Tutorial 1 - Installing ROS2 Jazzy in Virtual Machine

Objective

- Guide students through the process of installing ROS 2 Jazzy on a Ubuntu virtual machine.
- Cover downloading and setting up Ubuntu 24.04 in VMware Workstation Pro 17, configuring the virtual machine, installing ROS 2 Jazzy, setting up the environment, and verifying the installation with basic examples like the talker-listener nodes and the turtlesim simulator.
- Provide a foundational setup for learning and developing with ROS 2 in a virtualized environment.

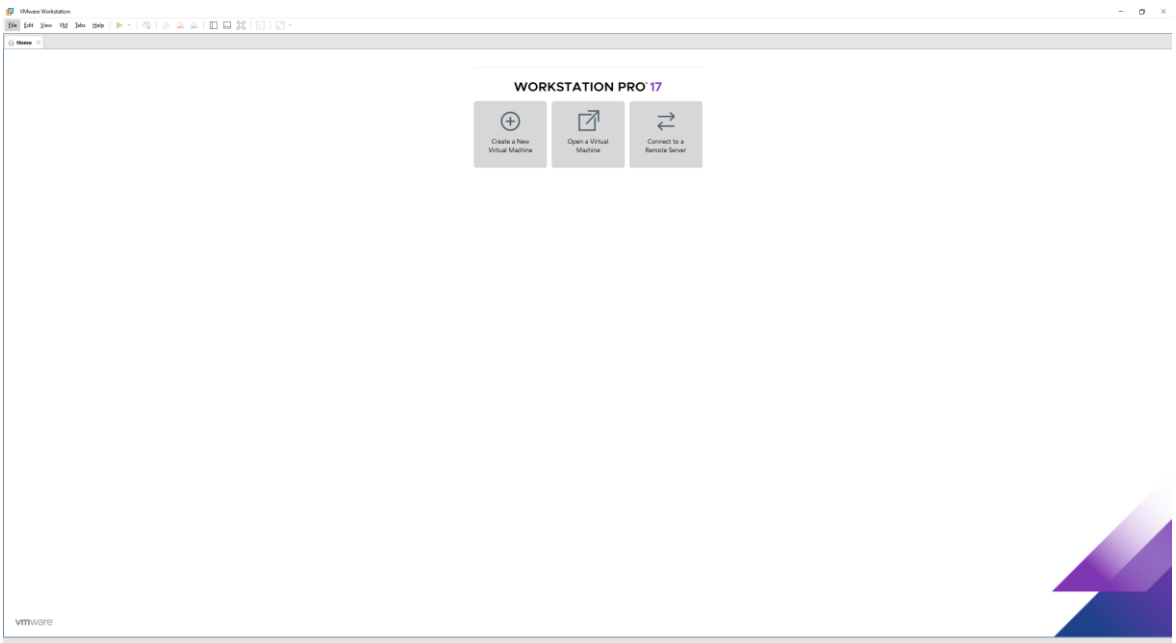
1 Download the Ubuntu ISO file

ROS 2 Jazzy is officially supported on Ubuntu 24.04.

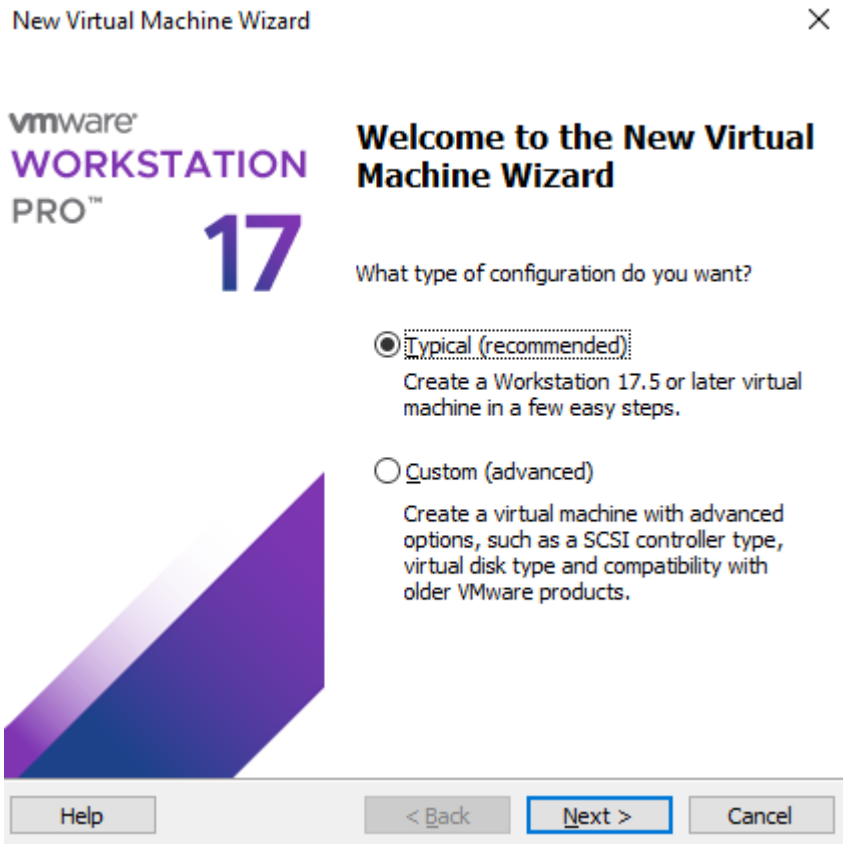
1. Go to the Ubuntu 24.04 LTS download website page at https://releases.ubuntu.com/24.04/.
2. Download the 64-bit desktop image (ubuntu-24.04-desktop-amd64.iso).

2 Create a new Virtual Machine in VMWare Workstation

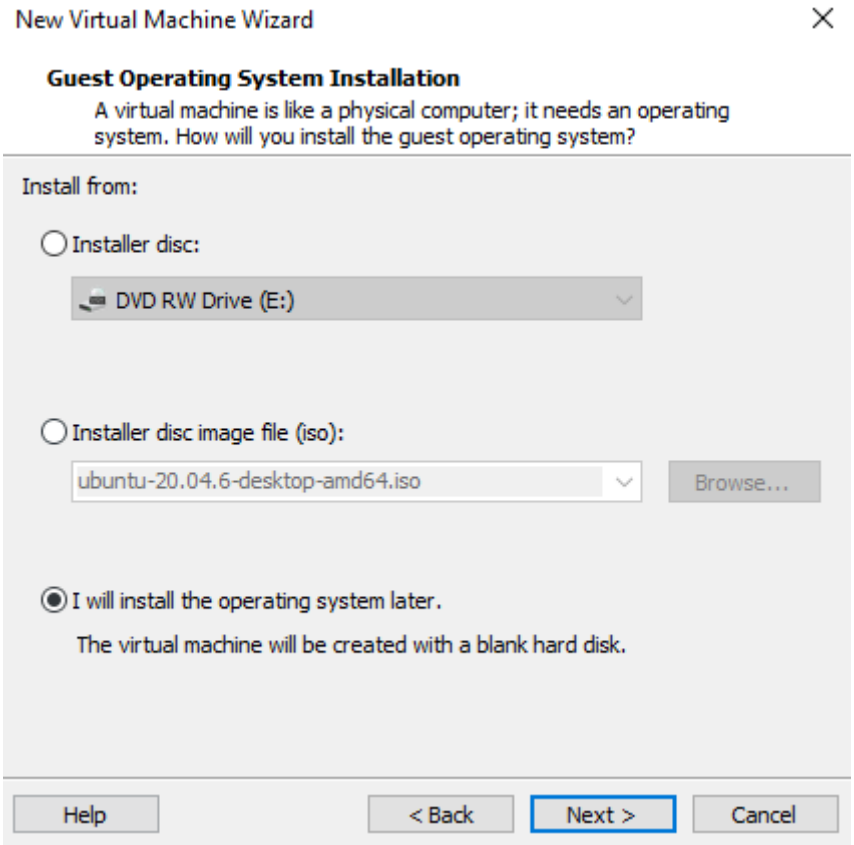
1. Open VMWare Workstation Pro 17 and Click "Create a New Virtual Machine".



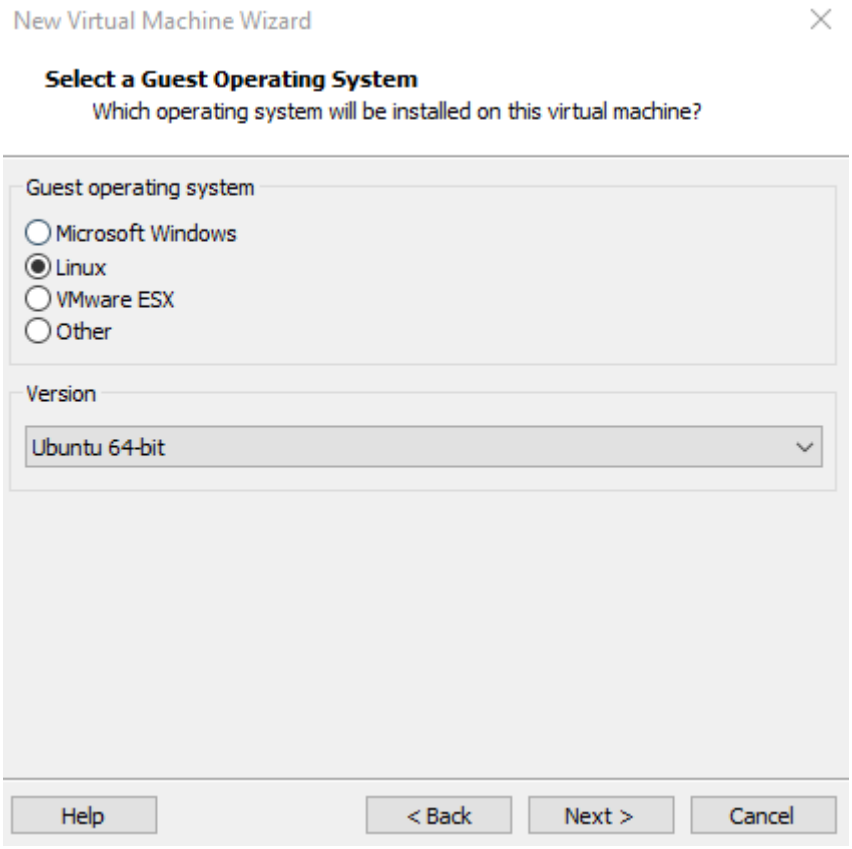
2. Select “Typical” and click “Next”.



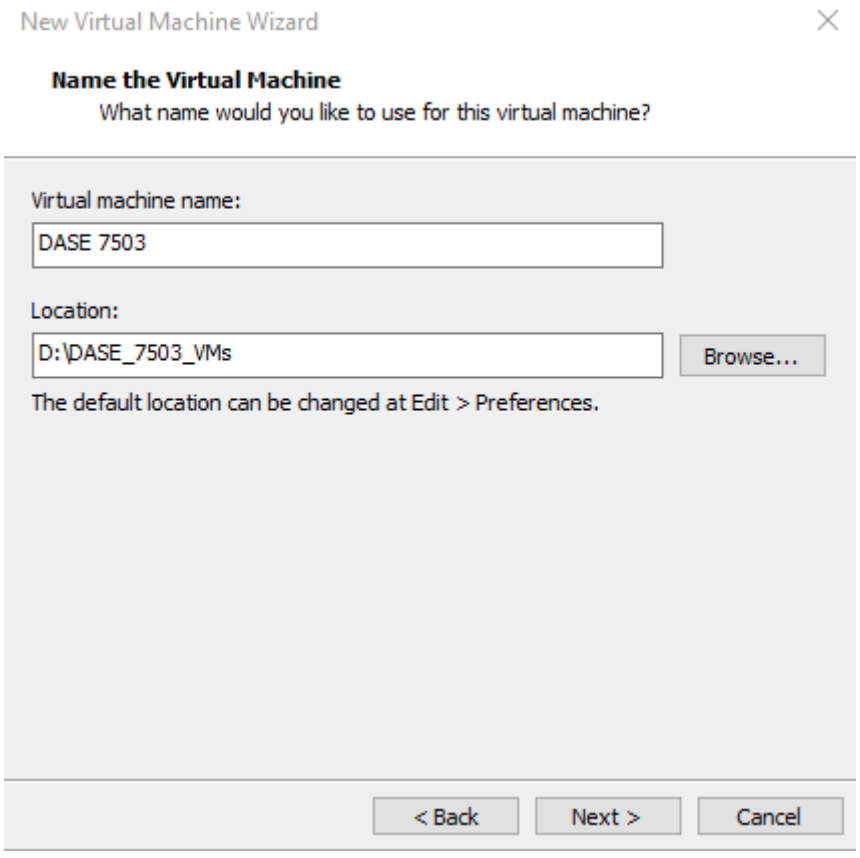
3. Select “I will install the operating system later” and click “Next”.



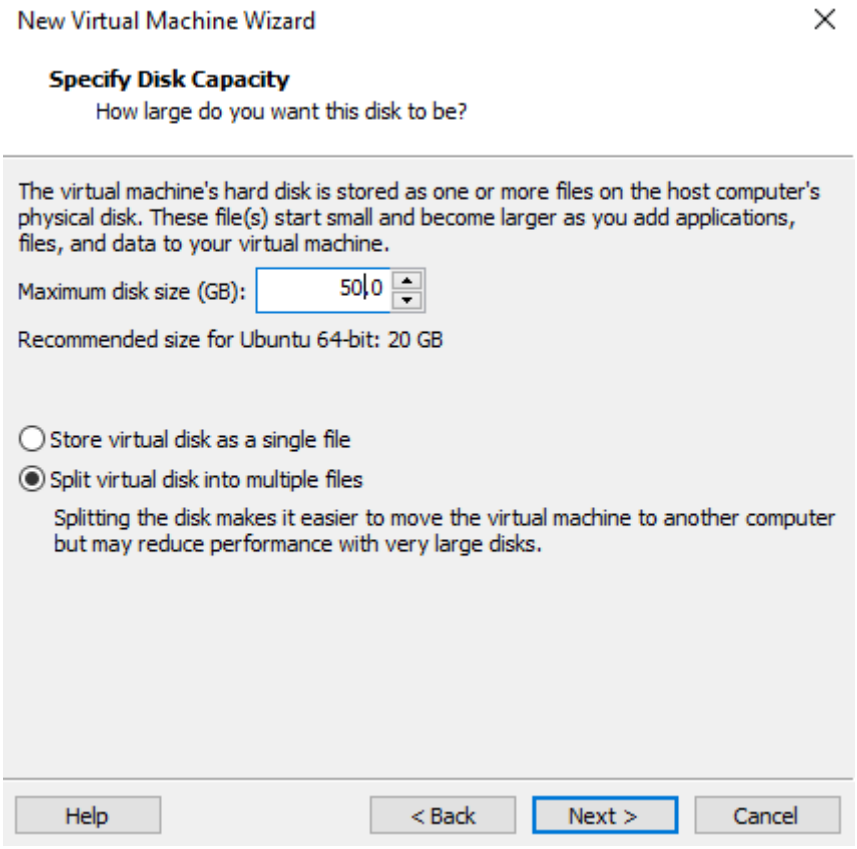
4. Select “Linux” and click “Next”.



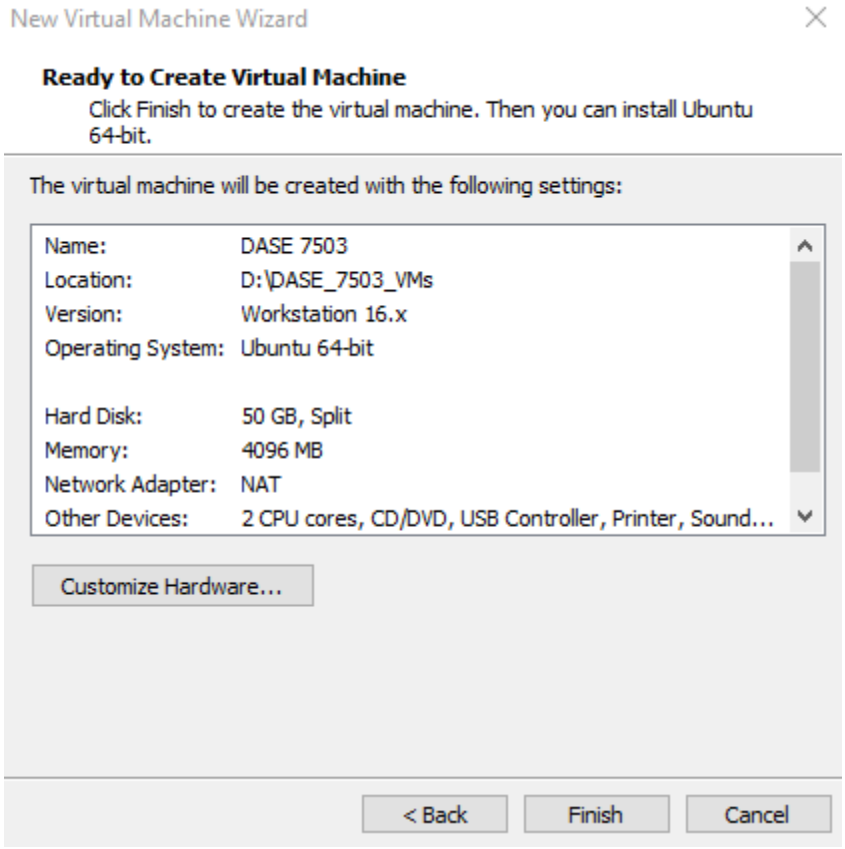
5. Input the name of the virtual machine and the location of the virtual machine, then click “Next”.



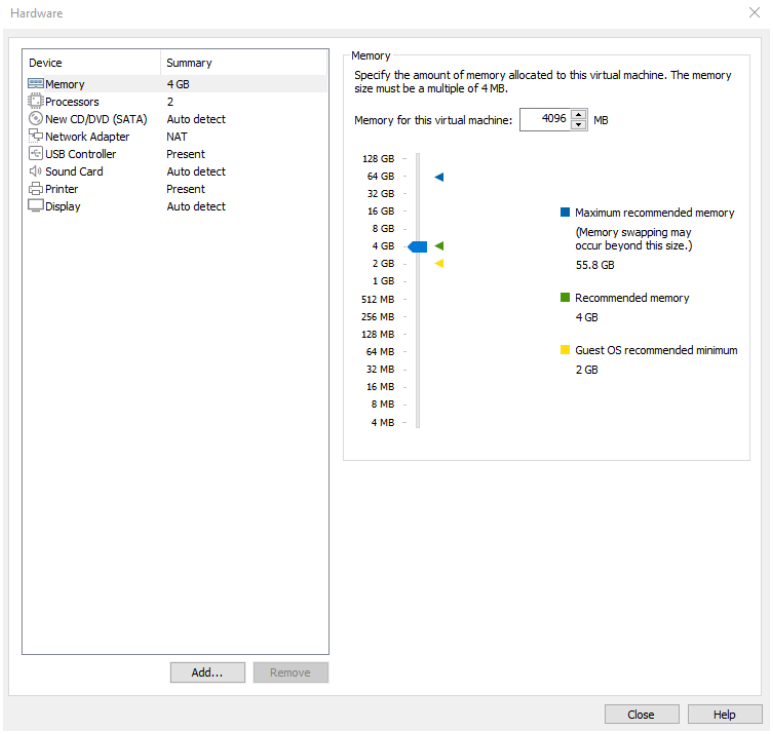
6. Specify the disk size of the virtual machine as **50** GB and click “Next”.



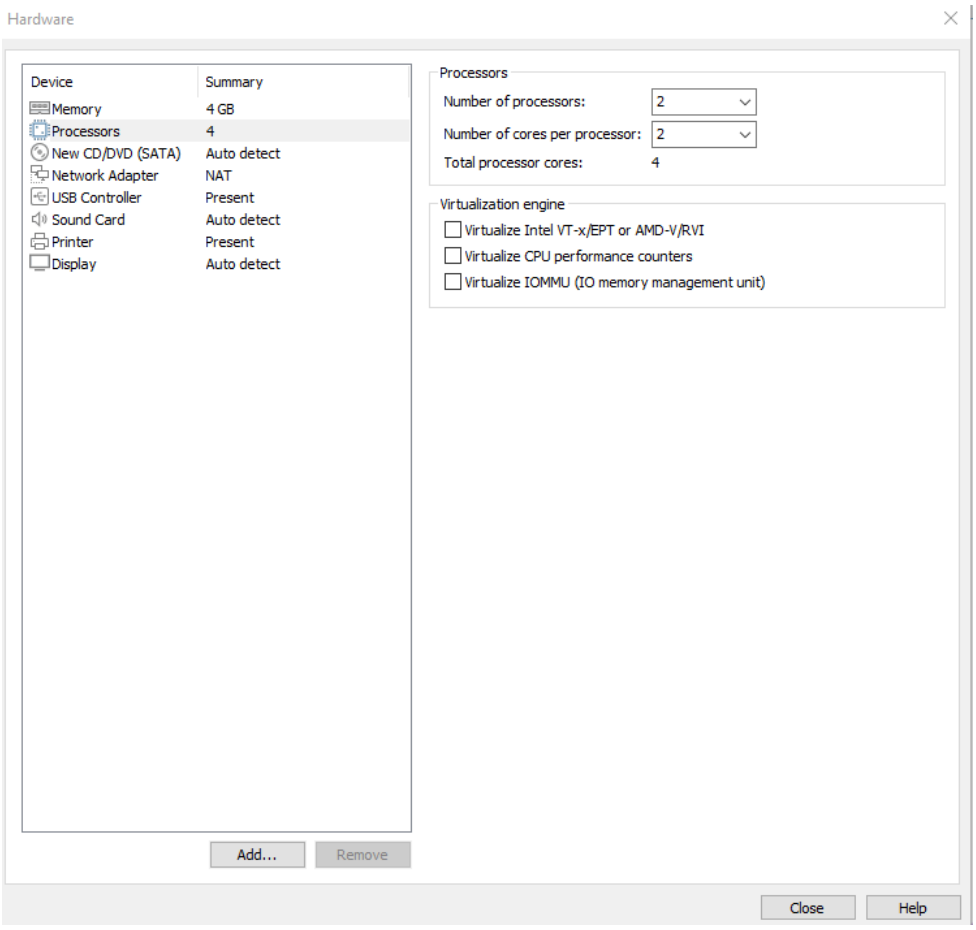
7. Click “Customize Hardware”.



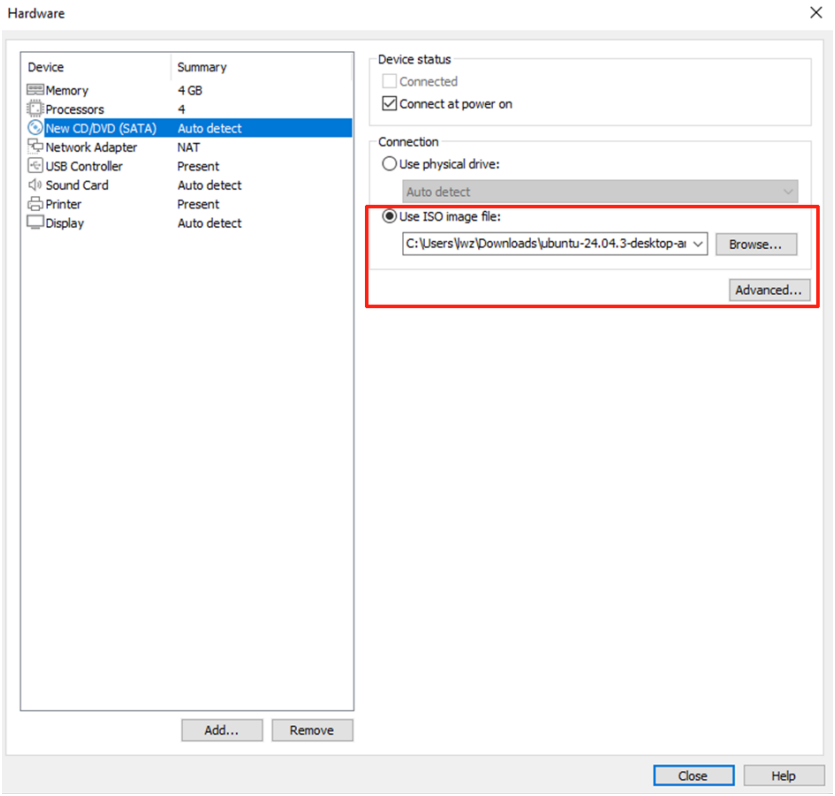
8. Allocate as much memory as the computer can comfortably handle, at least 4096 MB (4GB) of RAM.



9. For processors, allocate 2 processors and 2 cores per processor.



10. In the “New CD/DVD (SATA)”, select “Use ISO Image file” and browse the Ubuntu image file downloaded in the previous step. Then click “close”.



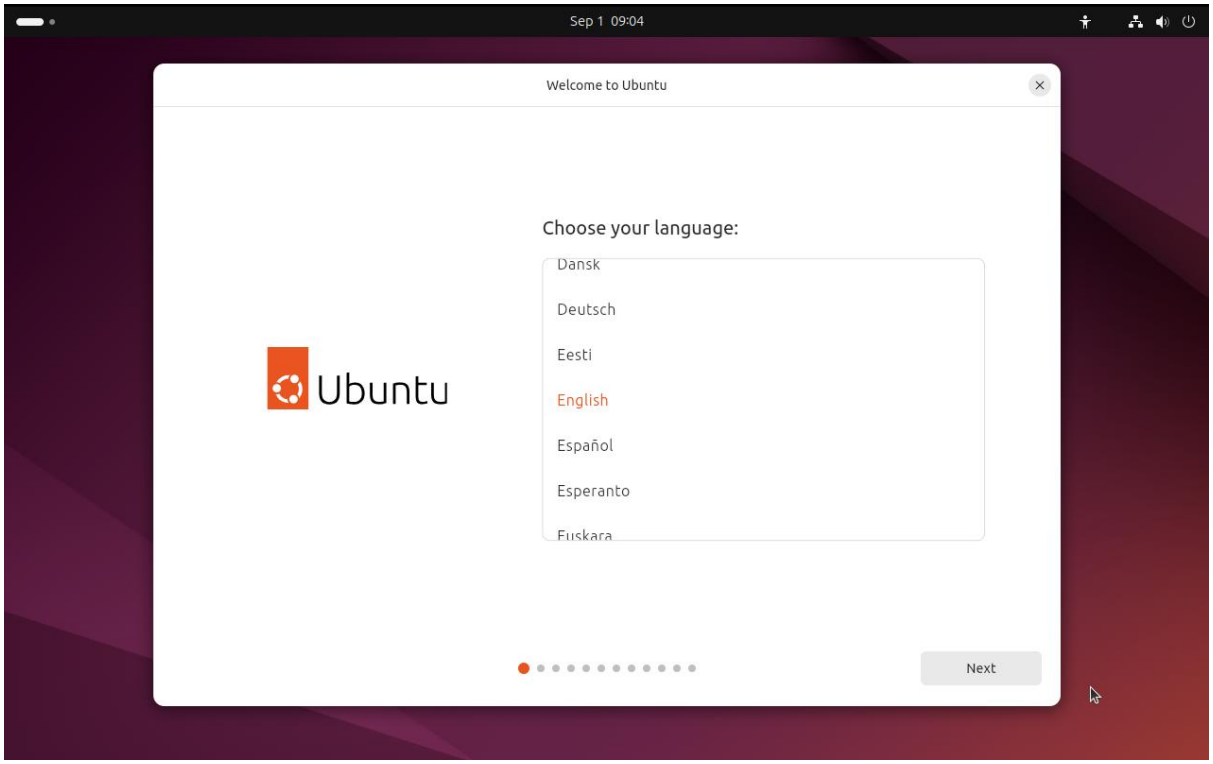
11. Click “Close” and “Finish” to complete the configuration of the virtual machine.

3 Install Ubuntu in the Virtual Machine

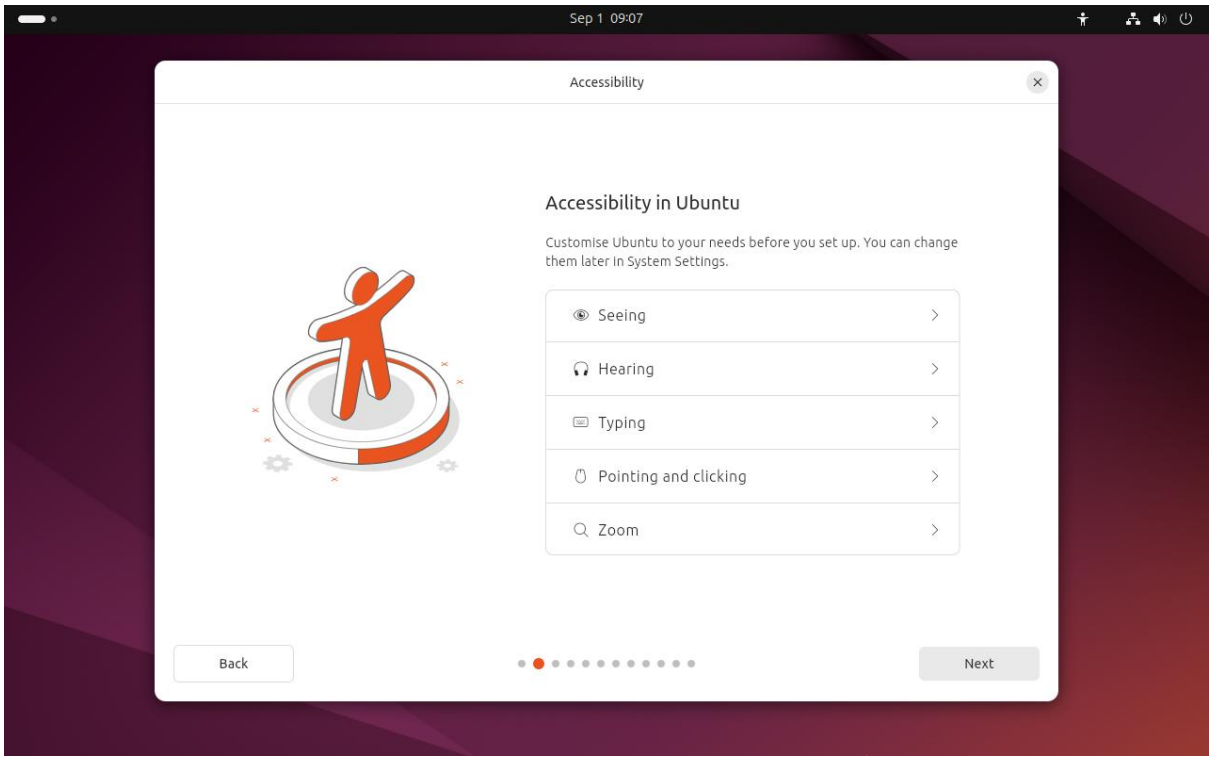
1. Click “Power on this virtual machine”. Press ENTER to continue installing Ubuntu.



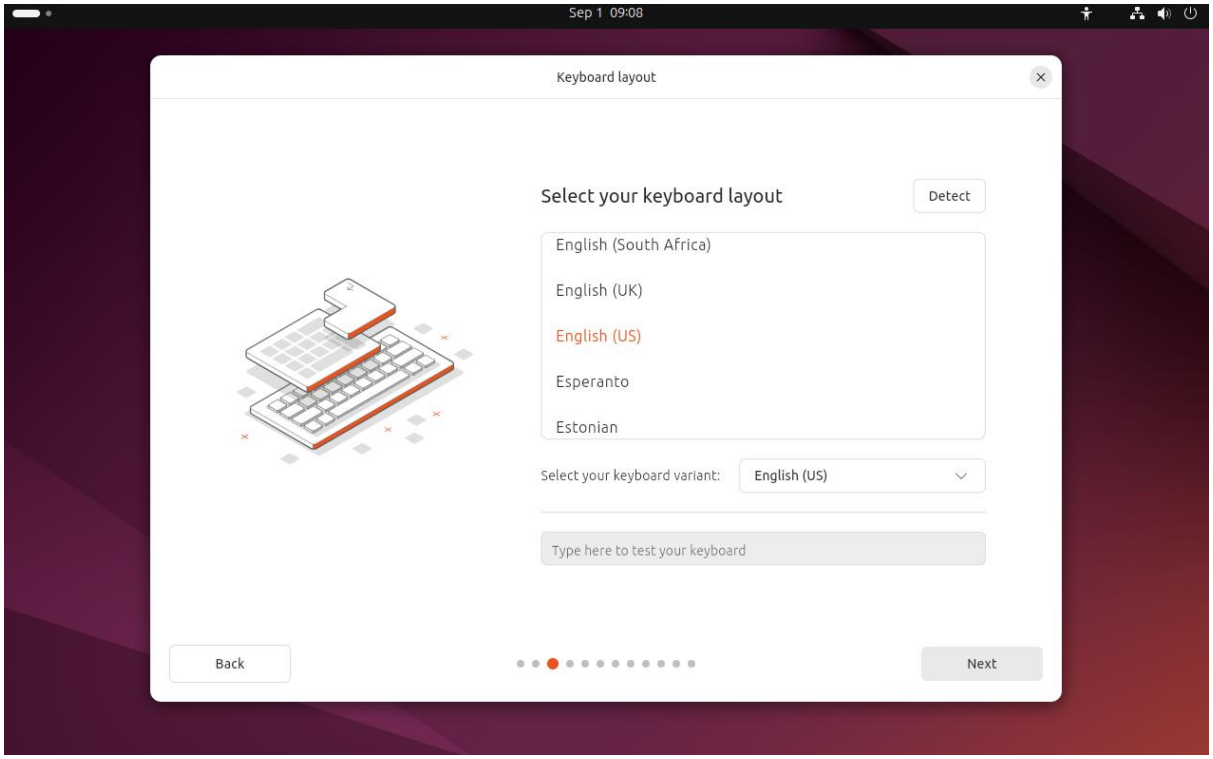
2. Choose “English” as the language and click “Next”.



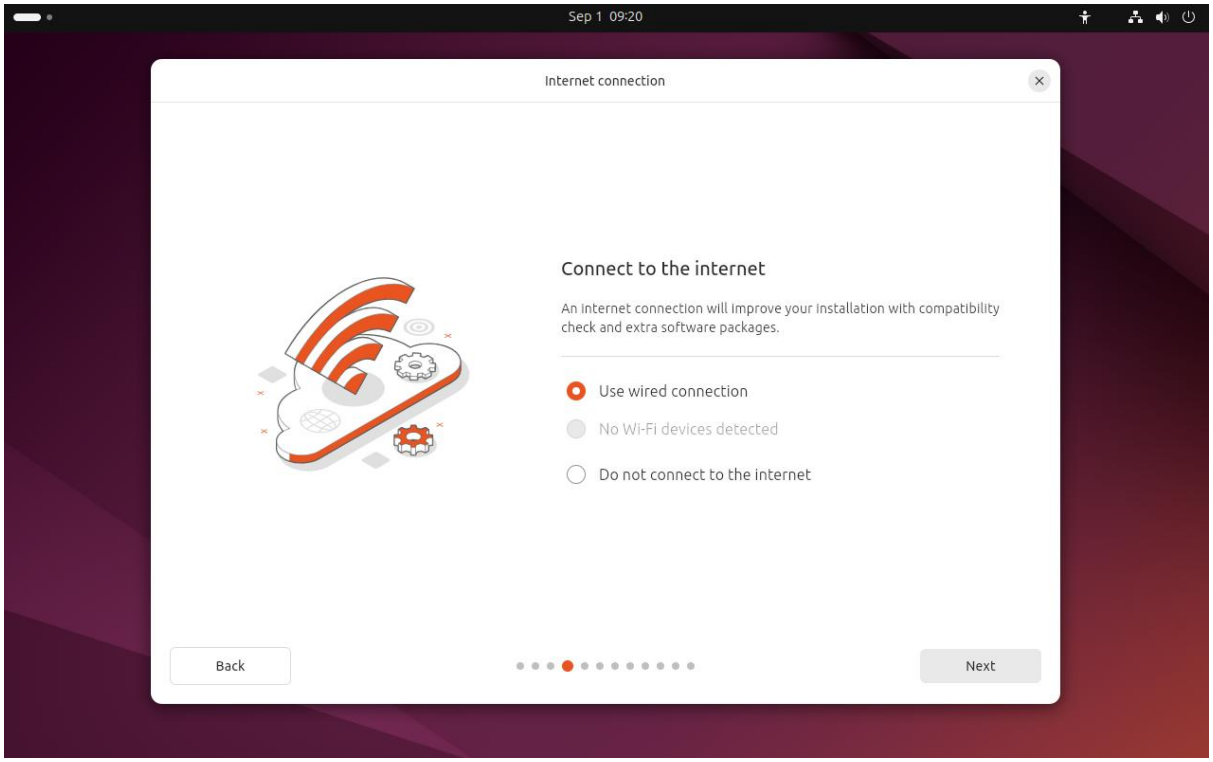
3. Click “Next”.



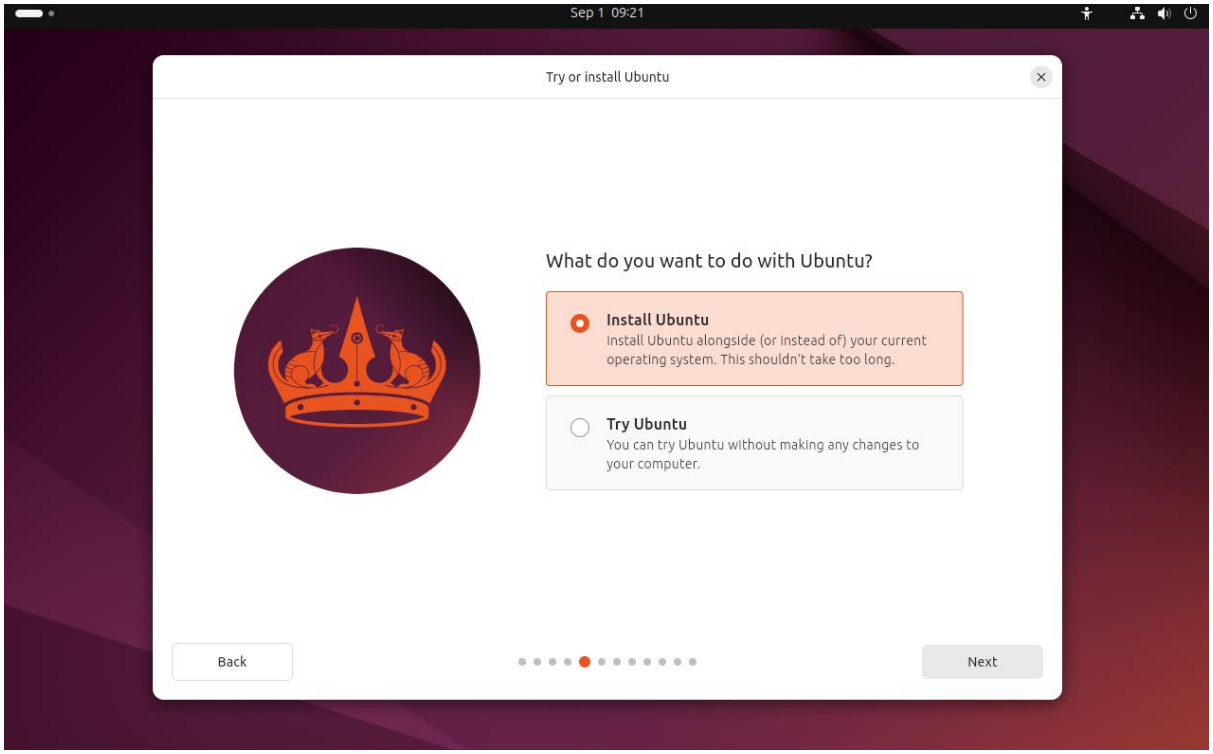
4. Click “Next”.



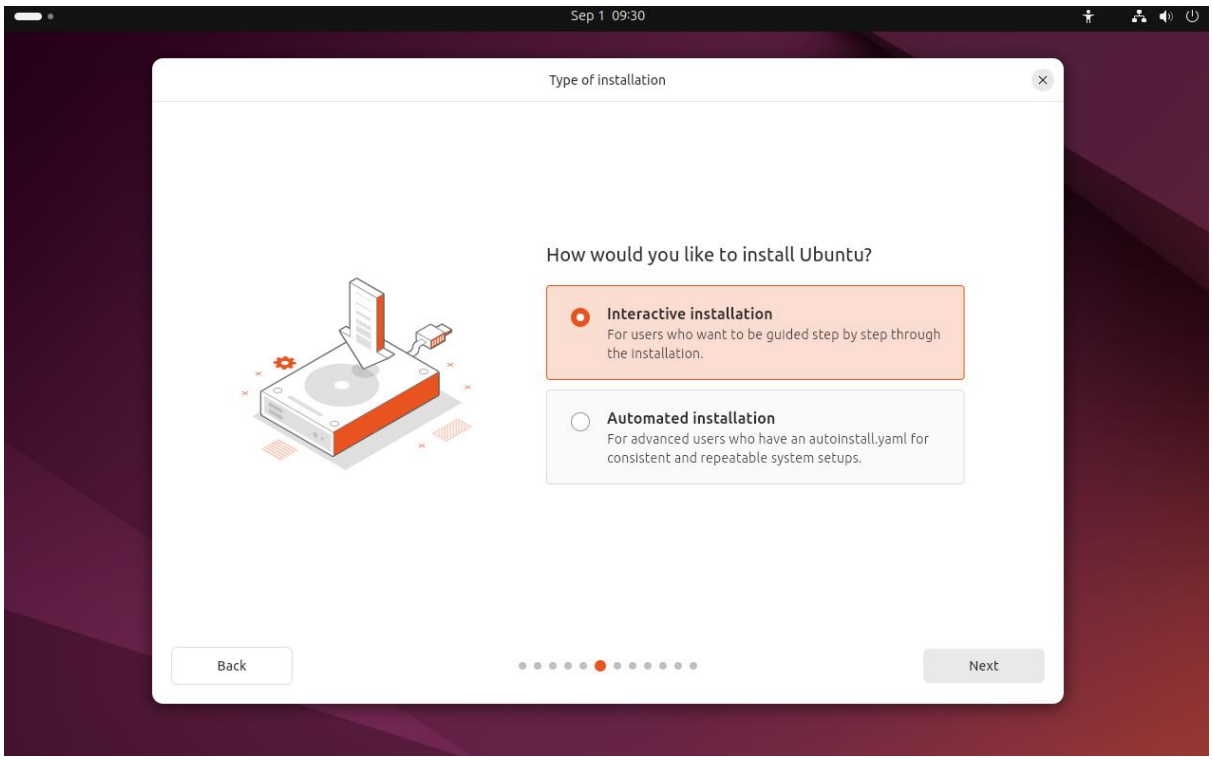
5. Choose “Use wired connection” and click “Next”.



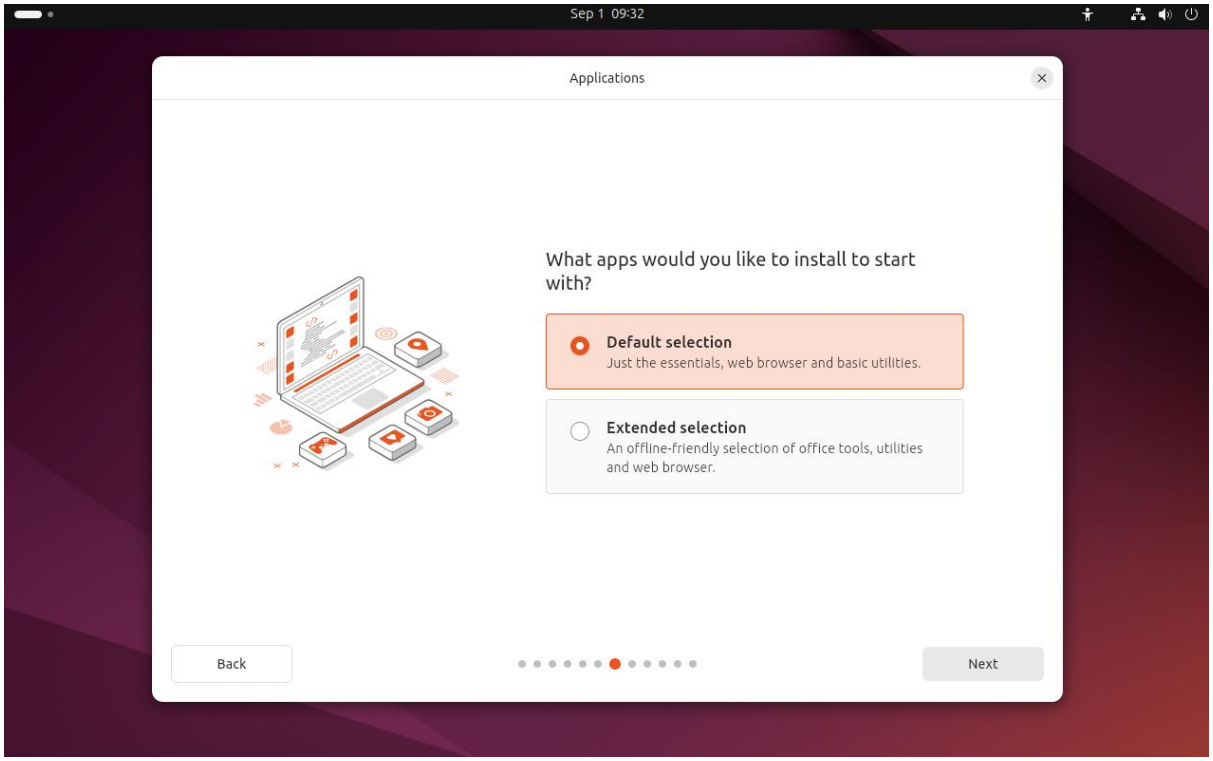
6. Choose “Install Ubuntu” and click next.



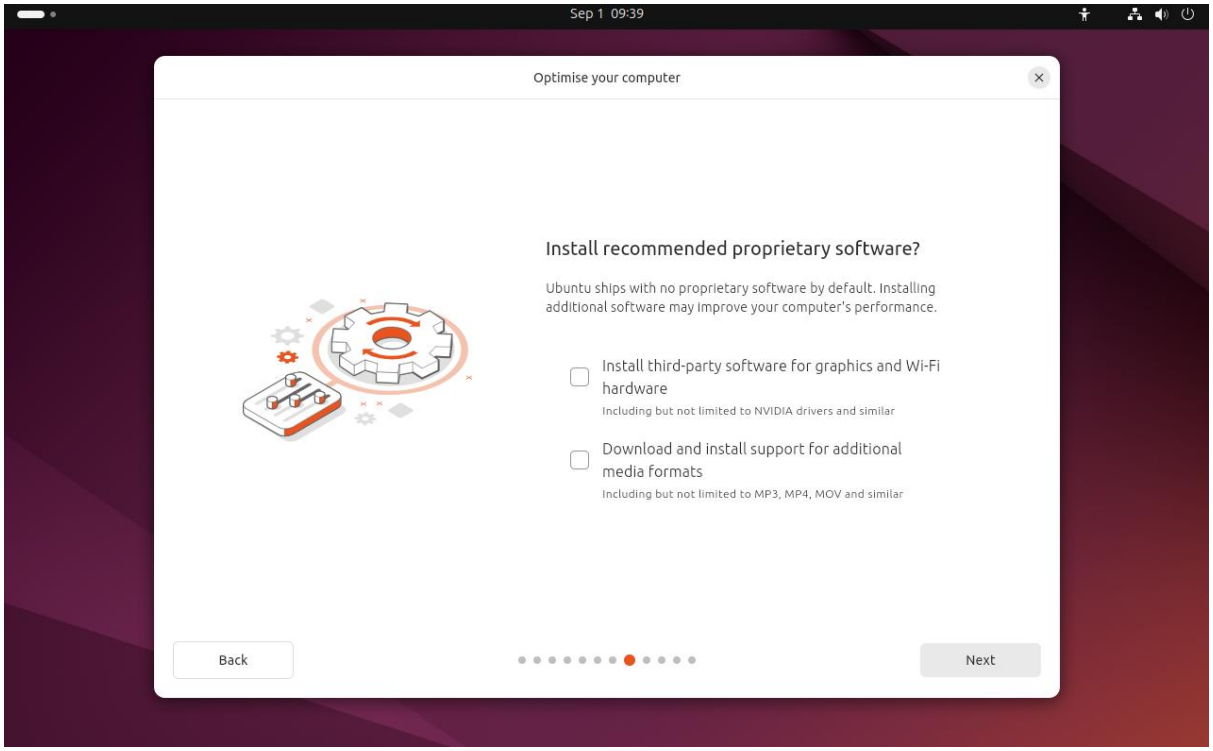
7. Choose “Interactive installation” and click “Next”.



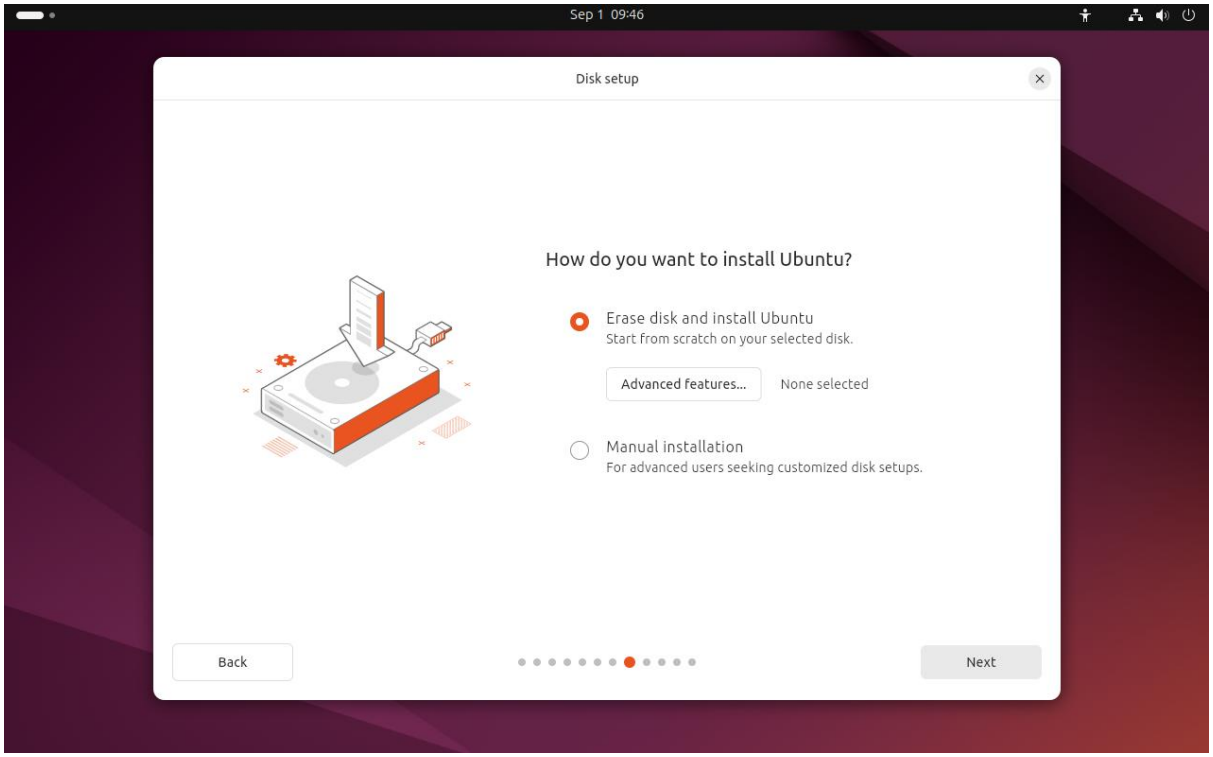
8. Choose “Default selection” and click “Next”.



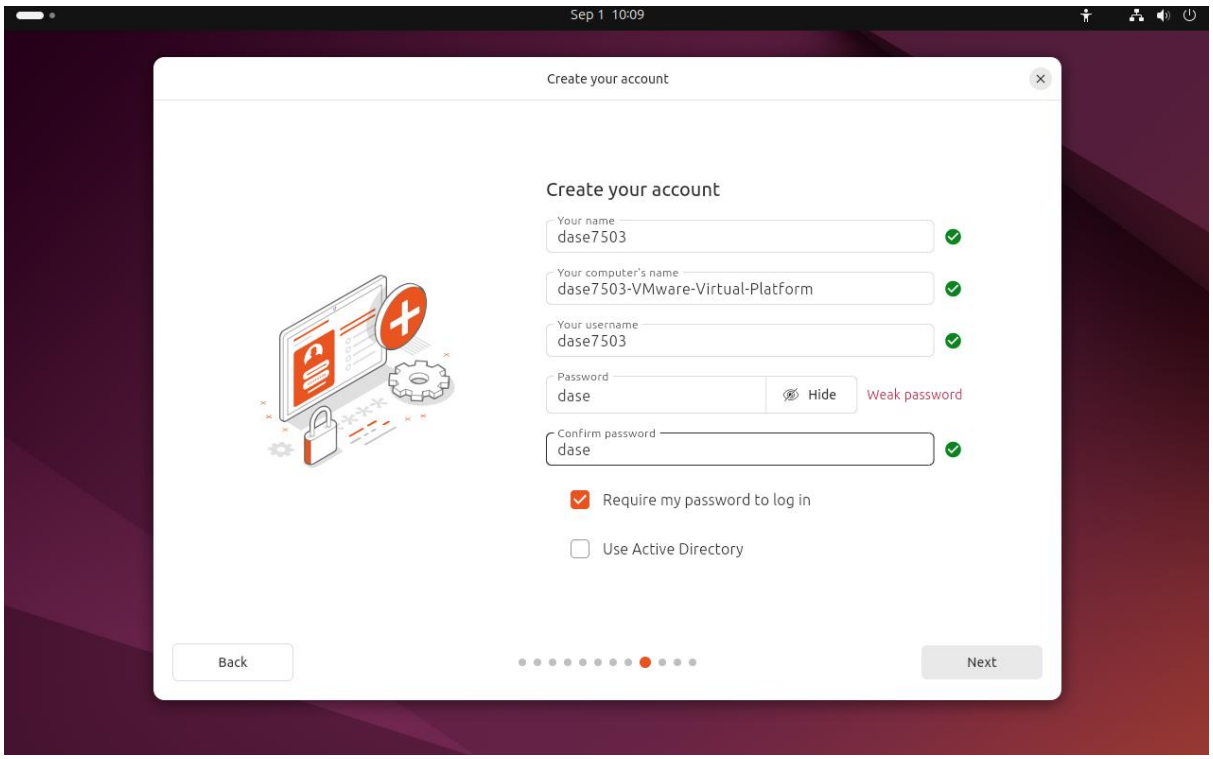
9. Click “Next”.



10. Choose “Erase disk and install Ubuntu” and click “Next”.



11. Input the information, including the name, computer name, username, and password. Then, click “Next”.



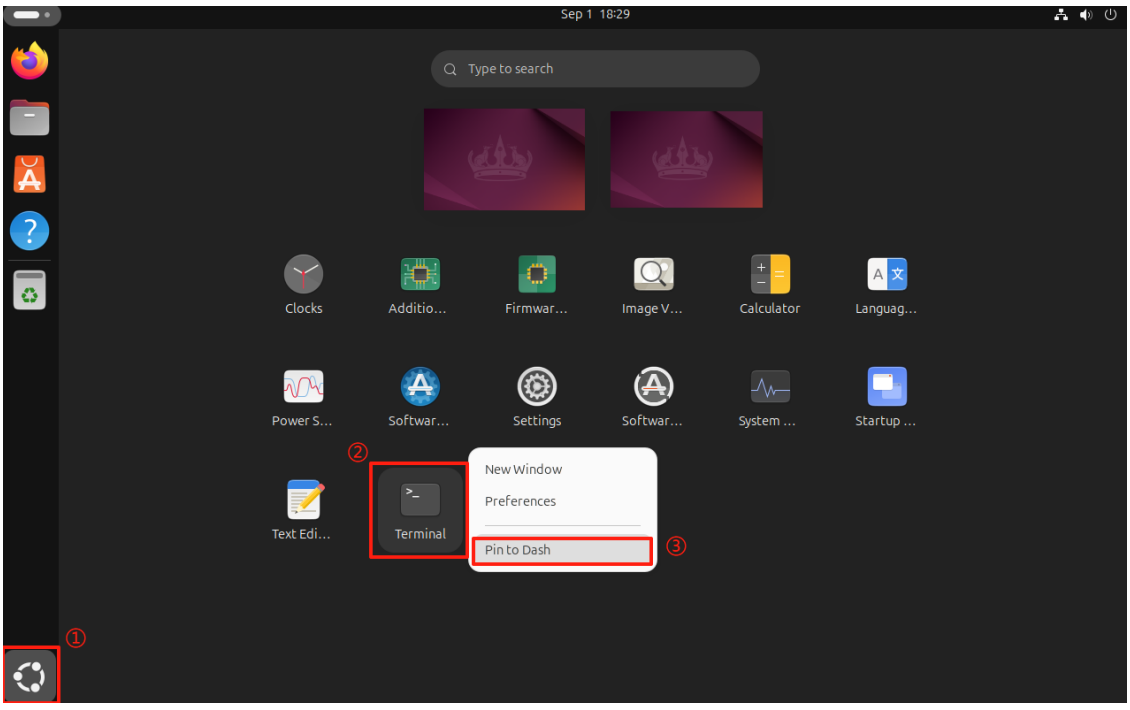
12. Click “Next”.



13. Click “Install”. Then wait for the installation to be completed. Click “Restart now”.

4 Install ROS2 Jazzy in Ubuntu

1. To open a terminal more conveniently, click the menu item in the bottom left corner, find the “Terminal” icon and right-click the icon to select “Pin to dash”. After that, a terminal can be opened in the dashboard list on the left-hand side. Also, a terminal can be opened by “Ctrl + Shift + T”.



2. Set locale. (The "$" symbol at the beginning of a line indicates the start of a new command. The "$" is not a part of the command and should not be entered.)

```
$ sudo apt update && sudo apt install locales
$ sudo locale-gen en_US en_US.UTF-8
$ sudo update-locale LC_ALL=en_US.UTF-8 LANG=en_US.UTF-8
$ export LANG=en_US.UTF-8
```

3. Enable required repositories and VMware tools.

```
$ sudo apt install software-properties-common -y
$ sudo add-apt-repository universe
$ sudo apt install open-vm-tools open-vm-tools-desktop -y
```

4. Reboot the Ubuntu.

5. Sign in to Ubuntu and then open a "Terminal".

6. Install ros2-apt-source package

```
$ sudo apt update && sudo apt install curl -y
$ export ROS_APT_SOURCE_VERSION=$(curl -s https://api.github.com/repos/ros-infrastructure/ros-apt-source/releases/latest | grep -F "tag_name" | awk -F\" '{print $4}')

$ curl -L -o /tmp/ros2-apt-source.deb "https://github.com/ros-infrastructure/ros-apt-source/releases/download/${ROS_APT_SOURCE_VERSION}/ros2-apt-source_${ROS_APT_SOURCE_VERSION}.$(. /etc/os-release && echo $VERSION_CODENAME)_all.deb"
# If using Ubuntu derivates use $UBUNTU_CODENAME

$ sudo apt install /tmp/ros2-apt-source.deb
```

7. Install development tools

```
$ sudo apt update && sudo apt install ros-dev-tools -y
```

8. Install ROS 2 and relative demo packeges

```
$ sudo apt update
$ sudo apt upgrade
$ sudo apt install ros-jazzy-desktop ros-jazzy-ros-base ros-jazzy-demo-nodes-cpp ros-jazzy-demo-nodes-py -y
```

9. Setup Environment

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

Without the command above, you would have to enter the command below every time you

open a terminal. The command above adds the command to your shell startup script.

```
$ source /opt/ros/jazzy/setup.bash
```

10. Try some examples

Open another terminal and run talker

```
$ source /opt/ros/jazzy/setup.bash
$ ros2 run demo_nodes_cpp talker
```

Open another terminal again and run listener

```
$ source /opt/ros/jazzy/setup.bash
$ ros2 run demo_nodes_py listener
```

You should see the talker saying that it's Publishing messages and the listener saying I heard those messages. This verifies that both the C++ and Python APIs are working properly.

6 Install and Try Turtlesim

Turtlesim is a lightweight simulator for learning ROS 2. It illustrates what ROS 2 does at the most basic level to give you an idea of what you will do with a real robot or simulation later.

1. Install Turtlesim

```
$ sudo apt install ros-jazzy-turtlesim -y
```

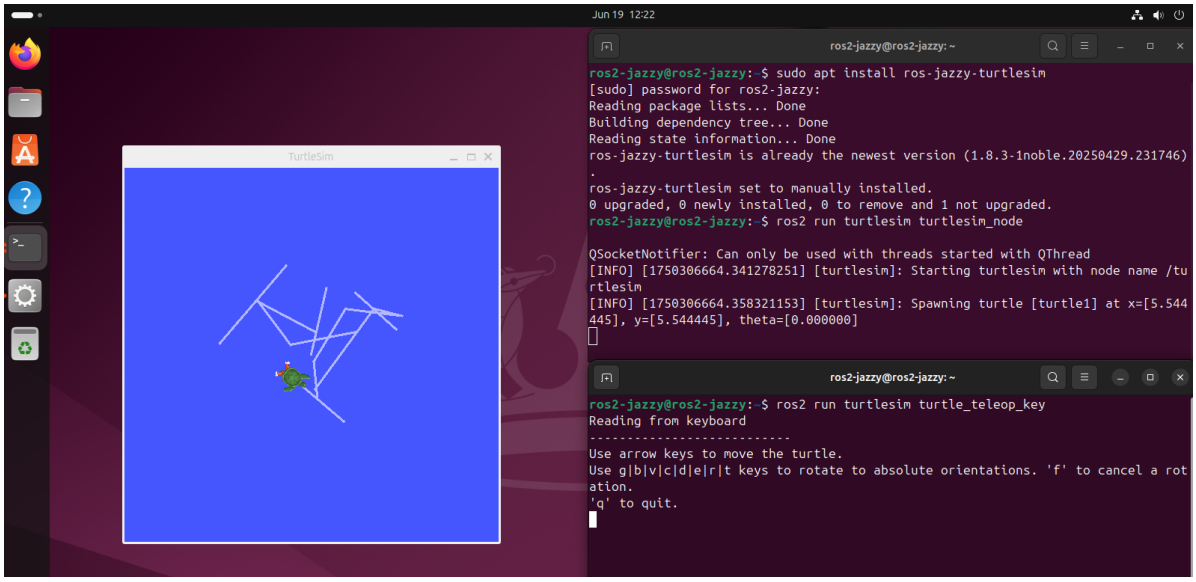
2. Start Turtlesim

```
$ ros2 run turtlesim turtlesim_node
```

3. Use Turtlesim

Open a new terminal and enter the command below. Then you can use the keyboard to control the turtle.

```
$ ros2 run turtlesim turtle_teleop_key
```


Jun 19 12:22
TurtleSim
ros2-jazzy@ros2-jazzy: ~
ros2-jazzy@ros2-jazzy:~$ sudo apt install ros-jazzy-turtlesim
[sudo] password for ros2-jazzy:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
ros-jazzy-turtlesim is already the newest version (1.8.3-1noble.20250429.231746)
.
ros-jazzy-turtlesim set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 1 not upgraded.
ros2-jazzy@ros2-jazzy:~$ ros2 run turtlesim turtlesim_node
QSocketNotifier: Can only be used with threads started with QThread
[INFO] [1750306664.341278251] [turtlesim]: Starting turtlesim with node name /turtlesim
[INFO] [1750306664.358321153] [turtlesim]: Spawning turtle [turtle1] at x=[5.544445], y=[5.544445], theta=[0.000000]
ros2-jazzy@ros2-jazzy: ~
ros2-jazzy@ros2-jazzy:~$ ros2 run turtlesim turtle_teleop_key
Reading from keyboard

Use arrow keys to move the turtle.
Use g|b|v|c|d|e|r|t keys to rotate to absolute orientations. 'f' to cancel a rotation.
'q' to quit.