that corresponds to your GPU quota. In the **Machine type** section select **Customize**. Pick as many virtual CPU cores and memory as you like but note that more ressources consume more credits. Because most of the training will happen on the GPU we recommend to use only 2-4 cores. Memory is more impotant, 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:



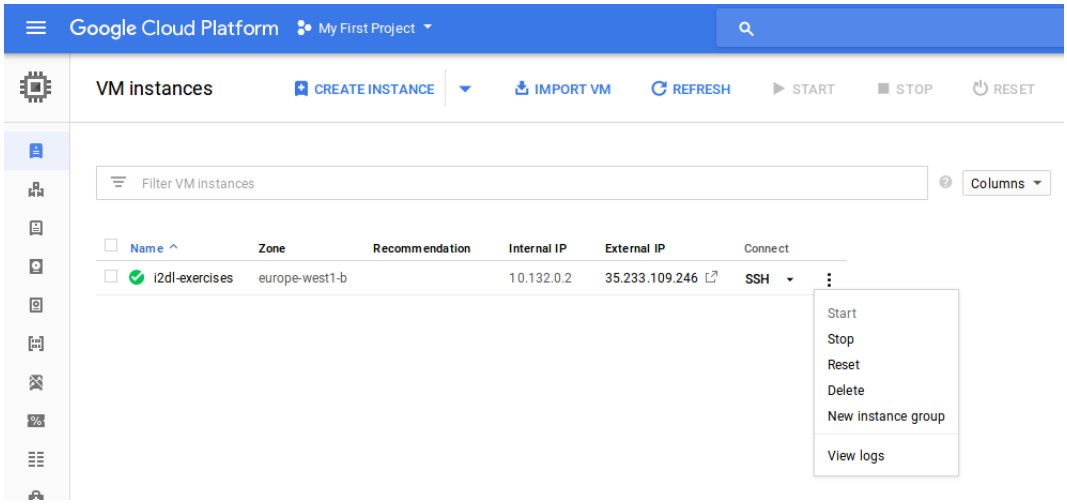
In the **Boot disk** section click on **Change**, choose **OS images** and check **Ubuntu 16.04 LTS**. We recommend to increase the size of the hard disk, e.g. to 50 GB or more (hard disk memory is cheap).



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**.


Google Cloud Platform
My First Project
Create an instance
Deploy a container image to this VM instance. Learn more
Boot disk
New 50 GB standard persistent disk
Image
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:

   ```
   sudo apt-get install nvidia-cuda-toolkit
   ```

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
   ```