Chapter 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.

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'
```

Set up your keys

```
sudo apt install curl # if you haven't already installed curlcurl -s
https://raw.githubusercontent.com/ros/rosdistro/master/ros.asc | sudo apt-key add -
```

Installation

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

```
sudo apt update
```

Now pick how much of ROS you would like to install.

Desktop-Full Install: (Recommended) : Everything in Desktop plus 2D/3D simulators and 2D/3D perception packages

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

or click here

Desktop Install: Everything in ROS-Base plus tools like rqt and rviz

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

or click here

ROS-Base: (Bare Bones) ROS packaging, build, and communication libraries. No GUI tools.

```
sudo apt install ros-noetic-ros-base
```

or click here

There are even more packages available in ROS. You can always install a specific package directly.

```
sudo apt install ros-noetic-PACKAGE
```

e.g.

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

To find available packages, see ROS Index or use:

```
apt search ros-noetic
```

Environment setup

You must source this script in every bash terminal you use ROS in.

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

It can be convenient to automatically source this script every time a new shell is launched. These commands will do that for you.

Bash

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

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

zsh

```
echo "source /opt/ros/noetic/setup.zsh" >> ~/.zshrcsource ~/.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 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 python3-rosdep python3-rosinstall python3-rosinstall-generator python3-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.

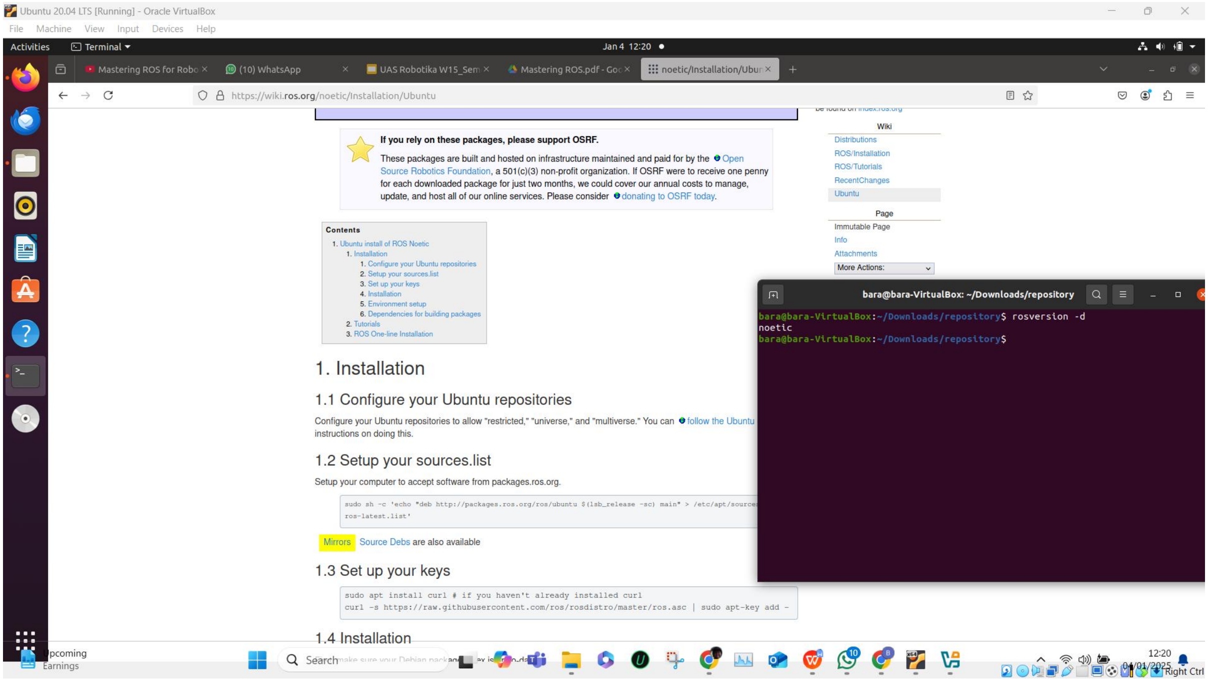
```
sudo apt install python3-rosdep
```

With the following, you can initialize rosdep.

```
sudo rosdep initrosdep update
```

Analisis Chapter 1

ROS (Robot Operating System) merupakan framework revolusioner dalam dunia robotika yang menerapkan konsep modular dan sistem komunikasi yang canggih. Berdasarkan analisis dari proses instalasi dan konsep dasarnya, ROS menggunakan arsitektur node-based yang memungkinkan pengembang memisahkan fungsi-fungsi robot menjadi komponen independen yang dapat berkomunikasi melalui Topics (publish-subscribe) dan Services (request-response). Sistem ini didukung oleh tools development yang komprehensif seperti RViz untuk visualisasi 3D, rqt untuk GUI development, dan Gazebo untuk simulasi, serta menggunakan catkin sebagai build system yang powerful. Proses instalasi ROS sendiri menunjukkan pendekatan yang sistematis dengan penggunaan Ubuntu 20.04 LTS sebagai basis, sistem manajemen dependensi rosdep yang efisien, dan mekanisme keamanan melalui kunci repositori khusus. Keunggulan ROS juga terlihat dari dukungannya terhadap multiple programming languages (terutama Python dan C++), cross-platform compatibility, dan ekosistem yang kuat dengan komunitas aktif yang terus mengembangkan package-package baru, documentation yang lengkap, serta kemampuan integrasi dengan berbagai hardware robotik, menjadikannya pilihan utama dalam pengembangan sistem robotika modern baik untuk aplikasi industri, penelitian, pendidikan, maupun prototyping.



If you rely on these packages, please support OSRF.

These packages are built and hosted on infrastructure maintained and paid for by the Open Source Robotics Foundation, a 501(c)(3) non-profit organization. If OSRF were to receive one penny for each downloaded package for just two months, we could cover our annual costs to manage, update, and host all of our online services. Please consider donating to OSRF today.

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1. Installation

1.1 Configure your Ubuntu repositories

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1.2 Setup your sources.list

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

Mirrors Source Debs are also available

1.3 Set up your keys

```
sudo apt install curl # if you haven't already installed curl
curl -s https://raw.githubusercontent.com/ros/rosdistro/master/ros.asc | sudo apt-key add -
```

1.4 Installation

```
bara@bara-VirtualBox:~/Downloads/repository$ rosversion -d
noetic
bara@bara-VirtualBox:~/Downloads/repository$
```