

# ROS Workshop - Tutorial 2 - Installing ROS

## ME 4140 - Introduction to Robotics - Fall 2020

### Overview:

After completing *Tutorial 1 - Virtualize Ubuntu*, your new operating system is running, and you are ready to install ROS. You can read more about this installation [here](#) on the wiki.

### System Requirements:

- **OS:** This tutorial is intended for the Ubuntu 18.04 LTS operating system. Alternate flavors of 18.04 (i.e. - Mint, Mate, kubuntu) may work but have not been tested.
- **Internet:** Your computer must be connected to the internet to proceed. Downloading and installing ROS may take approximately 15 to 30 minutes .

### Disclaimer:

- **Copy and Paste Errors:** It is strongly recommended to download this PDF and view it in Ubuntu so that you can copy and paste the required commands correctly.
- **Backup:** If you are using a virtual machine, it is recommended to make a snapshot of your virtual machine in case you want to revert. See *Tutorial 1 - Virtualize Ubuntu* for details.

### Installation Instructions:

You will enter several commands into the terminal during this tutorial. **The terminal commands are shown in gray boxes.** Press `Ctrl` + `Alt` + `T` to open a new terminal, then carefully copy each command and paste it into the terminal then press `Enter` .

1. Setup your sources.list 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'
```

2. Set up your keys which are used to authenticate software packages for security.

```
sudo apt-key adv --keyserver 'hkp://keyserver.ubuntu.com:80'\
--recv-key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
```

3. Update your Ubuntu system. It is a good idea to do this daily.

```
sudo apt update
```

4. Download and install ROS Melodic Desktop-Full. Depending on your network connection this step will take some time. Now is a good time to get a ☕ ☺.

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

5. Initialize rosdep (2 separate commands)

```
sudo rosdep init
```

```
rosdep update
```

6. Environment Setup (2 separate commands)

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

```
source ~/.bashrc
```

7. Install Development Tools. You are almost there!

```
sudo apt install python-rosinstall python-rosinstall-generator \  
python-wstool build-essential
```

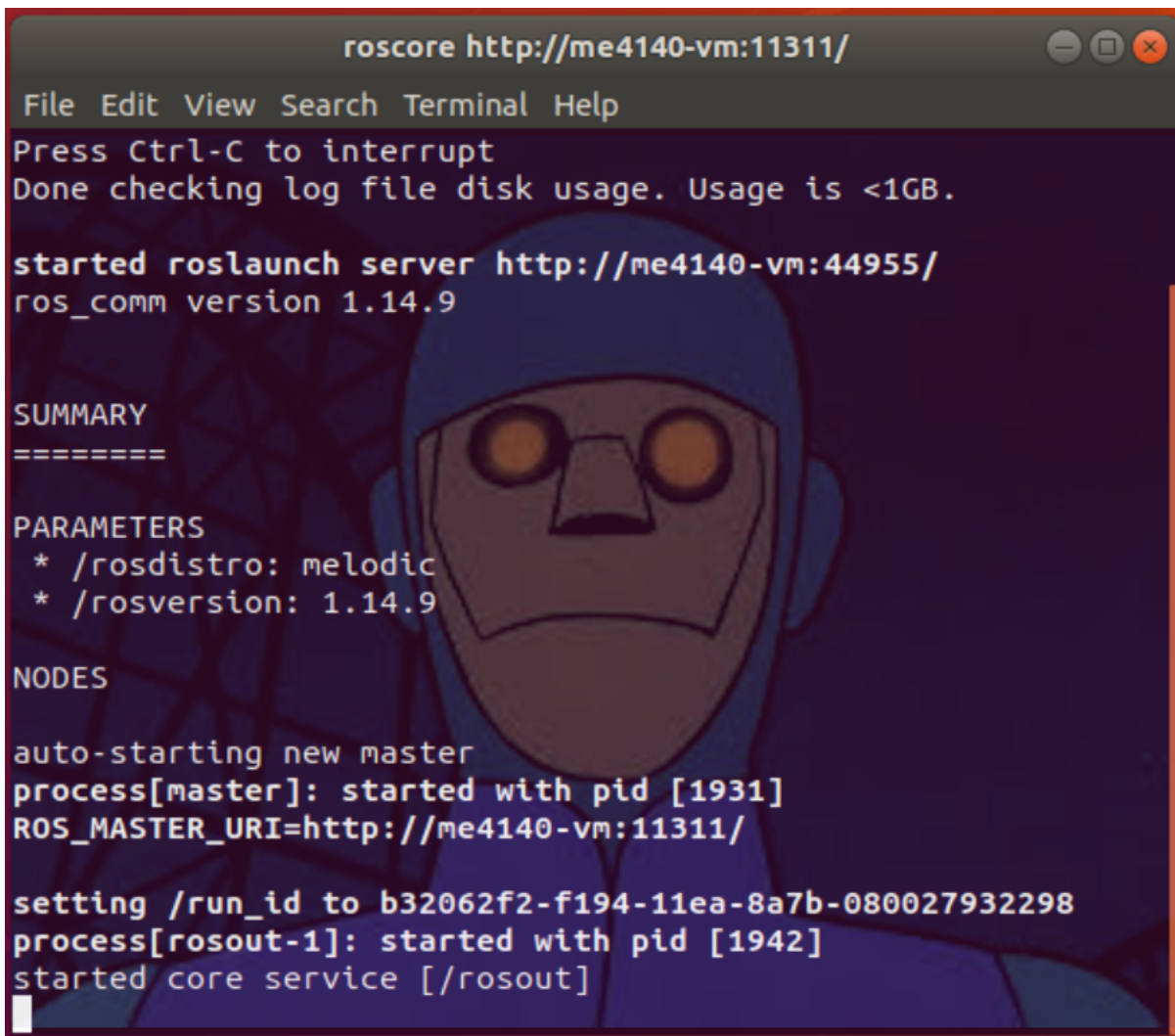
After completing Step 7 you have installed ROS on your Ubuntu system. Now it is time to test the installation.

## Test ROS Installation

Close all open terminal windows. Next, open a new terminal and try the following command.

```
roscore
```

If the installation was successful, the terminal output will be *similar* to the image below.

A terminal window titled 'roscore http://me4140-vm:11311/' with standard window controls. The background is dark blue with a faint, stylized illustration of a person's face. The terminal text shows the process of starting a ROS master. It includes a menu bar (File, Edit, View, Search, Terminal, Help), a prompt to press Ctrl-C to interrupt, a log file check message, and the start of a roslaunch server. It then displays a summary of parameters (rostdistro: melodic, rosversion: 1.14.9) and the start of nodes, including the master process (pid 1931) and the rosout process (pid 1942).

```
roscore http://me4140-vm:11311/
File Edit View Search Terminal Help
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://me4140-vm:44955/
ros_comm version 1.14.9

SUMMARY
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PARAMETERS
* /rostdistro: melodic
* /rosversion: 1.14.9

NODES

auto-starting new master
process[master]: started with pid [1931]
ROS_MASTER_URI=http://me4140-vm:11311/

setting /run_id to b32062f2-f194-11ea-8a7b-080027932298
process[rosout-1]: started with pid [1942]
started core service [/rosout]
█
```