# Cuda Installation

**Table 1. CUDA Toolkit and Compatible Driver Versions**

| CUDA Toolkit | Linux x86_64 Driver Version |
|---|---|
| CUDA 11.0 (11.0.171) | >= 450.36.06 |
| CUDA 10.2 (10.2.89) | >= 440.33 |
| CUDA 10.1 (10.1.105) | >= 418.39 |
| CUDA 10.0 (10.0.130) | >= 410.48 |
| CUDA 9.2 (9.2.88) | >= 396.26 |
| CUDA 9.1 (9.1.85) | >= 390.46 |
| CUDA 9.0 (9.0.76) | >= 384.81 |
| CUDA 8.0 (8.0.61 GA2) | >= 375.26 |
| CUDA 8.0 (8.0.44) | >= 367.48 |
| CUDA 7.5 (7.5.16) | >= 352.31 |
| CUDA 7.0 (7.0.28) | >= 346.46 |

**This table helps you to decide which cuda version you need!**

## Step 1:

You can download the cuda toolkit through the following link
**https://developer.nvidia.com/cuda-downloads**

You can download the cuda according to your need by following these steps below:



## Step 2:
After selecting the options you will get the following:



Download Installer for Linux Ubuntu 16.04 x86_64

The base installer is available for download below.

> Base Installer

Installation Instructions:

```
$ wget https://developer.download.nvidia.com/compute/cuda/11.2.1/local_installers/cuda_11.2.1_460.32.03_linux.run
$ sudo sh cuda_11.2.1_460.32.03_linux.run
```

The CUDA Toolkit contains Open-Source Software. The source code can be found here.
The checksums for the installer and patches can be found in Installer Checksums.
For further information, see the Installation Guide for Linux and the CUDA Quick Start Guide.

Now you only need to copy & run these commands on your Terminal.

## Step 3:

You should get the following screen:



Accept this!

**Also make sure that this installation does not install new drivers.**



**Unselect drivers when installing cuda!**

After installation succeed you will get the following screen:

```
===========
= Summary =
===========

Driver:    Not Selected
Toolkit:   Installed in /usr/local/cuda-10.1/
Samples:   Installed in /home/ana/, but missing recommended libraries

Please make sure that
 -    PATH includes /usr/local/cuda-10.1/bin
 -    LD_LIBRARY_PATH includes /usr/local/cuda-10.1/lib64, or, add /usr/local/cuda-10.
1/lib64 to /etc/ld.so.conf and run ldconfig as root

To uninstall the CUDA Toolkit, run cuda-uninstaller in /usr/local/cuda-10.1/bin

Please see CUDA_Installation_Guide_Linux.pdf in /usr/local/cuda-10.1/doc/pdf for deta
iled information on setting up CUDA.
***WARNING: Incomplete installation! This installation did not install the CUDA Drive
r. A driver of version at least 418.00 is required for CUDA 10.1 functionality to wor
k.
To install the driver using this installer, run the following command, replacing <Cud
aInstaller> with the name of this run file:
    sudo <CudaInstaller>.run --silent --driver

Logfile is /var/log/cuda-installer.log
```
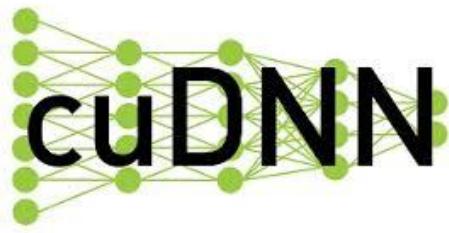
# For installation of CnDNN you need follow these steps:

These are the last couple of steps before you can start using your GPU for deep learning!

**You can install any updated version.**

## Step 1: Download CuDNN

The following link takes you to the cudnn download site.

**https://developer.nvidia.com/rdp/cudnn-download**

## NVIDIA Developer Program Membership Required

The file or page you have requested requires membership in the NVIDIA Developer Program. Please either log in or join the program to access this material. Learn more about the benefits of the NVIDIA Developer Program.

Login    Join now

First you need to login before you actually start downloading anything.
Also you need to fill all the information which they want.

After that you will get the url to download the cuDNN.

## cuDNN Download

NVIDIA cuDNN is a GPU-accelerated library of primitives for deep neural networks.

☑ **I Agree To the Terms of the cuDNN Software License Agreement**

Note: Please refer to the Installation Guide for release prerequisites, including supported GPU architectures and compute capabilities, before downloading.

For more information, refer to the cuDNN Developer Guide, Installation Guide and Release Notes on the Deep Learning SDK Documentation web page.

Download cuDNN v8.1.0 (January 26th, 2021), for CUDA 11.0,11.1 and 11.2

Download cuDNN v8.1.0 (January 26th, 2021), for CUDA 10.2

Archived cuDNN Releases

Now after clicking any particular version it will show the dropdown menu of files

## Library for Windows and Linux, Ubuntu(x86_64, armsbsa, PPC architecture)

cuDNN Library for Linux (aarch64sbsa)

cuDNN Library for Linux (x86_64)

cuDNN Library for Linux (PPC)

cuDNN Library for Windows (x86)

cuDNN Runtime Library for Ubuntu20.04 x86_64 (Deb)

cuDNN Developer Library for Ubuntu20.04 x86_64 (Deb)

cuDNN Code Samples and User Guide for Ubuntu20.04 x86_64 (Deb)

cuDNN Runtime Library for Ubuntu20.04 aarch64sbsa (Deb)

cuDNN Developer Library for Ubuntu20.04 aarch64sbsa (Deb)

cuDNN Code Samples and User Guide for Ubuntu20.04 aarch64sbsa (Deb)

cuDNN Cross-compile Library for Ubuntu20.04 aarch64sbsa (Deb)

cuDNN Developer Cross-compile Library for Ubuntu20.04 aarch64sbsa (Deb)

cuDNN Runtime Library for Ubuntu18.04 x86_64 (Deb)

Now you need to download these files:
- The cuDNN library
- The cuDNN runtime library (Deb)
- The cuDNN developer library (Deb)
- The cuDNN code samples (Deb)

## Library for Windows and Linux, Ubuntu(x86_64, armsbsa, PPC architecture)

cuDNN Library for Linux (aarch64sbsa)

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cuDNN Developer Library for Ubuntu20.04 aarch64sbsa (Deb)

cuDNN Code Samples and User Guide for Ubuntu20.04 aarch64sbsa (Deb)

cuDNN Cross-compile Library for Ubuntu20.04 aarch64sbsa (Deb)

cuDNN Developer Cross-compile Library for Ubuntu20.04 aarch64sbsa (Deb)

## Step 2: Install CuDNN

Cd into your download folder (or whatever the download files are)
Unpack the archive with the following commands:

```
$ tar -zxvf cudnn-10.1-linux-x64-v7.6.5.32.tgz
```

Copy the files into cuda toolkit directory and change the permissions:

```
$ sudo cp cuda/include/cudnn.h /usr/local/cuda/include
$ sudo cp cuda/lib64/libcudnn* /usr/local/cuda/lib64
$ sudo chmod a+r /usr/local/cuda/include/cudnn.h /usr/local/cuda/lib64/libcudnn*
```

**You will specify your own path above!**
Install the 3 libraries with the following commands:

```
$ sudo dpkg -i libcudnn7_7.6.5.32–1+cuda10.1_amd64.deb
$ sudo dpkg -i libcudnn7-dev_7.6.5.32-1+cuda10.1_amd64.deb
$ sudo dpkg -i libcudnn7-doc_7.6.5.32-1+cuda10.1_amd64.deb
```

## Step 3: Check that everything is working correctly

In order to do so, cuDNN have created a sample code which will run some computation on the MNIST dataset using your GPU. To do so, you need to follow these steps:

```
$ cp -r /usr/src/cudnn_samples_v7/ $HOME
$ cd  $HOME/cudnn_samples_v7/mnistCUDNN
$ make clean && make
$ ./mnistCUDNN
```

If everything worked fine, you should see something like this:

## Step 4:

Open bash file:
$ sudo nano ~/.bashrc

Include these following commands in bash file:
export LD_LIBRARY_PATH="$LD_LIBRARY_PATH:/usr/local/cuda/lib64"
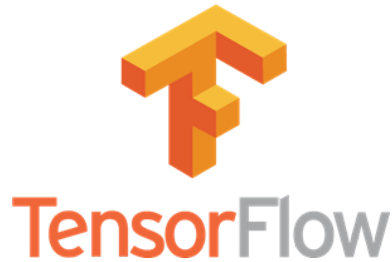export CUDA_HOME=/usr/local/cuda
**Must change the path of above commands according to your directory!**

Then reload using this command:
source ~/.bashrc

## Follow these steps in order to install tensorflow-GPU:

### Step 1:
The following link guides you further about tensorflow
**https://www.tensorflow.org/install/pip#ubuntu**

### Step 2:
If these packages are already installed, skip to the next step.
$ sudo apt update
$ sudo apt install python3-dev python3-pip python3-venv

### Step 3:
After installing the prerequisite packages, you can finally install TensorFlow 2.0
$ pip install tensorflow==2.2.0

The tensorflow package now includes GPU support by default as opposed to the old days that we need to install tensorflow-gpu specifically.

### Step 4:
Verify that TensorFlow can detect your GPU by running:
$ python3
>> import tensorflow as tf
>> tf.config.list_physical_devices('GPU')


**Hope You will enjoy this article and successfully run all the commands**
**Created by: Safe Drive**