Installation

Configure your Ubuntu repositories

Configure your Ubuntu repositories to allow "restricted," "universe," and "multiverse." You can [follow the Ubuntu guide](https://help.ubuntu.com/community/Repositories/Ubuntu) for instructions on doing this.

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](http://wiki.ros.org/ROS/Installation/UbuntuMirrors) | [Source Debs](http://wiki.ros.org/DebianPackageSources) are also available |

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 -

Installation

First, make sure your Debian package index is up-to-date:

* sudo apt update

There are many different libraries and tools in ROS. We provided four default configurations to get you started. You can also install ROS packages individually.

In case of problems with the next step, you can use following repositories instead of the ones mentioned above [ros-shadow-fixed](http://wiki.ros.org/ShadowRepository)

* **Desktop-Full Install: (Recommended)** : ROS, [rqt](http://wiki.ros.org/rqt), [rviz](http://wiki.ros.org/rviz), robot-generic libraries, 2D/3D simulators and 2D/3D perception
  + sudo apt install ros-melodic-desktop-full

or [click here](apt:ros-melodic-desktop-full?refresh=yes)

* **Desktop Install:**ROS, [rqt](http://wiki.ros.org/rqt), [rviz](http://wiki.ros.org/rviz), and robot-generic libraries
  + sudo apt install ros-melodic-desktop

or [click here](apt:ros-melodic-desktop?refresh=yes)

* **ROS-Base: (Bare Bones)** ROS package, build, and communication libraries. No GUI tools.
  + sudo apt install ros-melodic-ros-base

or [click here](apt:ros-melodic-ros-base?refresh=yes)

* **Individual Package:** You can also install a specific ROS package (replace underscores with dashes of the package name):
  + sudo apt install ros-melodic-PACKAGE

e.g.

sudo apt install ros-melodic-slam-gmapping

To find available packages, use:

apt search ros-melodic

Environment setup

It's convenient if the ROS environment variables are automatically added to your bash session every time a new shell is launched:

echo "source /opt/ros/melodic/setup.bash" >> ~/.bashrc

source ~/.bashrc

*If you have more than one ROS distribution installed, ~/.bashrc must only source the setup.bash for the version you are currently using.*

If you just want to change the environment of your current shell, instead of the above you can type:

source /opt/ros/melodic/setup.bash

If you use zsh instead of bash you need to run the following commands to set up your shell:

echo "source /opt/ros/melodic/setup.zsh" >> ~/.zshrc

source ~/.zshrc

Dependencies for building packages

Up to now you have installed what you need to run the core ROS packages. To create and manage your own ROS workspaces, there are various tools and requirements that are distributed separately. For example, [rosinstall](http://wiki.ros.org/rosinstall) is a frequently used command-line tool that enables you to easily download many source trees for ROS packages with one command.

To install this tool and other dependencies for building ROS packages, run:

sudo apt install python-rosdep python-rosinstall python-rosinstall-generator python-wstool build-essential

Initialize rosdep

Before you can use many ROS tools, you will need to initialize rosdep. rosdep enables you to easily install system dependencies for source you want to compile and is required to run some core components in ROS. If you have not yet installed rosdep, do so as follows.

sudo apt install python-rosdep

With the following, you can initialize rosdep.

sudo rosdep init

rosdep update