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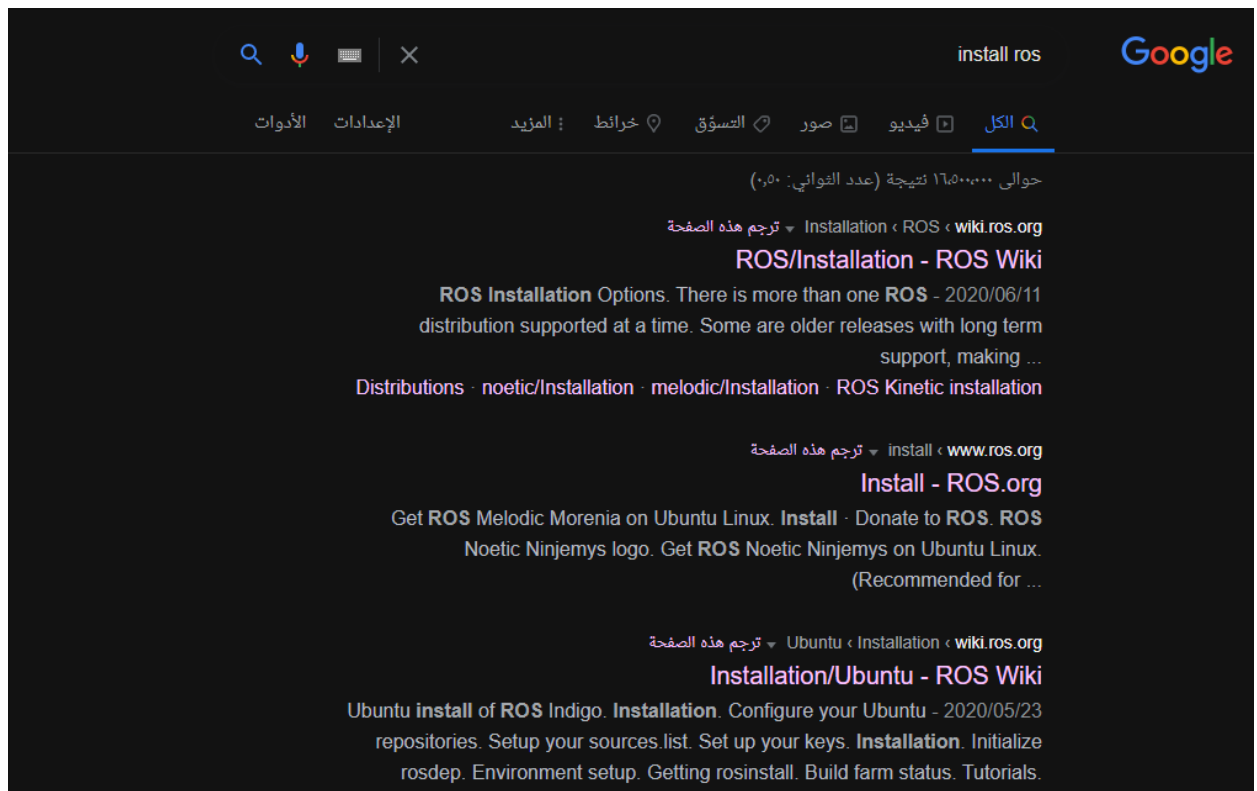
2. From the "ROS Installation Options" there are three preferred version, you can look here for more details http://wiki.ros.org/Distributions, I will choose the latest version of ROS called "ROS Noetic Ninjemys"

3. Choose your platform, in my case I will choose the Ubuntu

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"

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 C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
```

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!