

Deep Reinforcement Learning Tutorial Installation Guide

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June 6, 2019

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1 Introduction

Deep Reinforcement Learning (also called RL) is a huge step towards the creation of an universal artificial intelligence.

This guide will lead the reader through the setup process for the beginner tutorial "Deep Reinforcement Learning". It is also possible to use this as a base for different

Prerequisites It is recommended that a reader already acquired some basic knowledge about programming with Python and is familiar with basic deep learning concepts like Un-/Supervised Learning or at least with basic concept of AI ¹. It is also useful to be able to perform some basic linux commands, as we will use them later to install some additional packages.

Outlook The user will get to know basic concepts of RL with the help of:

Python3 One of the most popular programming languages for deep learning. The following tutorials will be based on Python. See <https://www.python.org/> for more information.

Pip A package installer for Python, which will download and install packages for us from a repository.

Jupyter Lab Enables execution of Python code inside a document, used to teach theory and implementation.

¹Artificial Intelligence

Google Cloud Cloud based processing power for training of different implementations of RL. Delivers a linux environment with preinstalled utilities for deep learning including different libraries for Python, Python itself and Jupyter Lab.

Keras Framework, which delivers different premade algorithms.

OpenAiGym A framework to train and evaluate different AI-based algorithms

2 Installation

2.1 Google Cloud

As "Reinforcement Learning" is pretty resource-intensive, Google Cloud will deliver the required performance in the cloud. Python itself, all libraries required and Jupyter Lab need to be available. Luckily, Google already provides a template for a Linux Virtual Machine, which we can use as base for this tutorial. You will have to create a Google account to use the cloud.

It is also possible to use this tutorial locally. You will have to prepare a Jupyter Lab environment with the help of PIP or Anaconda. Both are package installers for Python. See this tutorial https://jupyterlab.readthedocs.io/en/stable/getting_started/installation.html for more information.

2.1.1 Deep Learning VM

To get started in the most simple way, we will use the Google "Deep Learning VM" template to create our environment. It can be found at <https://cloud.google.com/deep-learning-vm> or alternatively you can search for "Deep Learning VM" in the Google Cloud marketplace, as shown in picture 1.

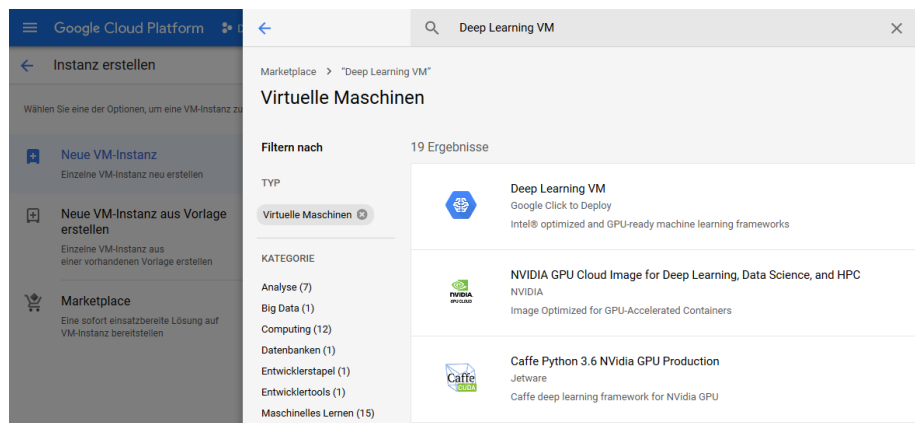


Figure 1: Searching for "Deep Learning VM"

After you choose the virtual machine, you will be provided with some additional information. Choose "start in compute engine" as shown in picture 2.

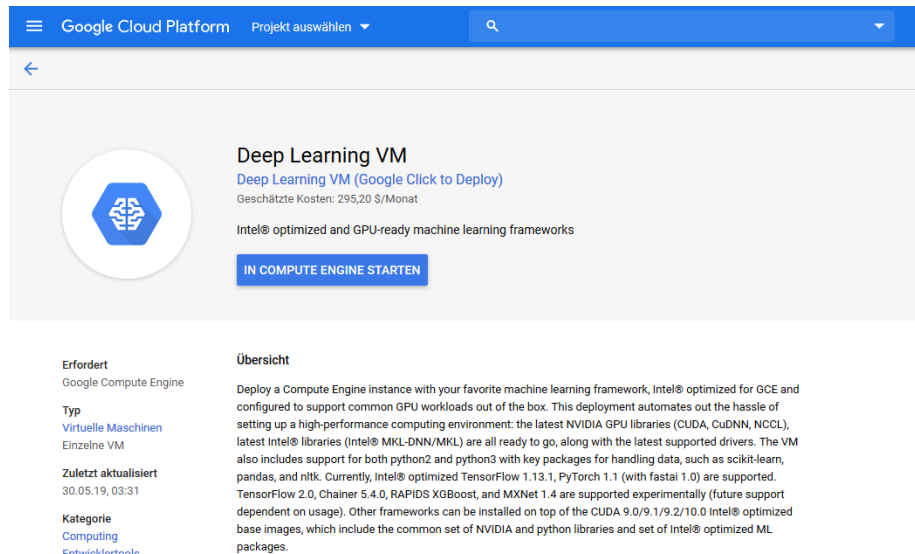


Figure 2: After Selecting "Deep Learning VM"

You will be presented with the final configuration screen as shown in picture 3 . We need to configure the following options:

- Choose a name for your virtual machine
- Choose any number of CPU/GPU you want to use (1 CPU is enough)
- Choose TensorFlow 1.13 as framework
- Activate: "Install NVIDIA GPU Driver automatically on first startup?"
- Activate: "Enable access to JupyterLab via URL instead of SSH."
- Choose a proper size for the boot disk (minimum of 30 GB is enough)

2.1.2 Installing Additional Software

After we successfully created our first virtual machine instance, we need to install some additional software on the virtual machine. This is possible through an administrator console, which can be opened by clicking the "SSH" button in the "virtual machine instances" sub-menu, as shown in picture 4. The open console can be seen in picture 5.

Google Cloud Platform

DeepLearning01

← Neues Deep Learning VM-Deployment

Deployment name

deeplearningexample

Zone

GPU availability is limited to certain zones. [Learn more](#)

us-west1-b

Machine type

1 vCPU

3,75 GB Speicherplatz

Anpassen

GPUs

Die Anzahl der GPU-Dies ist mit der Anzahl der CPU-Kerne und mit dem für diese Instanz ausgewählten Speicher verknüpft. Für die aktuelle Konfiguration müssen Sie mindestens 1 GPU-Die dieses Typs auswählen. [Weitere Informationen](#)

Anzahl der GPUsGPU-Typ

–

NVIDIA Tesla K80

Maschinen mit GPUs können nicht bei der Hostwartung migriert werden

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.

TensorFlow 1.13 (Intel® optimized, with Intel® MKL-DNN/MKL and CUDA ...

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).

Access to the Jupyter Lab

☒ Enable access to JupyterLab via URL instead of SSH. (Beta)

Enable this feature to access the running JupyterLab environment through a URL instead of SSH tunneling. Anyone who has been granted the Editor or Owner role in your GCP project can access this URL. This feature is available only in the US, EU and Asia.

Boot Disk

Boot disk type

Standard Persistent Disk

Boot disk size in GB

30

Networking

Netzwerk

default

Subnetzwerk

default (10.128.0.0/20)

Externe IP-Adresse

Vorübergehend

Bereitstellen

Figure 3: Final Configuration Screen

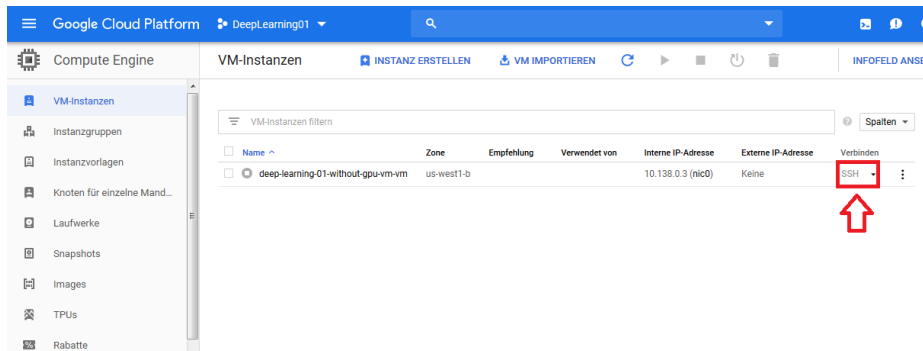


Figure 4: The "SSH" button

```
Resources:
* Google Deep Learning Platform StackOverflow: https://stackoverflow.com/questi
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 i
n 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 deep-learning-01-without-gpu-vm-vm 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.
root@deep-learning-01-without-gpu-vm-vm:~$
```

Figure 5: The administrator console

We need to execute the following commands:

- `sudo apt-get install python-opengl`
- `sudo apt-get install xvfb`

This will install both `python-opengl` and `xvfb` with root rights on our server. We need to allow the installation by entering "y". As the Google Cloud server does not provide a display or Open-Gl graphics drivers, we need these programs to run OpenAiGym with visible training/evaluation. After the installation we can finally use Jupyter Lab.

2.2 Jupyter Lab

2.2.1 Upload Notebooks