

تنصيب الروز في الاوبنتو على نظام ابل

Install ROS (Robot Operating System) on ubuntu20.04 in macOS

لتحميل الروز على أي جهاز يتطلب تحميل اوبنتو لينكس ثم نظام الروز بداخله

■ يتطلب تحميل الفيرتشوال بوكس قبل تحميل اوبنتو لينكس لتشغيل نظام التشغيل المراد دون محو النظام الأساسي

To download ROS on any device that requires Ubuntu Linux, then ROS is installed inside it

- It requires downloading the Virtual Box before downloading ubuntu Linux to run the desired operating system without erasing the platform



* في حال التحميل والمعرفة المسبقة للفيرتشوال بوكس وتنزيل الاوبنتو انتقل للخطوة الثالثة

* If you downloaded and got to know the Virtual Box and downloaded Ubuntu, go to step 3

الخطوة الأولى : تحميل الفيرتشوال بوكس باكج بالنسخة المناسبة لنظام الجهاز

First step: Download the Virtual Box Package with the appropriate version for the system of the device

<https://www.virtualbox.org/wiki/Downloads>

VirtualBox
Download VirtualBox

Here you will find links to VirtualBox binaries and its source code.

VirtualBox binaries

By downloading, you agree to the terms and conditions of the respective license.

If you're looking for the latest VirtualBox 6.0 packages, see [VirtualBox 6.0 builds](#). Please also use version 6.0 if you need to run VMs with software virtualization, as this has been discontinued in 6.1. Version 6.0 will remain supported until July 2020.

If you're looking for the latest VirtualBox 5.2 packages, see [VirtualBox 5.2 builds](#). Please also use version 5.2 if you still need support for 32-bit hosts, as this has been discontinued in 6.0. Version 5.2 will remain supported until July 2020.

VirtualBox 6.1.10 platform packages

- ⇒ Windows hosts
- ⇒ OS X hosts
- ⇒ Linux distributions
- ⇒ Solaris hosts

The binaries are released under the terms of the GPL version 2.

See the [changelog](#) for what has changed.

You might want to compare the checksums to verify the integrity of downloaded packages. *The SHA256 checksums should be favored as the MD5 algorithm must be treated as insecure!*

- ⇒ [SHA256 checksums](#), [MD5 checksums](#)

Note: After upgrading VirtualBox it is recommended to upgrade the guest additions as well.

VirtualBox 6.1.10 Oracle VM VirtualBox Extension Pack

- ⇒ [All supported platforms](#)

الخطوة الثانية : تحميل الاوبنتو و تثبيته على الفيرتشوال بوكس

The second step: download Ubuntu and install it on the Virtual Box

<https://ubuntu.com/download/desktop>



سيتم اختصار الخطوات من خلال مقطع يوتيوب قصير لسهولة التنفيذ والتطبيق

Steps will be shortened with a short YouTube clip for easy implementation

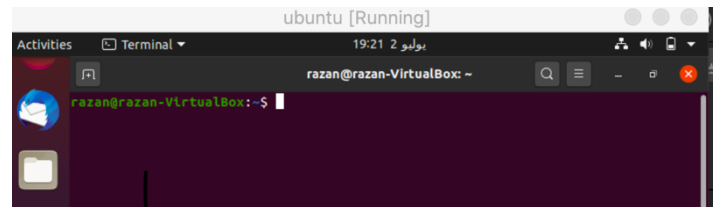
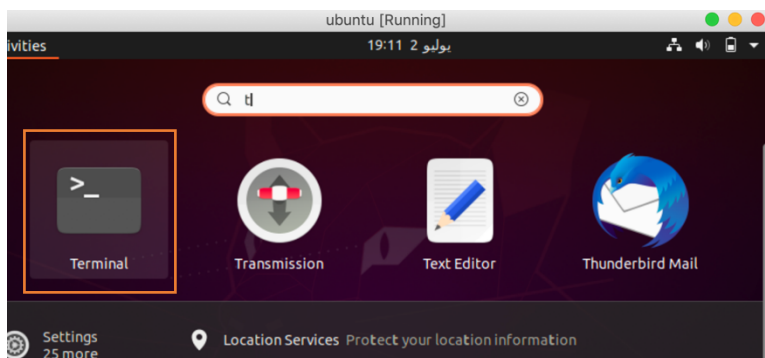
Youtube: <https://www.youtube.com/watch?v=aJcc-xC6krE>

الخطوة الثالثة : تحميل الـ ROS في الاوبنتو

The third Step : Uploading ROS in Ubuntu

1 - بعد تحميل الاوبنتو على الفيرتشوال بوكس نذهب الى التيرمينال الخاص بالاوبنتو

1- After uploading Ubuntu to the Virtual Box, we go to the Ubuntu terminal



*الإصدار المتبع اوبنتو ٢٠٠٤

* Version used Ubuntu 20.04

انسخ الكود المكتوب في المربع الرمادي الى التيرمينال

Copy the code written in the Black box to the terminal

i. Set up ROS Noetic repo for Ubuntu 20.04

```
echo "deb http://packages.ros.org/ros/ubuntu focal main" | sudo tee  
/etc/apt/sources.list.d/ros-focal.list
```

After running the command above, you will see the output: `deb http://packages.ros.org/ros/ubuntu focal
main.`

ii. Add official ROS keyring

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

After running the command above, you will see the output: `Executing: /tmp/apt-key-
gpghome.mdMVphTCAR/gpg.1.sh --keyserver hkp://keyserver.ubuntu.com:80 --recv-
key C1CF6E31E6BADE8868B172B4F42ED6FBAB17C654
gpg: key F42ED6FBAB17C654: public key "Open Robotics info@osrfoundation.org"
imported
gpg: Total number processed: 1
gpg: imported: 1`

then write:

```
curl -sSL  
'http://keyserver.ubuntu.com/pks/lookup?op=get&search=0xC1CF6E31E6BADE8868B172B4F42ED6FBAB17C6  
54' | sudo apt-key add -
```

If you see output “OK”, the key is successfully added.

iii. Update ROS package index

```
sudo apt update
```

You will see output like the following, especially the text in bold:

```
Hit:1 http://security.ubuntu.com/ubuntu focal-security InRelease  
Hit:2 http://dl.google.com/linux/chrome/deb stable InRelease  
Hit:3 http://packages.ros.org/ros/ubuntu focal InRelease  
Hit:4 http://archive.ubuntu.com/ubuntu focal InRelease  
Hit:5 https://download.docker.com/linux/ubuntu bionic InRelease  
Hit:6 http://archive.ubuntu.com/ubuntu focal-updates InRelease  
Hit:7 http://archive.ubuntu.com/ubuntu focal-backports InRelease  
Reading package lists... Done  
Building dependency tree  
Reading state information... Done  
48 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

iv. Install ROS Noetic package

- Install `ros-noetic-desktop-full`

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

Press Y and enter or simply press enter to continue installing.

- Install `ros-noetic-desktop`

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

- Install `ros-noetic-base`

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

- Install `ros-noetic-core`
`sudo apt install ros-noetic-core`

- Set up ROS Noetic environment

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

then write :

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

then write

```
echo "source /opt/ros/noetic/setup.zsh" >> ~/.zshrc
```

- Verify Noetic installation

You can see the current directory of your prompt is changed to where we installed Noetic: `/opt/ros/noetic`.