

How to install ROS Robot Operating System on Linux

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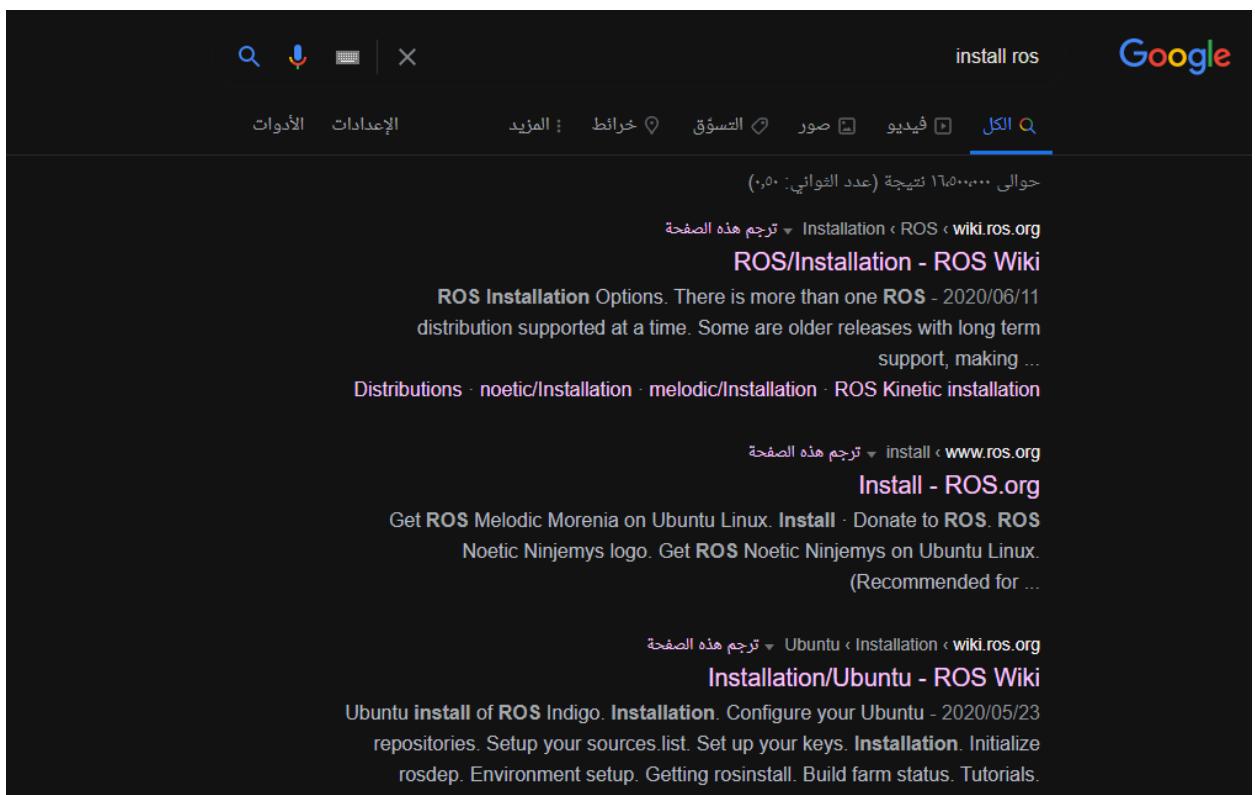
Introduction

ROS (Robot Operating System) is a popular multipurpose robotics framework used widely in research and industry. It is highly modular, with an architecture based around many "nodes" communicating with each other, and can be used with many different programming languages, notably Python and C++. With an active community surrounding it, it is easy to find support and useful packages to perform many advanced tasks.

ROS Installation

Note: we will use the terminal to install ROS, the commands that you will paste and execute on terminal will be highlighted in yellow.

1. First, go to google and type “install ROS” then open “ROS/Installation - ROS Wiki” page



2. From the “ROS Installation Options” there are three preferred version, you can look here for more details <http://wiki.ros.org/Distributions>, I will choose the latest version of ROS called “ROS Noetic Ninjemys”

ROS Installation Options

There is more than one ROS distribution supported at a time. Some are older releases with long term support, making them more stable, while others are newer with shorter support life times, but with binaries for more recent platforms and more recent versions of the ROS packages that make them up. See the [Distributions page](#) for more details. We recommend one of the versions below:

ROS Kinetic Kame Released May, 2016 LTS, supported until April, 2021 <i>This version isn't recommended for new installs.</i>	ROS Melodic Morenia Released May, 2018 LTS, supported until May, 2023 <i>Recommended for Ubuntu 18.04</i>	ROS Noetic Ninjemys Released May, 2020 Latest LTS , supported until May, 2025 <i>Recommended for Ubuntu 20.04</i>
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3. Choose your platform, in my case I will choose the Ubuntu

To install our previous long-term support release, **ROS Melodic Morenia**, please see the [ROS Melodic installation instructions](#).

Select Your Platform

Supported:

-  [Ubuntu Focal](#) [amd64](#) [armhf](#) [arm64](#)
-  [Debian Buster](#) [amd64](#) [arm64](#)

[Source installation](#)

Experimental:

-  [Windows 10](#) [amd64](#)

4. Before ROS installation you have to install the latest Ubuntu packages to keep the system up to date: simply go to terminal and type “**sudo apt update**”, then again type “**sudo apt upgrade**”

```
ros-user@SP:~$ sudo apt update
Ign:1 http://yt.google.com/cilinux/chrome/deb stable InRelease
Get:2 http://security.ubuntu.com/ubuntu xenial-security InRelease [102 kB]
Hit:3 http://ppa.launchpad.net/graphics-drivers/ppa/ubuntu xenial InRelease
Hit:4 http://dl.google.com/linux/chrome/deb stable Release
Hit:5 https://download.docker.com/linux/ubuntu xenial InRelease
Hit:6 http://in.archive.ubuntu.com/ubuntu xenial InRelease
Hit:8 http://ppa.launchpad.net/maarten-baert/simplescreenrecorder/ubuntu xenial InRelease
Get:9 http://in.archive.ubuntu.com/ubuntu xenial-updates InRelease [102 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu xenial-backports InRelease [102 kB]
Fetched 306 kB in 2s (124 kB/s)
Reading package lists... Done
Building dependency tree
Reading state information... Done
116 packages can be upgraded. Run 'apt list --upgradable' to see them.
ros-user@SP:~$ sudo apt upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following packages were automatically installed and are no longer required:
  linux-headers-4.10.0-27 linux-headers-4.10.0-27-generic linux-image-4.10.0-27-generic linux-image-extra-4.10.0-27-
Use 'sudo apt autoremove' to remove them.
The following packages will be upgraded:
  apparmor apt apt-utils base-files binutils cpp-5 cups cups-bsd cups-client cups-common cups-core-drivers cups-daem
  gir1.2-packagekitglib-1.0 gnome-software gnome-software-common google-chrome-stable grub-common grub-pc grub-pc-bi
  gvfs-libs initramfs-tools initramfs-tools-bin initramfs-tools-core kmod libapparmor-perl libapparmor1 libappstream
  libcryptsetup4 libcurl2 libcurlscgi1 libcurlsmime1 libcurlspdc1 libegl1-mesa libgail-common libgail18
  libgles2-mesa libgomp1 libgtk2.0-0 libgtk2.0-bin libgtk2.0-common libitm1 libkmod2 liblsan0 libmpx0 libpackagekit-
  libpython3.5-minimal libpython3.5-stdlib libquadmath0 libsnapd-glib1 libstdc++-5-dev libstdc++6 libtsan0 libubsan6
  mesa-vdpau-drivers nvidia-settings plymouth plymouth-label plymouth-theme-ubuntu-logo plymouth-theme-ubuntu-text p
  python3-update-manager python3.5 python3.5-minimal snap-confine snapd snapd-login-service ubuntu-core-launcher ubu
  _update-manager-core update-notifier update-notifier-common whoopsie
116 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 183 MB of archives.
After this operation, 45.5 MB disk space will be freed.
Do you want to continue? [Y/n]
```

Note: if you encounter “Do you want to continue? [Y/n] simply type “y”. Additionally, the terminal will ask you to enter the password before you can update.

5. Let's go back to install ROS Neotic, there are set of commands which we need to copy and paste it on terminal one by one, I will list them below for faster installation:

1. Installation

1.1 Configure your Ubuntu repositories

Configure your Ubuntu repositories to allow "restricted," "universe," and "multiverse." You can [follow the Ubuntu guide](#) for instructions on doing this.

1.2 Setup your sources.list

Setup your computer to accept software from packages.ros.org

```
sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" > /etc/apt/sources.list.d/ros-latest.list'
```

Mirrors Source Debs are also available

1.3 Set up your keys

```
sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key C1CF6E31E6BADE8868B172B4F172B4F42ED6FBAB17C654
```

If you experience issues connecting to the keyserver, you can try substituting hkp://pgp.mit.edu:80 or hkp://keyserver.ubuntu.com:80 in the previous command.

Alternatively, you can use curl instead of the apt-key command, which can be helpful if you are behind a proxy server:

```
curl -sSL 'http://keyserver.ubuntu.com/pks/lookup?op=get&search=0xC1CF6E31E6BADE8868B172B4F42ED6FBAB17C654' | sudo apt-key add -
```

1.4 Installation

```
sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -sc) main" >
```

```
/etc/apt/sources.list.d/ros-latest.list'
```

```
sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80' --recv-key
```

```
C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
```

```
sudo apt update
```

```
sudo apt install ros-noetic-desktop-full
```

Congratulations, you successfully installed ROS!

Testing(optional):

In order to test if ROS installation went successfully follow the steps below:

- You must source this script in every bash terminal you use ROS in.

Type on terminal: “`source /opt/ros/noetic/setup.bash`”

Note: every time you open new terminal you should repeat this process again, Moreover, the “setup.bash” location for your forward projects may vary based on where you stored it.

- **then run ROS master node:** The role of the Master is to enable individual ROS nodes to locate one another. Once these nodes have located each other they communicate with each other peer-to-peer.

Type on terminal: “`roscore`”

```
ros-user@SP:/opt/ros/kinetic$ roscore
... logging to /home/ros-user/.ros/log/e187abf0-b506-11e7-a7bb-02420377e57d/roslaunch-SP-27334.log
Checking log directory for disk usage. This may take awhile.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://SP:42999/
ros_comm version 1.12.7

SUMMARY
=====

PARAMETERS
  * /rosdistro: kinetic
  * /rosversion: 1.12.7

NODES

auto-starting new master
process[master]: started with pid [27345]
ROS_MASTER_URI=http://SP:11311

setting /run_id to e187abf0-b506-11e7-a7bb-02420377e57d
process[rosout-1]: started with pid [27358]
started core service [/rosout]
```

- ❖ This output should appear on the terminal

Good Luck!