Installing ROS Kinetic on Ubuntu 16.04 LTS

This file will help you to install ROS (**R**obotics **O**perating **S**ystem) on your **Linux Ubuntu 16.04) machine**.

What is ROS?

Robot Operating System (ROS) is a framework which provides tools and libraries to help software developers to create robot applications. The primary goal of ROS is to support code reuse in robotics research and development. Testing of robot code can be time-consuming and error-prone and sometimes physical robot might not be present. ROS provides a solution to this problem as it separates the hardware part and decision making (coding) part. Because of this separation, we can replace hardware part with a model in the simulator and test the behavior of decision-making part. It is an **open-source** software. It also provides a simple way to record and play data.
To know more about ROS you can visit here.

The main ROS client libraries (C++ and Python) are geared toward a Unix-like system, primarily because of their dependence on large collections of open-source software. Hence these client libraries require Linux operating system.

You must install the **ROS-Kinetic** on **Ubuntu 16.04** on your Laptop with atleast the following specifications:

- 8 GB RAM memory
- Intel i5-6th gen core or other processor with similar/better performance.

You can Download the **Ubuntu 16.04 desktop image from** here (64-bit) / (32-bit).

NOTE: ROS must be installed on Ubuntu 16.04 only.

Installing Instructions for ROS-kinetic on Ubuntu 16.04:

The steps listed below installs the 'Desktop-Full' ROS kinetic. This means that simulators like **Gazebo7, Rviz** along with a large number of ROS packages are installed as well.
Open the terminal by pressing `CTRL+ALT+T` and execute the following commands/steps in the terminal one after the other

NOTE: Type or Copy-Paste the commands only one at a time, if any error occurs make sure to rectify it before proceeding to the next step.

```
> 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://ha.pool.sks-keyservers.net:80
  --recv-key 421C365BD9FF1F717815A3895523BAEEB01FA116
```

The output for these commands should look like figure 1, as below:

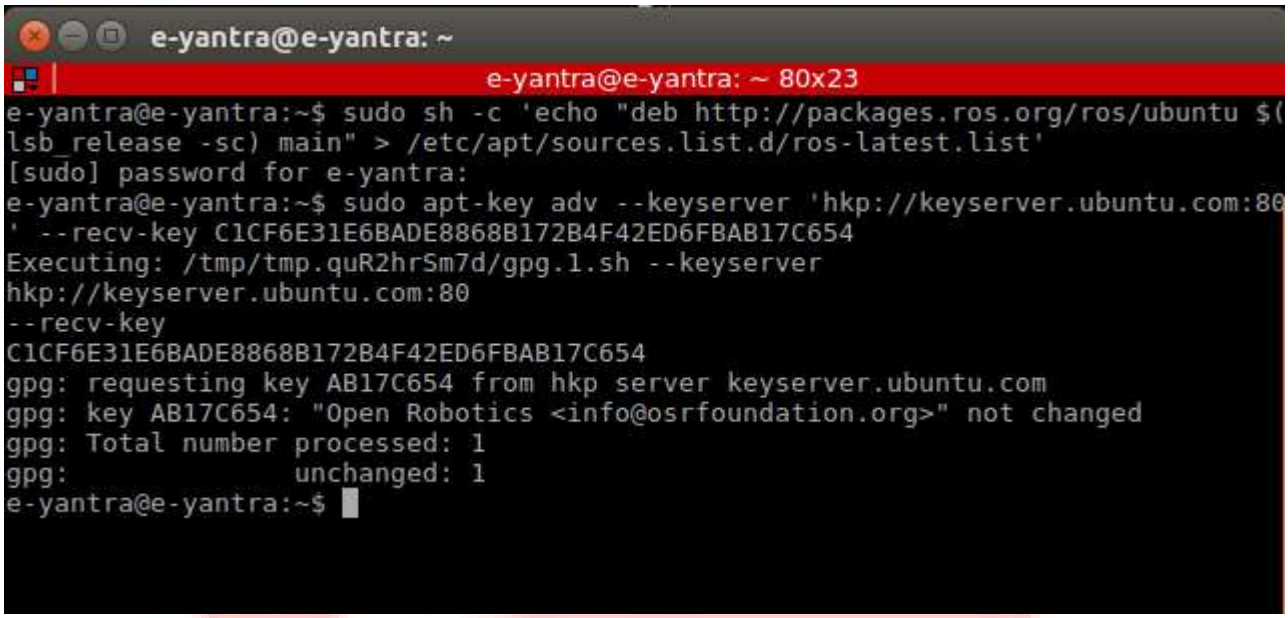

Figure 1: Output of successfully adding keys & source list

```
> sudo apt-get update
```

The below command will take considerable time to execute, depending on computer specs:

```
> sudo apt-get install ros-kinetic-desktop-full
> sudo rosdep init
```

After executing this line, if successful, your terminal will prompt to “rosdep update” which is exactly the next command.

```
> rosdep update
> printf "source /opt/ros/kinetic/setup.bash" >> ~/.bashrc
> source ~/.bashrc
> sudo apt-get install python-rosinstall
```

After this we will create a catkin workspace, follow the commands below to do so:

```
>   mkdir -p ~/catkin_ws/src
>   cd ~/catkin_ws/src
>   catkin_init_workspace
>   printf "\nsource ~/catkin_ws/devel/setup.bash" >> ~/.bashrc
```

This folder (catkin_ws) as we called it as workspace will be containing most of the required packages and built libraries.

To check proper installation of ROS-kinetic, execute the following command:

```
>   rosversion -d
```

To check Gazebo (version 7) installation, execute the following command:

```
>   gazebo -v
```

The output for these commands should look like figure 2, as below:

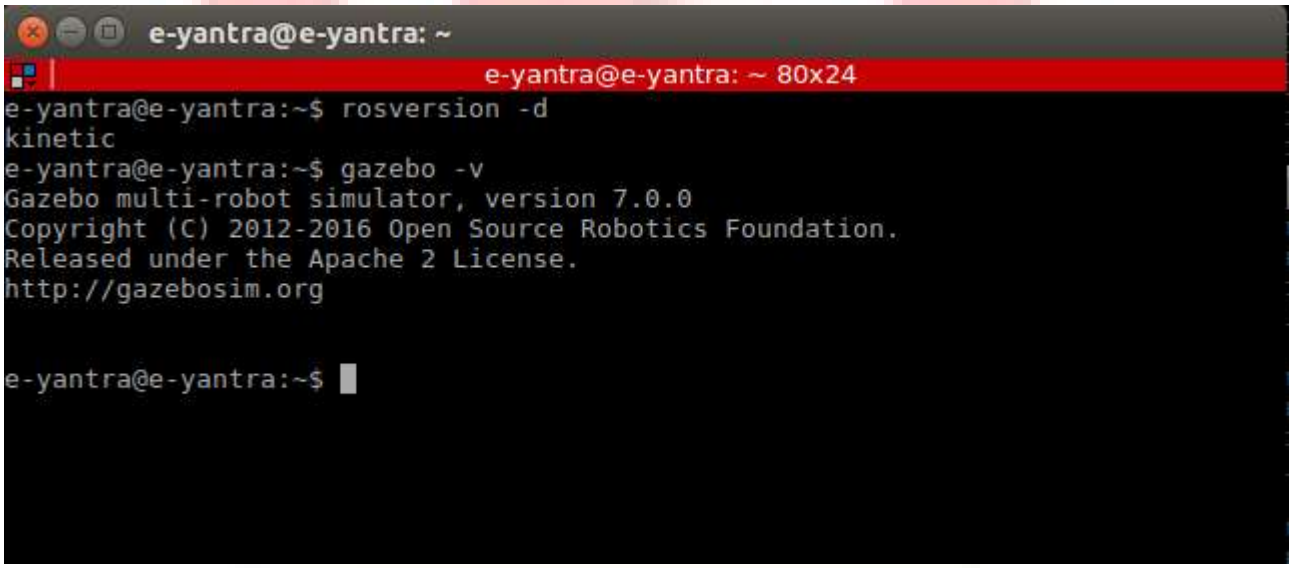

Figure 2: Output of version checking commands

NOTE: **Make sure the installed gazebo is version-7 only !!!**