

1. Pull Ubuntu 20 Docker Image

```
sudo docker pull ubuntu:20.04
```

2. `xhost +local:docker`

```
arash@arash-IdeaPad-5-Pro:~$ sudo docker pull ubuntu:20.04
[sudo] password for arash:
20.04: Pulling from library/ubuntu
13b7e930469f: Pull complete
Digest: sha256:8feb4d8ca5354def3d8fce243717141ce31e2c428701f6682bd2faf15388214
Status: Downloaded newer image for ubuntu:20.04
docker.io/library/ubuntu:20.04
arash@arash-IdeaPad-5-Pro:~$ xhost +local:docker
non-network local connections being added to access control list
```

3. `sudo docker run -it --env DISPLAY=$DISPLAY -v`

```
/tmp/.X11-unix:/tmp/.X11-unix --name ros_container
ubuntu:20.04
```

4. `apt-get update`

```
arash@arash-IdeaPad-5-Pro:~$ sudo docker run -it --env DISPLAY=$DISPLAY -v /tmp/.X11-unix:/tmp/.X11-unix -name ros_container ubuntu:20.04
root@e71c85a8e5a0:/# apt-get update
Get:1 http://security.ubuntu.com/ubuntu focal-security InRelease [128 kB]
Get:2 http://archive.ubuntu.com/ubuntu focal InRelease [265 kB]
Get:3 http://security.ubuntu.com/ubuntu focal-security/main amd64 Packages [4431 kB]
Get:4 http://archive.ubuntu.com/ubuntu focal-updates InRelease [128 kB]
Get:5 http://archive.ubuntu.com/ubuntu focal-backports InRelease [128 kB]
Get:6 http://security.ubuntu.com/ubuntu focal-security/universe amd64 Packages [1308 kB]
Get:7 http://security.ubuntu.com/ubuntu focal-security/restricted amd64 Packages [4801 kB]
Get:8 http://archive.ubuntu.com/ubuntu focal/main amd64 Packages [1275 kB]
Get:9 http://archive.ubuntu.com/ubuntu focal/multiverse amd64 Packages [177 kB]
Get:10 http://security.ubuntu.com/ubuntu focal-security/multiverse amd64 Packages [33.1 kB]
Get:11 http://archive.ubuntu.com/ubuntu focal/restricted amd64 Packages [33.4 kB]
Get:12 http://archive.ubuntu.com/ubuntu focal/universe amd64 Packages [11.3 MB]
Get:13 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 Packages [4919 kB]
Get:14 http://archive.ubuntu.com/ubuntu focal-updates/restricted amd64 Packages [4998 kB]
Get:15 http://archive.ubuntu.com/ubuntu focal-updates/universe amd64 Packages [1599 kB]
Get:16 http://archive.ubuntu.com/ubuntu focal-updates/multiverse amd64 Packages [36.8 kB]
Get:17 http://archive.ubuntu.com/ubuntu focal-backports/main amd64 Packages [55.2 kB]
Get:18 http://archive.ubuntu.com/ubuntu focal-backports/universe amd64 Packages [28.6 kB]
Fetched 35.7 MB in 11s (3327 kB/s)
Reading package lists... Done
```

5. `apt-get install sudo`

```
root@e71c85a8e5a0:/# apt-get install sudo
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  sudo
0 upgraded, 1 newly installed, 0 to remove and 5 not upgraded.
Need to get 515 kB of archives.
After this operation, 2257 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 sudo amd64 1.8.31-1ubuntu1.5 [515 kB]
Fetched 515 kB in 2s (207 kB/s)
debcfg: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package sudo.
(Reading database ... 4124 files and directories currently installed.)
Preparing to unpack .../sudo_1.8.31-1ubuntu1.5_amd64.deb ...
Unpacking sudo (1.8.31-1ubuntu1.5) ...
Setting up sudo (1.8.31-1ubuntu1.5) ...
root@e71c85a8e5a0:/#
```

6. Let's install ROS Neotic and Gazebo

<https://foxlodge.dev/blog/installing-ros1-noetic-on-ubuntu>

<https://wiki.ros.org/noetic/Installation/Ubuntu>

Following this website following steps have been taken:-

```
sudo apt update && sudo apt install locales
```

```
root@e71c85a8e5a0:/# sudo apt update && sudo apt install locales
Hit:1 http://archive.ubuntu.com/ubuntu focal InRelease
Hit:2 http://security.ubuntu.com/ubuntu focal-security InRelease
Hit:3 http://archive.ubuntu.com/ubuntu focal-updates InRelease
Hit:4 http://archive.ubuntu.com/ubuntu focal-backports InRelease
Reading package lists... Done
Building dependency tree
Reading state information... Done
5 packages can be upgraded. Run 'apt list --upgradable' to see them.
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  locales
0 upgraded, 1 newly installed, 0 to remove and 5 not upgraded.
Need to get 3864 kB of archives.
After this operation, 17.6 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu focal-updates/main amd64 locales all 2.31-0ubuntu9.18 [3864 kB]
```

```
sudo locale-gen en_US.UTF-8
```

```
root@e71c85a8e5a0:/# sudo locale-gen en_US.UTF-8
Generating locales (this might take a while)...
  en_US.UTF-8... done
Generation complete.
```

```
sudo update-locale LC_ALL=en_US.UTF-8 LANG=en_US.UTF-8
```

```
export LANG=en_US.UTF-8
```

```
locale
```

```
root@e71c85a8e5a0:/# sudo update-locale LC_ALL=en_US.UTF-8 LANG=en_US.UTF-8
root@e71c85a8e5a0:/# export LANG=en_US.UTF-8
root@e71c85a8e5a0:/# locale
LANG=en_US.UTF-8
LANGUAGE=
LC_CTYPE="en_US.UTF-8"
LC_NUMERIC="en_US.UTF-8"
LC_TIME="en_US.UTF-8"
LC_COLLATE="en_US.UTF-8"
LC_MONETARY="en_US.UTF-8"
LC_MESSAGES="en_US.UTF-8"
LC_PAPER="en_US.UTF-8"
LC_NAME="en_US.UTF-8"
LC_ADDRESS="en_US.UTF-8"
LC_TELEPHONE="en_US.UTF-8"
LC_MEASUREMENT="en_US.UTF-8"
LC_IDENTIFICATION="en_US.UTF-8"
LC_ALL=
root@e71c85a8e5a0:/#
```

```
sudo apt install software-properties-common
```

```
root@e71c85a8e5a0:/# sudo apt install software-properties-common
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  ca-certificates dbus dbus-user-session dconf-service dirmngr distro-info-data
  dmsetup file gir1.2-glib-2.0 gir1.2-packagekitglib-1.0 glib-networking glib-networking-common
  glib-networking-services gnupg gnupg-l10n gnupg-utils gpg gpg-agent gpg-wks-client gpg-wks-server
  gpgconf gpgsm gpgv gsettings-desktop-schemas iso-codes krb5-locales libapparmor1 libappstream4
  libargon2-1 libasn1-8-heimdal libassuan0 libbrotli1 libcap2 libcap2-bin libcryptsetup12 libdbus-1-3
  libdconf1 libdevmapper1.02.1 libelf1 libexpat1 librepository-1.0-1 libglib2.0-0 libglib2.0-bin
  libglib2.0-data libgssapi-krb5-2 libgssapi3-heimdal libgstreamer1.0-0 libhcrypto4-heimdal
  libheimbase1-heimdal libheimntlm0-heimdal libhx509-5-heimdal libicu66 libip4tc2 libjson-c4
  libk5crypto3 libkeyutils1 libkmmod2 libkrb5-26-heimdal libkrb5-3 libkrb5support0 libksba8 libldap-2.4-2
  libldap-common liblmbdb0 libmagic-mgc libmagic1 libmpdec2 libnpth0 libnss-systemd
  libpackagekit-glib2-18 libpam-cap libpam-systemd libpolkit-agent-1-0 libpolkit-gobject-1-0 libproxy1v5
```

Subsequent configuration questions will narrow cities down by presenting a list of cities, representing the time zones in which they are located.

- | | | | |
|---------------|-------------|-------------|------------|
| 1. Africa | 5. Arctic | 9. Indian | 13. Etc |
| 2. America | 6. Asia | 10. Pacific | 14. Legacy |
| 3. Antarctica | 7. Atlantic | 11. SystemV | |
| 4. Australia | 8. Europe | 12. US | |

Geographic area: Asia

8. Atyrau	26. Famagusta	44. Kolkata	62. Qatar	80. Tomsk
9. Baghdad	27. Gaza	45. Krasnoyarsk	63. Qostanay	81. Ujung_Pandang
10. Bahrain	28. Harbin	46. Kuala_Lumpur	64. Qyzylorda	82. Ulaanbaatar
11. Baku	29. Hebron	47. Kuching	65. Rangoon	83. Urumqi
12. Bangkok	30. Ho_Chi_Minh	48. Kuwait	66. Riyadh	84. Ust-Nera
13. Barnaul	31. Hong_Kong	49. Macau	67. Sakhalin	85. Vientiane
14. Beirut	32. Hovd	50. Magadan	68. Samarkand	86. Vladivostok
15. Bishkek	33. Irkutsk	51. Makassar	69. Seoul	87. Yakutsk
16. Brunei	34. Istanbul	52. Manila	70. Shanghai	88. Yangon
17. Chita	35. Jakarta	53. Muscat	71. Singapore	89. Yekaterinburg
18. Choibalsan	36. Jayapura	54. Nicosia	72. Srednekolymsk	90. Yerevan

Time zone: Kolkata

```
sudo add-apt-repository universe
```

```
root@ce4775369044:/# sudo add-apt-repository universe
'universe' distribution component is already enabled for all sources.
root@ce4775369044:/#
```

```
sudo add-apt-repository restricted
```

```
root@ce4775369044:/# sudo add-apt-repository restricted  
'restricted' distribution component is already enabled for all sources.  
root@ce4775369044:/# 
```

```
sudo add-apt-repository multiverse
```

```
root@ce4775369044:/# sudo add-apt-repository multiverse  
'multiverse' distribution component is already enabled for all sources.  
root@ce4775369044:/# 
```

```
sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu  
$(lsb_release -sc) main" >  
/etc/apt/sources.list.d/ros-latest.list'
```

```
root@ce4775369044:/# sudo sh -c 'echo "deb http://packages.ros.org/ros/ubuntu $(lsb_release -s  
c) main" > /etc/apt/sources.list.d/ros-latest.list'  
root@ce4775369044:/# 
```

```
sudo apt install curl  
root@ce4775369044:/# sudo apt install curl  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following additional packages will be installed:
```

```
curl -s  
https://raw.githubusercontent.com/ros/rosdistro/master/ros.asc  
| sudo apt-key add -
```

```
Sudo apt update
```

```
root@ce4775369044:/# curl -s https://raw.githubusercontent.com/ros/rosdistro/master/ros.asc |  
sudo apt-key add -  
OK  
root@ce4775369044:/# sudo apt update
```

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

```
root@ce4775369044:/# sudo apt install ros-noetic-desktop-full  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
The following additional packages will be installed:
```

```
52. Esperanto          82. Slovenian
33. Estonian          83. Spanish
34. Faroese           84. Spanish (Latin American)
35. Filipino           85. Swahili (Kenya)
36. Finnish            86. Swahili (Tanzania)
37. French             87. Swedish
38. French (Canada)    88. Switzerland
39. French (Democratic Republic of the Congo) 89. Taiwanese
40. French (Guinea)     90. Tajik
41. French (Togo)       91. Thai
42. Georgian           92. Tswana
43. German              93. Turkish
44. German (Austria)    94. Turkmen
```

[More]

```
45. Greek              95. Ukrainian
46. Hebrew             96. Urdu (Pakistan)
47. Hungarian          97. Uzbek
48. Icelandic          98. Vietnamese
49. Indian              99. Wolof
50. Indonesian (Arab Melayu, phonetic)
```

Country of origin for the keyboard:

Country of origin for the keyboard: **Indian**

Progress: [72%] [#####.....]

```
30. Indian - Telugu
31. Indian - Telugu (KaGaPa phonetic)
32. Indian - Telugu (Sarala)
33. Indian - Urdu (alt. phonetic)
34. Indian - Urdu (phonetic)
35. Indian - Urdu (Win keys)
```

Keyboard layout: Indian - English

You will need a way to toggle the keyboard between the national layout and the standard Latin layout.

Right Alt or Caps Lock keys are often chosen for ergonomic reasons (in the latter case, use the combination Shift+Caps Lock for normal Caps toggle). Alt+Shift is also a popular combination; it will however lose its usual behavior in Emacs and other programs that use it for specific needs.

Not all listed keys are present on all keyboards.

```
1. Caps Lock          6. Menu key        11. Left Control+Left Shift 16. Scroll Lock key
2. Right Alt (AltGr)  7. Alt+Shift      12. Left Alt                17. No toggling
3. Right Control      8. Control+Shift   13. Left Control
```

Not all listed keys are present on all keyboards.

```
1. Caps Lock          6. Menu key        11. Left Control+Left Shift 16. Scroll Lock key
2. Right Alt (AltGr)  7. Alt+Shift      12. Left Alt                17. No toggling
3. Right Control      8. Control+Shift   13. Left Control
4. Right Shift         9. Control+Alt    14. Left Shift
5. Right Logo key     10. Alt+Caps Lock  15. Left Logo key
```

Method for toggling between national and Latin mode: **No toggling**

Progress: [72%] [#####.....]

```
sudo apt install ros-noetic-slam-gmapping
```

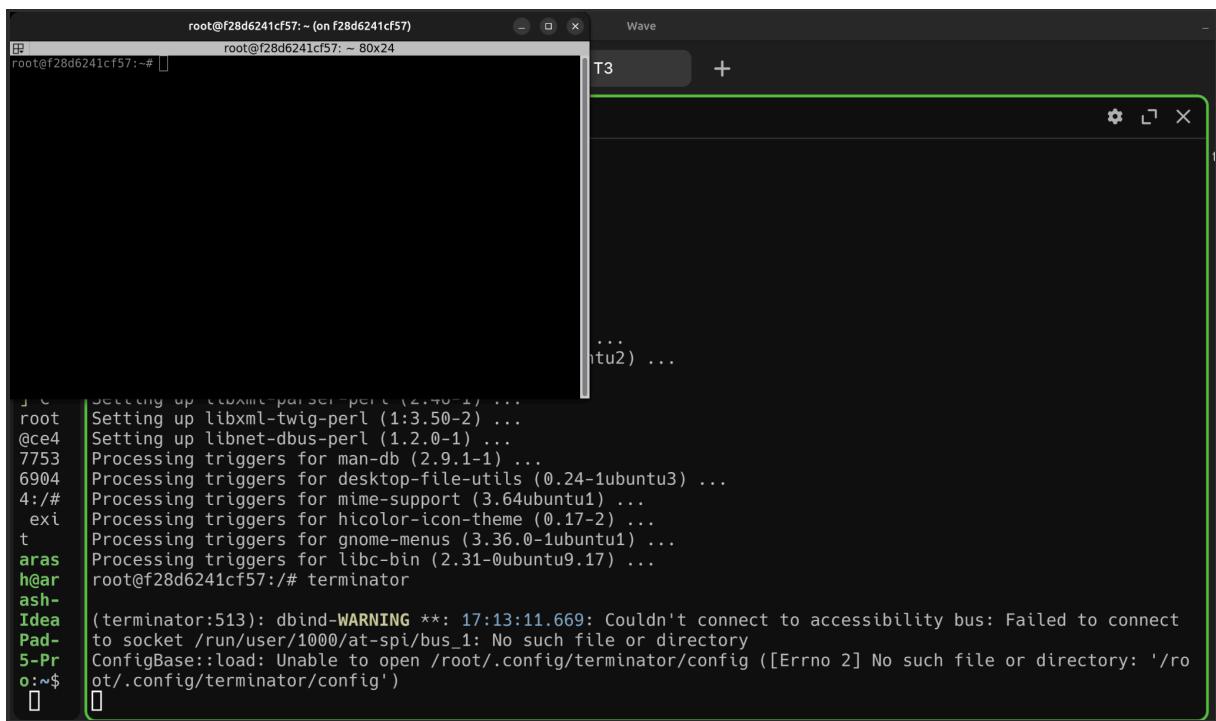
```
source /opt/ros/noetic/setup.bash
```

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

```
source ~/.bashrc
```

```
sudo apt install terminator
```

```
root@f28d6241cf57:/# sudo apt install terminator
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
gir1.2-keybinder-3.0 libauthen-sasl-perl libdata-dump-perl
libencode-locale-perl libfile-basedir-perl
libfile-desktopentry-perl libfile-listing-perl
libfile-mimeinfo-perl libfont-afm-perl libhtml-form-perl
libhtml-format-perl libhtml-parser-perl libhtml-tagset-perl
libhtml-tree-perl libhttp-cookies-perl libhttp-daemon-perl
libhttp-date-perl libhttp-message-perl libhttp-negotiate-perl
```



```
roscore
```

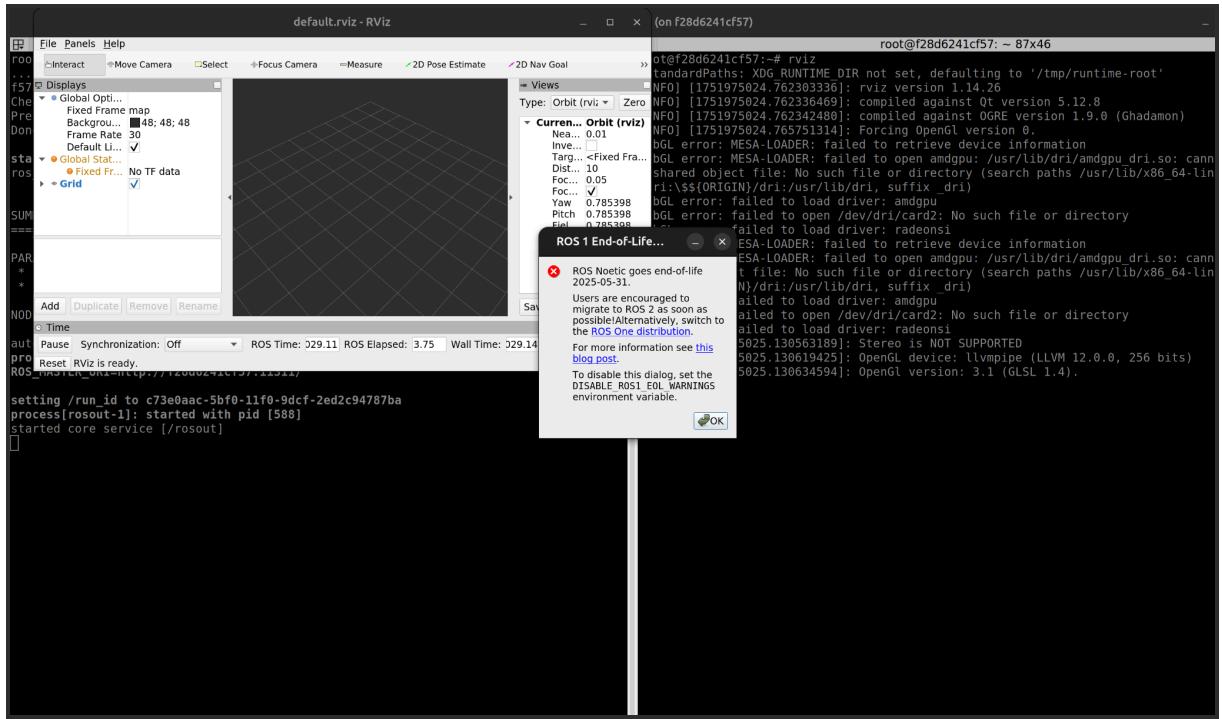
```
root@f28d6241cf57:~# roscore
... logging to /root/.ros/log/c73e0aac-5bf0-11f0-9dcf-2ed2c94787ba/roslaunch-f28d6241cf57-570.log
Checking log directory for disk usage. This may take a while.
Press Ctrl-C to interrupt
Done checking log file disk usage. Usage is <1GB.

started roslaunch server http://f28d6241cf57:36809/
ros_comm version 1.17.4

SUMMARY
=====
PARAMETERS
* /rosdistro: noetic
* /rosversion: 1.17.4

NODES
auto-starting new master
process[master]: started with pid [578]
ROS_MASTER_URI=http://f28d6241cf57:11311/
setting /run_id to c73e0aac-5bf0-11f0-9dcf-2ed2c94787ba
process[rosout-1]: started with pid [588]
started core service [/rosout]
```

rviz



```
sudo apt install python3-rosdep python3-rosinstall
```

```
python3-rosinstall-generator python3-wstool build-essential
```

```
[11:51:57] [root@f28d6241cf57: ~]# sudo apt install python3-rosdep python3-rosinstall python3-rosinstall-generator python3-wstool build-essential
Reading package lists... Done
Building dependency tree
Reading state information... Done
build-essential is already the newest version (12.8ubuntu1.1).
build-essential set to manually installed.
The following additional packages will be installed:
  brz bzr git git-man less liberror-perl libpython2.7-minimal
  libpython2.7-minimal libserf-1-1 libsvn1 libutf8proc2 mercurial mercurial-common
  python2 python2-minimal python2.7 python2.7-minimal python3-breezy
  python3-deprecated python3-dulwich python3-fastimport python3-github python3-gitlab
  python3-gpg python3-rosdistro python3-vcstools python3-wrapt subversion
Suggested packages:
  brz-doc python3-breezy-tests git-daemon-run | git-daemon-sysvinit git-doc git-email
  git-email git-gui gitweb git-cvs git-mediawiki git-svn kdiff3 | kdiff3-qt
  | kompare | meld | tkcvs | mgdiff qct python-mysqldb python-openssl python-pygments
  python2-doc python-tk python2.7-doc python3-breezy-dbg python3-kerberos
  python-gitlab-doc db5.3-util libapache2-mod-svn subversion-tools
The following NEW packages will be installed:
  brz bzr git git-man less liberror-perl libpython2.7-minimal
  libpython2.7-minimal libserf-1-1 libsvn1 libutf8proc2 mercurial mercurial-common
  python2 python2-minimal python2.7 python2.7-minimal python3-breezy
  python3-deprecated python3-dulwich python3-fastimport python3-qgithub python3-qitlab
```

```
sudo apt install python3-rosdep
```

```
[root@f28d6241cf57:~# sudo apt install python3-rosdep
Reading package lists... Done
Building dependency tree
Reading state information... Done
python3-rosdep is already the newest version (0.25.1-1).
0 upgraded, 0 newly installed, 0 to remove and 3 not upgraded.
root@f28d6241cf57:~# ]
```

```
sudo rosdep init
```

```
rosdep update
```

```
[root@f28d6241cf57:~# sudo rosdep init
Wrote /etc/ros/rosdep/sources.list.d/20-default.list
Recommended: please run

      rosdep update

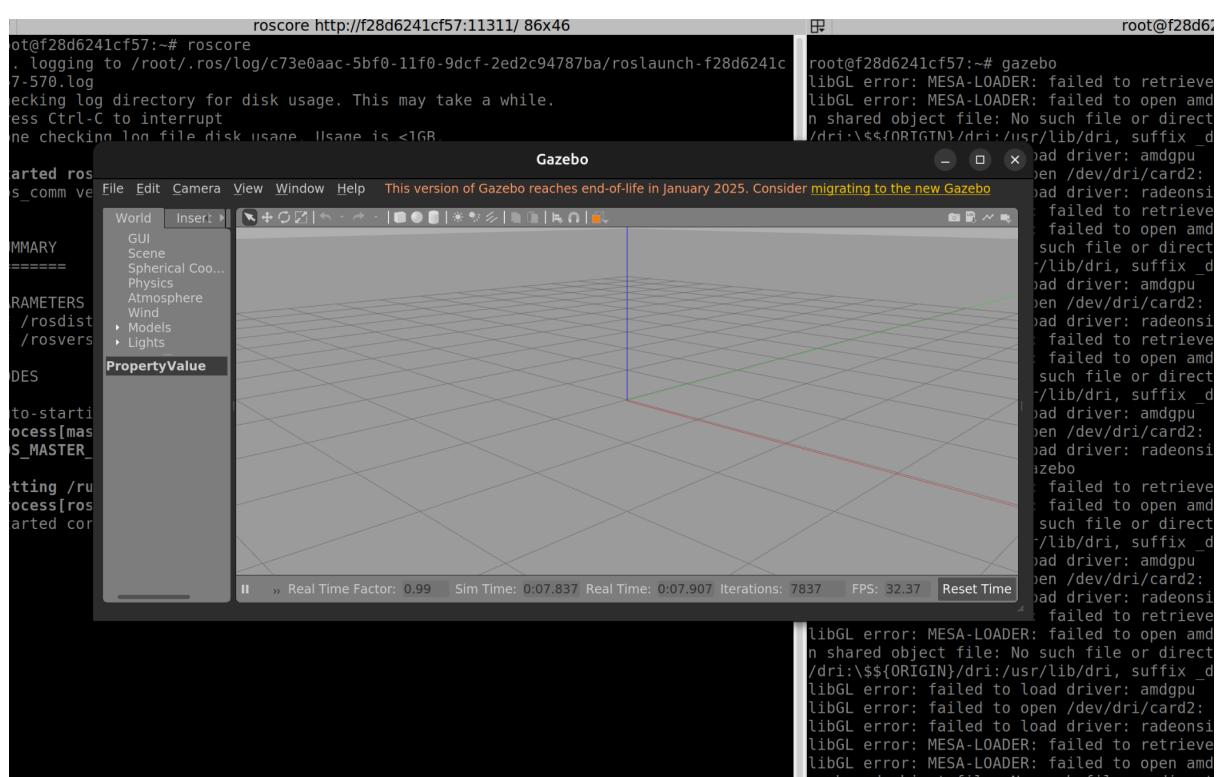
root@f28d6241cf57:~# rosdep update
reading in sources list data from /etc/ros/rosdep/sources.list.d
Warning: running 'rosdep update' as root is not recommended.
  You should run 'sudo rosdep fix-permissions' and invoke 'rosdep update' again without
  sudo.
Hit https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/osx-homebrew.yaml
Hit https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/base.yaml
Hit https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/python.yaml
Hit https://raw.githubusercontent.com/ros/rosdistro/master/rosdep/ruby.yaml
```

For Gazebo Installation Following

https://classic.gazebosim.org/tutorials?tut=install_ubuntu

Gazebo

```
root@f28d6241cf57:~# gazebo
libGL error: MESA-LOADER: failed to retrieve device information
libGL error: MESA-LOADER: failed to open amdgpu: /usr/lib/dri/amdgpu_dri.so: cannot open shared object file: No such file or directory (search paths /usr/lib/x86_64-linux-gnu/dri:\$\${ORIGIN}/dri:/usr/lib/dri, suffix _dri)
libGL error: failed to load driver: amdgpu
libGL error: failed to open /dev/dri/card2: No such file or directory
libGL error: failed to load driver: radeonsi
libGL error: MESA-LOADER: failed to retrieve device information
libGL error: MESA-LOADER: failed to open amdgpu: /usr/lib/dri/amdgpu_dri.so: cannot open shared object file: No such file or directory (search paths /usr/lib/x86_64-linux-gnu/dri:\$\${ORIGIN}/dri:/usr/lib/dri, suffix _dri)
libGL error: failed to load driver: amdgpu
libGL error: failed to open /dev/dri/card2: No such file or directory
libGL error: failed to load driver: radeonsi
libGL error: MESA-LOADER: failed to retrieve device information
libGL error: MESA-LOADER: failed to open amdgpu: /usr/lib/dri/amdgpu_dri.so: cannot open shared object file: No such file or directory (search paths /usr/lib/x86_64-linux-gnu/dri:\$\${ORIGIN}/dri:/usr/lib/dri, suffix _dri)
libGL error: failed to load driver: amdgpu
libGL error: failed to open /dev/dri/card2: No such file or directory
libGL error: failed to load driver: radeonsi
^Croot@f28d6241cf57:~# 
```



At the end Donot Forget to Stop The Container To save Your Work

```
sudo docker container stop ros_container
```

For Running new Session/New Day

```
xhost +local:docker  
  
sudo docker commit ros_container new_image  
  
sudo docker rm ros_container  
  
sudo docker run -it --env DISPLAY=$DISPLAY -v  
/tmp/.X11-unix:/tmp/.X11-unix --name ros_container new_image
```

Can Do Whatever You want to do. All things will work smoothly.