



Introduction to Linux Systems

Package Management

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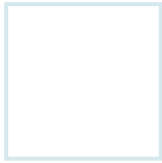
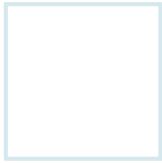
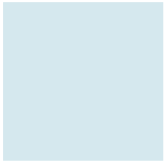
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Lab

- Install [ROS](#)
- ROS [Melodic](#) for Ubuntu 18.04
- ROS [Noetic](#) for Ubuntu 20.04
- ROS2 [Humble](#) for Ubuntu 22.04 (DEMO on Page.5)



Distribution: Melodic → Ubuntu 18.04

<http://wiki.ros.org/melodic/Installation/Ubuntu>

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/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

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](#)

Desktop-Full Install: (Recommended) - ROS, [rqt](#), [rviz](#), robot-generic libraries, 2D/3D simulators and 2D/3D perception

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

or [click here](#)

1.5 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
```





Demo: Run “roscore” and upload to moodle

```
vb@vb-VirtualBox-F12345678:~$ roscore
... logging to /home/vb/.ros/log/5345ee50-3eb5-11ec-b2c3-08002755e3ff/roslaunch
-vb-VirtualBox-2758.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://vb-VirtualBox:35971/
ros_comm version 1.14.12

SUMMARY
=====

PARAMETERS
* /rostdistro: melodic
* /rosversion: 1.14.12

NODES

auto-starting new master
process[master]: started with pid [2768]
ROS_MASTER_URI=http://vb-VirtualBox:11311/

setting /run_id to 5345ee50-3eb5-11ec-b2c3-08002755e3ff
process[rosout-1]: started with pid [2779]
started core service [/rosout]
```

1. Change your primary prompt and extend with your student ID.
2. Run “roscore” on the terminal and screenshot.
3. Upload the screenshot to moodle.

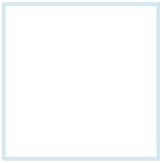
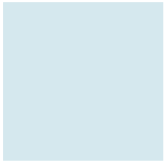


ROS 2 DEMO

One terminal runs talker and another terminal runs listener.

Take a screenshot and upload to moodle.

```
zong@zong-virtual-machine: ~  
zong@zong-virtual-machine:~$ source /opt/ros/humble/setup.bash  
zong@zong-virtual-machine:~$ ros2 run demo_nodes_py listener  
[INFO] [1667372364.772861722] [listener]: I heard: [Hello World: 20]  
[INFO] [1667372365.762463515] [listener]: I heard: [Hello World: 21]  
[INFO] [1667372366.762187393] [listener]: I heard: [Hello World: 22]  
[INFO] [1667372367.762271634] [listener]: I heard: [Hello World: 23]  
[INFO] [1667372368.762427485] [listener]: I heard: [Hello World: 24]  
[INFO] [1667372369.762222456] [listener]: I heard: [Hello World: 25]  
[INFO] [1667372370.762661245] [listener]: I heard: [Hello World: 26]  
[INFO] [1667372371.762396958] [listener]: I heard: [Hello World: 27]  
[INFO] [1667372372.762272908] [listener]: I heard: [Hello World: 28]  
[INFO] [1667372373.761946704] [listener]: I heard: [Hello World: 29]  
[INFO] [1667372374.762233716] [listener]: I heard: [Hello World: 30]  
[INFO] [1667372375.762422219] [listener]: I heard: [Hello World: 31]  
[INFO] [1667372376.762891773] [listener]: I heard: [Hello World: 32]  
[INFO] [1667372377.762361578] [listener]: I heard: [Hello World: 33]  
[INFO] [1667372378.761463828] [listener]: I heard: [Hello World: 34]  
[INFO] [1667372379.762030761] [listener]: I heard: [Hello World: 35]  
[INFO] [1667372380.761855271] [listener]: I heard: [Hello World: 36]  
[INFO] [1667372381.761566994] [listener]: I heard: [Hello World: 37]  
[INFO] [1667372382.762941446] [listener]: I heard: [Hello World: 38]  
[INFO] [1667372383.762519722] [listener]: I heard: [Hello World: 39]  
Home  
44) ...  
Processing triggers for libc-bin (2.35-0ubuntu3.1) ...  
zong@zong-virtual-machine:~$ source /opt/ros/humble/setup.bash  
zong@zong-virtual-machine:~$ ros2 run demo_nodes_cpp talker  
[INFO] [1667372345.762401907] [talker]: Publishing: 'Hello World: 1'  
[INFO] [1667372346.762882321] [talker]: Publishing: 'Hello World: 2'  
[INFO] [1667372347.762668622] [talker]: Publishing: 'Hello World: 3'  
[INFO] [1667372348.762880188] [talker]: Publishing: 'Hello World: 4'  
[INFO] [1667372349.762506608] [talker]: Publishing: 'Hello World: 5'  
[INFO] [1667372350.762497994] [talker]: Publishing: 'Hello World: 6'  
[INFO] [1667372351.762503162] [talker]: Publishing: 'Hello World: 7'  
[INFO] [1667372352.761802387] [talker]: Publishing: 'Hello World: 8'  
[INFO] [1667372353.762132088] [talker]: Publishing: 'Hello World: 9'
```



QUESTIONS