

# 深度学习GPU加速环境的搭建

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# Install CUDA Toolkit

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 **CUDA** (Compute Unified Device Architecture), 是显卡厂商 NVIDIA推出的运算平台。CUDA™是一种由NVIDIA推出的通用并行计算架构, 该架构使GPU能够解决复杂的计算问题。它包含...  
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**CUDA Zone.** CUDA® is a parallel computing platform and programming model developed by NVIDIA for general computing on graphical processing units (GPUs). With CUDA, developers are able to dramatically speed up computing applications by harnessing the power of GPUs.

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## Develop, Optimize and Deploy GPU-accelerated Apps

The NVIDIA® CUDA® Toolkit provides a development environment for creating high performance GPU-accelerated applications. With the CUDA Toolkit, you can develop, optimize and deploy your applications on GPU-accelerated embedded systems, desktop workstations, enterprise data centers, cloud-based platforms and HPC supercomputers. The toolkit includes GPU-accelerated libraries, debugging and optimization tools, a C/C++ compiler and a runtime library to deploy your application.

GPU-accelerated CUDA libraries enable drop-in acceleration across multiple domains such as linear algebra, image and video processing, deep learning and graph analytics. For developing custom algorithms, you can use available integrations with commonly used languages and numerical packages as well as well-published development APIs. Your CUDA applications can be deployed across all NVIDIA GPU families available on premise and on GPU instances in the cloud. Using built-in capabilities for distributing computations across multi-GPU configurations, scientists and researchers can develop applications that scale from single GPU workstations to cloud installations with thousands of GPUs.

To get started, browse through online getting started resources, optimization guides, illustrative examples and collaborate with the rapidly growing developer community.

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# Install CUDA Toolkit

## NOTE:

The latest CUDA toolkit version TensorFlow support officially is 9.0

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#### Select Target Platform ⓘ

Click on the green buttons that describe your target platform. Only supported platforms will be shown.

Operating System

Windows

Linux

Mac OSX

[Documentation >](#)

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# Install CUDA Toolkit

Previous releases of the CUDA Toolkit, GPU Computing SDK, documentation and developer drivers can be found using the links below. Please select the release you want from the list below, and be sure to check [www.nvidia.com/drivers](http://www.nvidia.com/drivers) for more recent production drivers appropriate for your hardware configuration.

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## Latest Release

[CUDA Toolkit 9.2](#) (March 2018)

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[CUDA Toolkit 8.0 GA2](#) (Feb 2017), [Online Documentation](#)

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# Choose platform (exp. **Ubuntu 18.04** )

## CUDA Toolkit 9.0 Downloads

### Select Target Platform ⓘ

Click on the green buttons that describe your target platform. Only supported platforms will be shown.

Operating System

Windows

Linux

Mac OSX

Architecture ⓘ

x86\_64

ppc64le

Distribution

Fedora

OpenSUSE

RHEL

CentOS

SLES

Ubuntu

Version

17.04

16.04

Installer Type ⓘ

runfile (local)

deb (local)

deb (network)

### Download Installer for Linux Ubuntu 17.04 x86\_64

The base installer is available for download below.

#### > Base Installer

Download (2.8 KB) ⬇

Installation Instructions:

1. ``sudo dpkg -i cuda-repo-ubuntu1704_9.0.176-1_amd64.deb``
2. ``sudo apt-key adv --fetch-keys https://developer.download.nvidia.com/compute/cuda/repos/ubuntu1704/x86_64/7fa2af80.pub``
3. ``sudo apt-get update``
4. ``sudo apt-get install cuda``

Other installation options are available in the form of meta-packages. For example, to install all the library packages, replace "cuda" with the "cuda-libraries-9-0" meta package. For more information on all the available meta packages click [here](#).

## Follow official guide

1. Download deb (network) file.

2. Install deb package

```
sudo dpkg -i cuda-repo-ubuntu1704_9.0.176-1_amd64.deb
```

3. Add keys

```
sudo apt-key adv --fetch-keys
```

```
https://developer.download.nvidia.com/compute/cuda/repos/ub  
untu1704/x86_64/7fa2af80.pub
```

4. Update software sources

```
sudo apt-get update
```

5. Install cuda

```
sudo apt-get install cuda
```



## Note

Ubuntu默认使用的Nvidia显卡驱动为开源驱动，安装CUDA会将驱动切换为Nvidia官方驱动

# Install cuDNN

The NVIDIA CUDA® Deep Neural Network library (cuDNN) is a GPU-accelerated library of primitives for deep neural networks.

Official site: <https://developer.nvidia.com/cudnn>

Download cuDNN, you need to join NVIDIA Developer Program.

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# Install cuDNN

## cuDNN Download

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

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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 v7.1.4 \[May 16, 2018\], for CUDA 9.2](#)

[Download cuDNN v7.1.4 \[May 16, 2018\], for CUDA 9.0](#)

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[cuDNN v7.1.4 Code Samples and User Guide for Ubuntu16.04 & Power8 \[Deb\]](#)

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[cuDNN v7.1.4 Code Samples and User Guide for Ubuntu14.04 \[Deb\]](#)

[Download cuDNN v7.1.4 \[May 16, 2018\], for CUDA 8.0](#)

[Archived cuDNN Releases](#)

Just use `sudo dpkg -i` to install downloaded cuDNN deb file.

# Install TensorFlow-GPU

TensorFlow™ 是一个开放源代码软件库，用于进行高性能数值计算。借助其灵活的架构，用户可以轻松地将计算工作部署到多种平台（CPU、GPU、TPU）和设备（桌面设备、服务器集群、移动设备、边缘设备等）。TensorFlow™ 最初是由 Google Brain 团队（隶属于 Google 的 AI 部门）中的研究人员和工程师开发的，可为机器学习和深度学习提供强力支持，并且其灵活的数值计算核心广泛应用于许多其他科学领域。

Easiest way:

```
pip install tensorflow-gpu
```

Other ways:

TensorFlow install: <https://www.tensorflow.org/install/>

# Install Pytorch-GPU

PyTorch is an optimized tensor library for deep learning using GPUs and CPUs.

Official site: <https://pytorch.org/>

Just follow the official guide:

## Get Started.

Select your preferences, then run the PyTorch install command.

Please ensure that you are on the latest pip and numpy packages.  
Anaconda is our recommended package manager

|                 |              |            |            |      |
|-----------------|--------------|------------|------------|------|
| OS              | <b>Linux</b> | MacOS      | Windows    |      |
| Package Manager | conda        | <b>pip</b> | Source     |      |
| Python          | 2.7          | 3.5        | <b>3.6</b> |      |
| CUDA            | 8            | <b>9.0</b> | 9.1        | None |

Run this command:

```
pip3 install http://download.pytorch.org/whl/cu90/torch-0.4.0-cp36-cp36m-linux_x86_64.whl
pip3 install torchvision
```

Example: **Ubuntu18.04** **CUDA9.0** **Python3.6**

```
pip3 install http://download.pytorch.org/whl/cu90/torch-0.4.0-cp36-cp36m-linux_x86_64.whl
pip3 install torchvision`
```