Complete Guide to Installing Ubuntu on Windows and Mac Systems

CMPUT 503 Teaching Assistant Team

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Contents

Important Disclaimer

If you encounter any difficulties or confusion during the installation process, please do not hesitate to contact one of the TAs for this course. Don't overcook anything as it can cook your PC! We prefer our computers well-functioning, not well-done.
The installation process takes approximately one hour to complete for both Windows and Mac users. We recommend setting aside this time before the semester begins as this will ensure you are fully prepared when classes start and can avoid any last-minute installation issues.

Cost Information

The cost of running Ubuntu varies depending on your operating system. For **Windows users**, the process is completely **FREE** as it involves dual-booting Ubuntu alongside your existing Windows installation. However, **Mac** users will need to use Parallels Desktop, which requires a **PAID** license.
For Mac users, Parallels Desktop is available at a discounted rate of roughly $63 for students (use your UofA ID). Before making this purchase, **we strongly recommend taking advantage of the 14-day free trial period**. This trial allows you to install Ubuntu and test ROS functionality to ensure everything works properly with your setup. Once you confirm that everything runs smoothly, you can proceed with the purchase.
Please note that Parallels Desktop only offers annual subscriptions; there is no monthly payment option available. This means you'll be making a one-year commitment when purchasing the software. It's important to **remember to cancel your subscription before it auto-renews** after the year is complete to avoid any unnecessary charges.
If the cost of Parallels Desktop is a concern, consider partnering with a Windows or native linux user for your coursework, as they have free access to Ubuntu through dual-booting. This can be a practical solution while still allowing you to complete all required coursework.

1 Introduction

This comprehensive guide provides detailed instructions for installing Ubuntu on both Windows and Mac systems. For Windows users, we cover the dual-booting method, while Mac users can follow the Parallels Desktop virtualization approach.

TL;DR

If you don't feel like reading the entire document, here's a github documentation for you: Dual booting Instructions

Note

Choose the appropriate section based on your operating system:
> Windows users: Follow Part I (Dual Boot Installation)
> Mac users: Follow Part II (Parallels Installation)

Side Note

The images that you will see in this document may vary a bit from the one you will actually see during installation as these are from older versions of Ubuntu but the process remains the same.

Part I
Dual Boot Installation for Windows

2 Prerequisites

2.1 System Requirements

Before beginning the installation process, ensure your system meets the following requirements:

- Minimum 60GB of free disk space
- Working USB port or DVD drive
- Internet connection for downloading required files
- Administrative access to your Windows system

2.2 Required Materials

- USB drive (minimum 8GB) or blank DVD
- Ubuntu 22.04 ISO image
- Rufus or similar USB creation tool

3 Pre-Installation Steps

3.1 Data Backup

Warning

Before proceeding with any system modifications, create a complete backup of all important data. While dual-booting is generally safe, unexpected issues can occur during partition manipulation.

3.2 Downloading Required Software

1. Download Ubuntu 22.04 ISO:
   - Visit: `https://releases.ubuntu.com/jammy/`
   - Select the AMD64 desktop image
2. Download Rufus:
   - Visit: `https://rufus.ie`
   - Download the latest version

4 Windows Preparation

4.1 Disabling Fast Startup

Fast Startup must be disabled to prevent potential conflicts:

1. Open Windows Control Panel

2. Navigate to Power Options
3. Click “Choose what the power buttons do”
4. Click “Change settings that are currently unavailable”
5. Uncheck “Turn on fast startup”
6. Save changes

4.2 BIOS Configuration

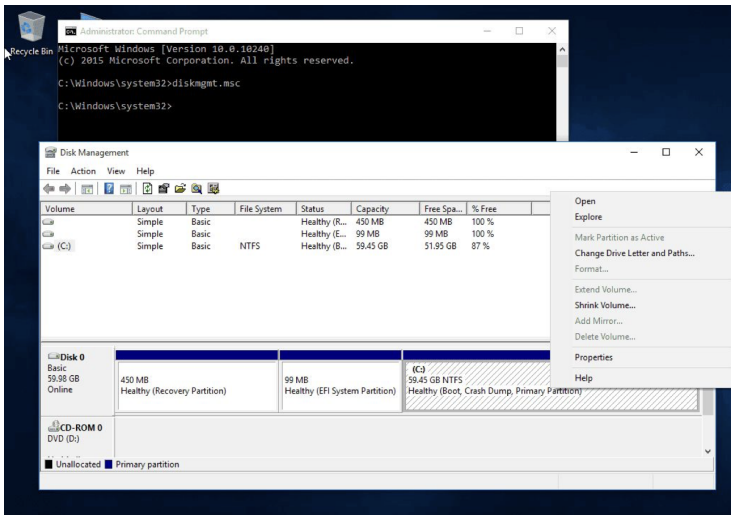
1. Access BIOS/UEFI settings:
   - Restart computer
   - Press appropriate key during startup (typically F2, F12, F10, or ESC)
2. Locate and disable Secure Boot
3. Save changes and exit

4.3 Disk Partitioning

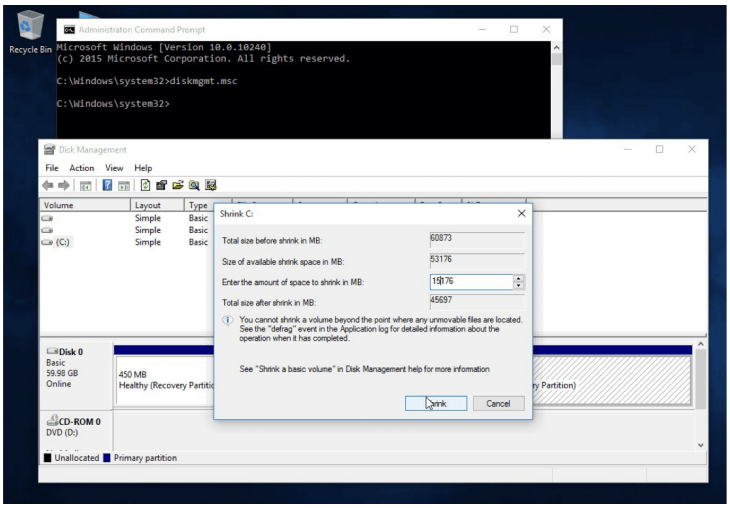
Warning

Incorrect partition manipulation can result in data loss. Follow these steps exactly as described.

1. Open Disk Management:
   - Right-click Start Menu
   - Search for “Disk Management” or run `diskmgmt.msc`

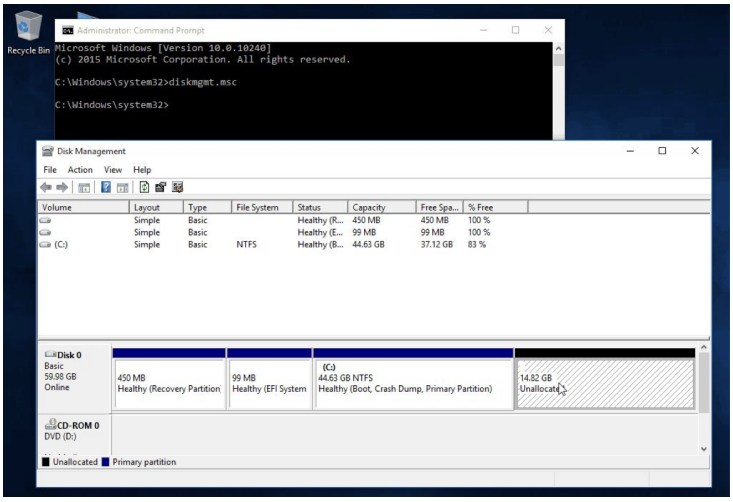


2. Create space for Ubuntu:
   - Right-click C: drive
   - Select “Shrink Volume”
   - Enter minimum 60000 MB (60GB)
   - Confirm shrink operation



Note: I have just added some random numbers in the above image but ensure that you allocate a minimum of 60GB free space.

3. Leave the unallocated space as it is.



5 Ubuntu Installation Process

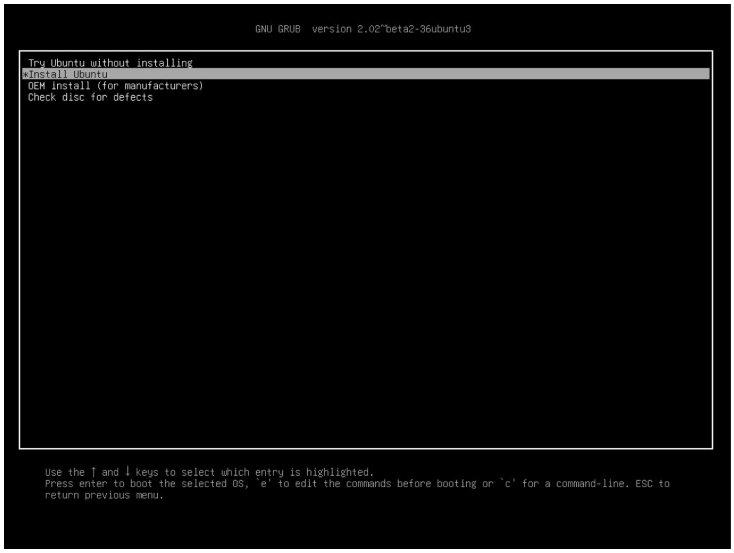
5.1 Creating Bootable USB

1. Launch Rufus
2. Insert USB drive
3. Configure Rufus:
   - Select USB drive
   - Choose downloaded Ubuntu ISO
   - Keep default settings
   - Click START

Follow this guide if needed.

5.2 Booting Ubuntu Installer

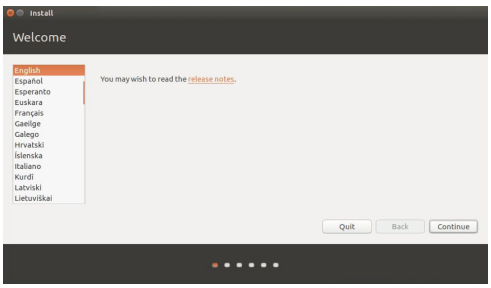
1. Insert bootable USB
2. Restart computer
3. Enter boot menu (F2, F12, F10 or manufacturer-specific key)
4. Select USB drive
5. Choose “Install Ubuntu” from boot menu



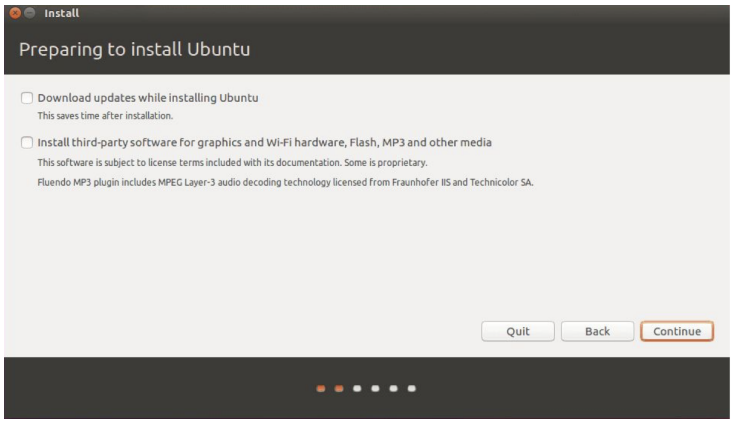
5.3 Installation Configuration

Note: This is the most important part so do it carefully!

1. Language Selection:
   - Choose preferred language
   - Click Continue



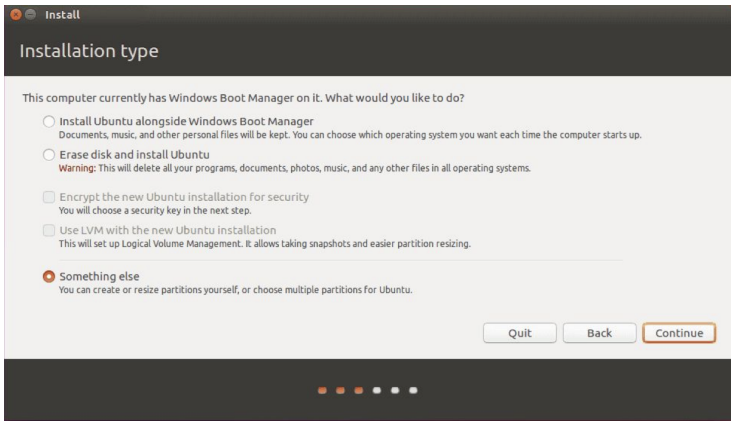
2. Installation Type:
   - Select “Normal Installation”
   - Enable “Download updates while installing” [Optional but Recommended]
   - Enable “Install third-party software” [Optional but Recommended]



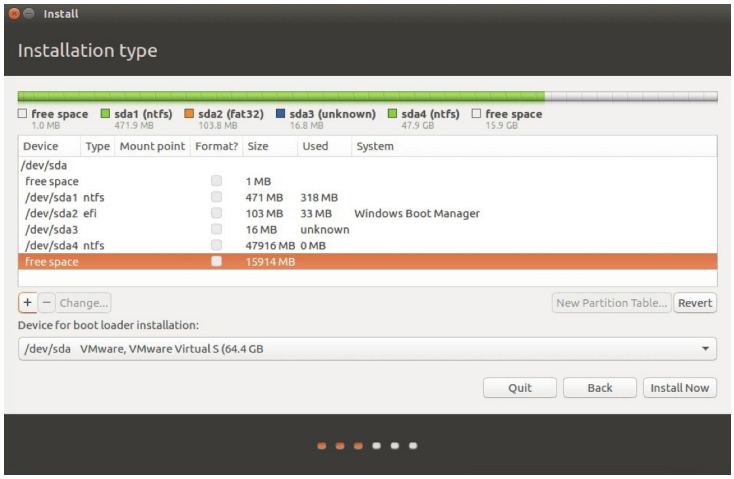
I haven't selected these options but you should select both of these.

Warning

Select "Something Else" for manual partitioning. Never select "Erase disk and install Ubuntu"!

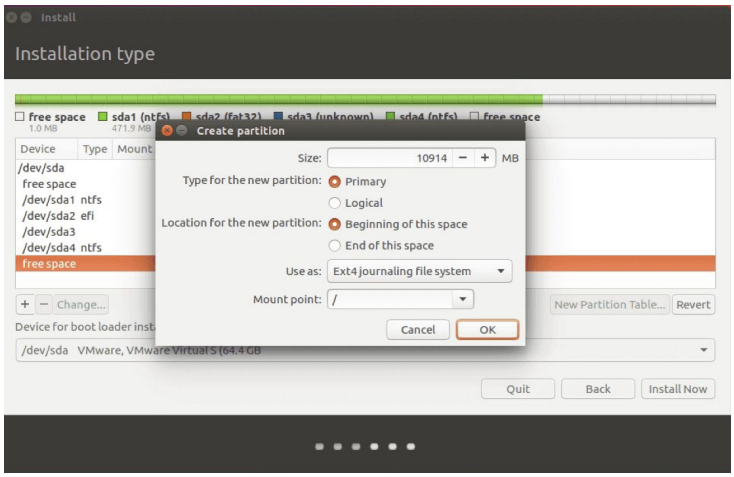


3. Partition Setup:



- Create Root Partition: To create the first partition, the root partition, select the free space (the shrink space from Windows created earlier) and hit on the + icon below. On partition settings use the following configurations and hit OK to apply changes:

  - Size: Total free space minus 10000MB
  - Type: Primary
  - File System: EXT4
  - Mount Point: /
- Create Swap Partition:
  - Size: 10000MB
  - Type: Swap Area



4. When finished, hit the "Install Now" button in order to apply changes to disk and start the installation process.

5. A pop-up window should appear to inform you about swap space. Ignore the alert by pressing on the "Continue" button. Next, a new pop-up window will ask you if you agree with committing changes to disk. Hit "Continue" to write changes to disk and the installation process will now start.

6 Final steps

- On the next screen adjust your machine physical location by selecting a city nearby from the map. When done hit "Continue" to move ahead.
- Next, select your keyboard layout and click on the "Continue" button.
- Pick up a username and password for your administrative sudo account, enter a descriptive name for your computer and hit "Continue" to finalize the installation.

> **Note**
>
> Remember this sudo (admin) password as you will be using it a lot for all the updates and installation requirements.

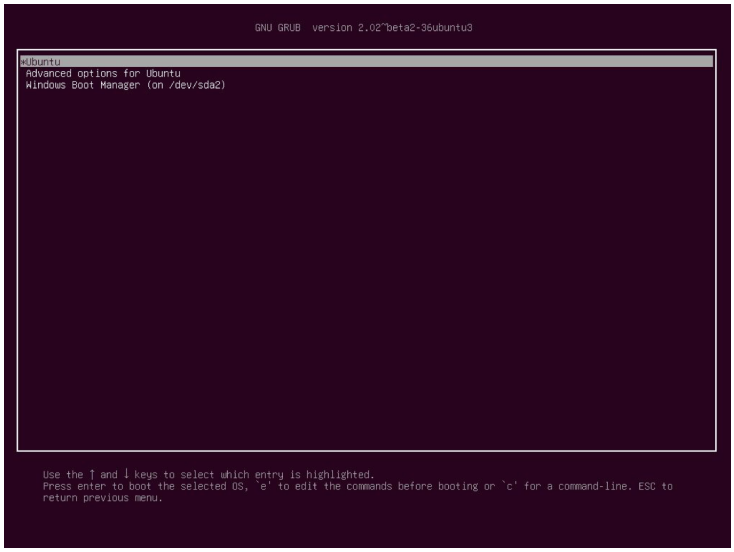
From here on the installation process will run automatically until it reaches the end.

7 Post-Installation Configuration

7.1 First Boot

After installation completes:

1. Restart system
2. Remove USB drive when prompted
3. GRUB bootloader will appear
    - Select Ubuntu or Windows Boot Manager



7.2 Ubuntu Updates

Open terminal and run:

```
sudo apt-get update && sudo apt-get upgrade
sudo reboot
```

8 Troubleshooting

First contact TAs if there is any issue!

8.1 Common Issues

1. GRUB Menu Not Appearing:
    - Hold SHIFT during boot
    - If persistent, repair GRUB using live USB
2. Windows Not Booting:
    - Check if Secure Boot is properly disabled
    - Verify Windows partition wasn't modified
3. Ubuntu Not Booting:
    - Check partition mounting points
    - Verify GRUB installation location

9 Best Practices

9.1 Regular Maintenance

- Keep both systems updated
- Maintain adequate free space on both partitions
- Create regular backups
- Test both systems after major updates

9.2 File Sharing

- Windows partitions are accessible from Ubuntu
- Create a shared data partition (optional)
- Use cloud storage for cross-platform file access

10 Remarks

Following this guide should result in a properly configured dual-boot system. Remember to:

- Always backup important data
- Follow instructions carefully
- Keep both systems updated
- Document any custom configurations

It will reboot your system and you are good to go now! Welcome to the Linux family!

Part II
Parallels Installation for Mac

11 Prerequisites for Mac Installation

11.1 System Requirements

Before beginning the Parallels installation, ensure your Mac meets these requirements:

- Intel or M-series Mac processor
- Minimum 20GB free disk space
- Active internet connection
- Administrative access to your Mac

11.2 Required Software and Accounts

- Parallels Desktop software (Parallels website)
- Parallels account
- Ubuntu ISO file (correct version for your processor):
  - **Intel Macs:** Standard x86-64 version from Ubuntu releases
  - **M-series Macs:** ARM64 version from Ubuntu ARM releases

12 Preparing for Installation

12.1 Downloading Required Files

1. Download Ubuntu ISO:
   - Intel Macs: Standard x86-64 version
   - M-series Macs: ARM64 version
2. Download Parallels Desktop from Parallels website.

13 Parallels Desktop Installation

13.1 Installing Parallels

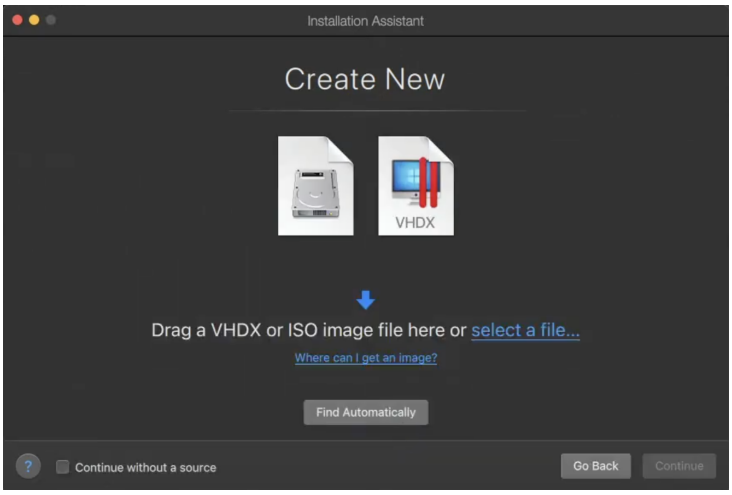
1. Mount the Parallels Desktop *.dmg* file:
   - Double-click the downloaded *.dmg*
   - Drag Parallels Desktop to Applications folder
2. Initial Setup:
   - Launch Parallels from Applications
   - Follow the setup wizard
   - Sign in with Parallels account
   - Use free account for sign in and initial installation and ignore license key when prompted

14 Creating Ubuntu Virtual Machine

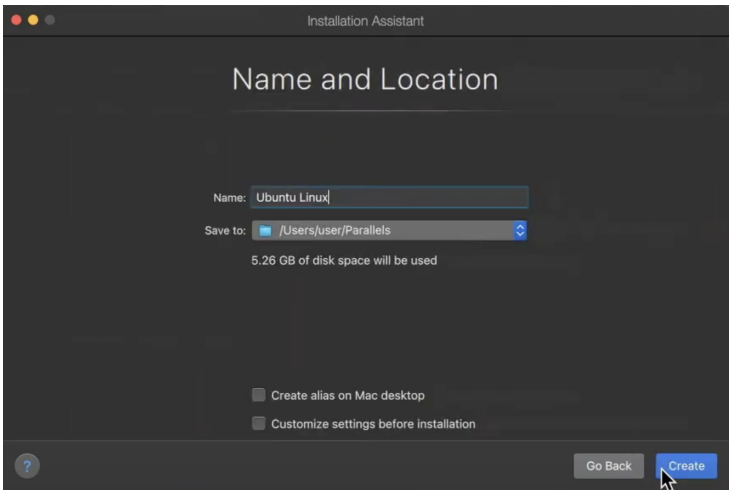
14.1 Virtual Machine Setup

1. Launch New VM Wizard:
    - Click **File** → **New**
    - Select **Install Windows or another OS**

2. Configure Installation Source:
    - Choose **Install from DVD or image file**
    - Select downloaded Ubuntu ISO



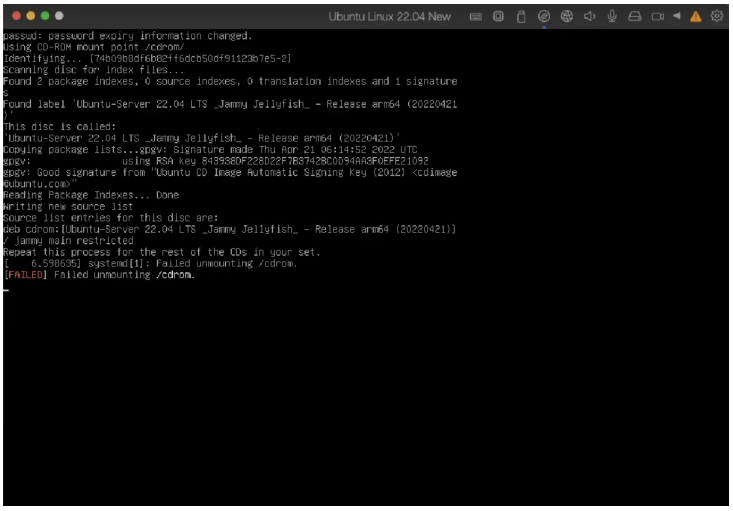
3. Virtual Machine Configuration:
    - Name: Choose descriptive name
    - Location: Select storage location
    - Resource allocation:
        - CPU: Minimum 2 cores
        - RAM: Minimum 4GB
        - Storage: Minimum 20GB



15 Ubuntu Installation in Parallels

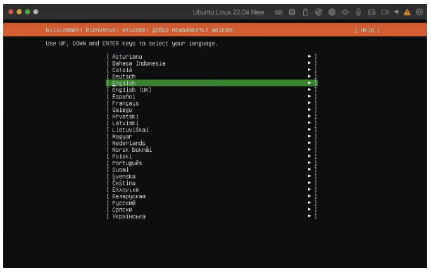
15.1 Start the Virtual Machine

- Select your newly created virtual machine and click “Start.”
- Choose Try or Install Ubuntu Server

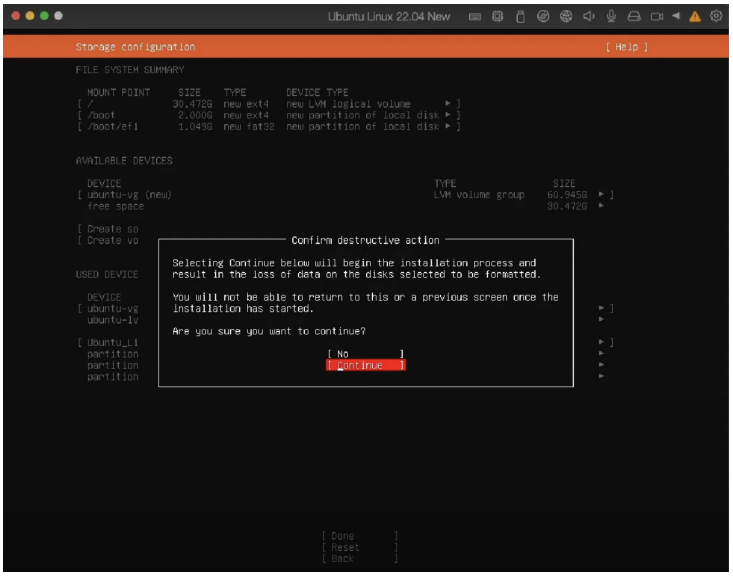


15.2 Installation Process

1. Initial Setup:
   - Select your language



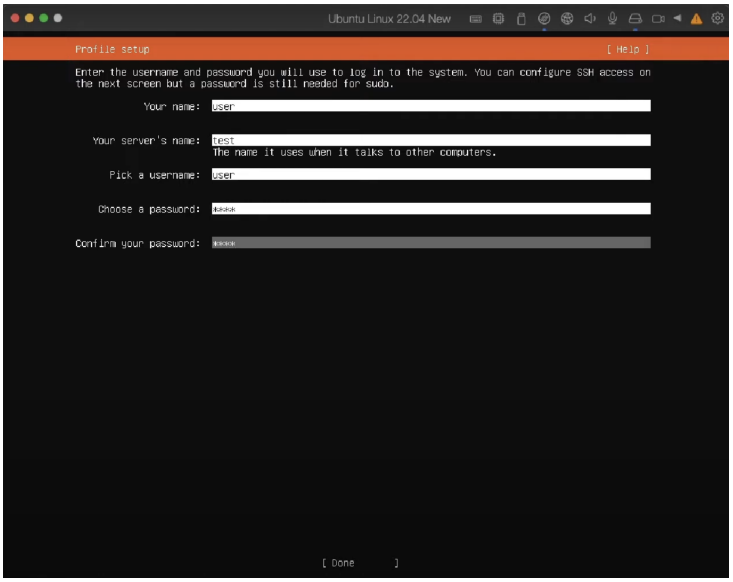
- Check Download updates while installing Ubuntu and Install third-party software (optional but recommended).
- Keep pressing “Done”(without entering anything) until you reach:



- Press “Continue”

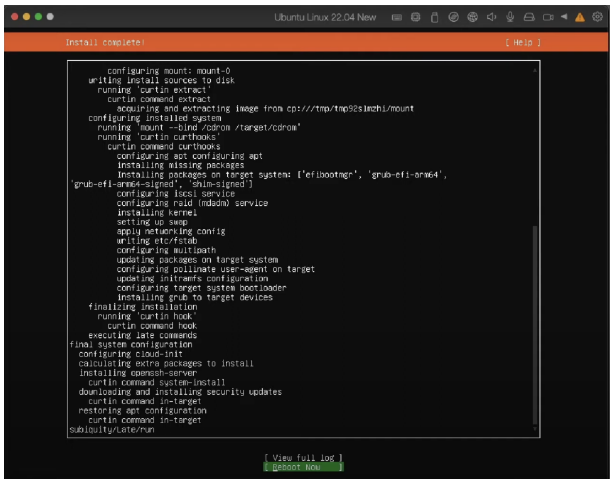
2. User Setup:

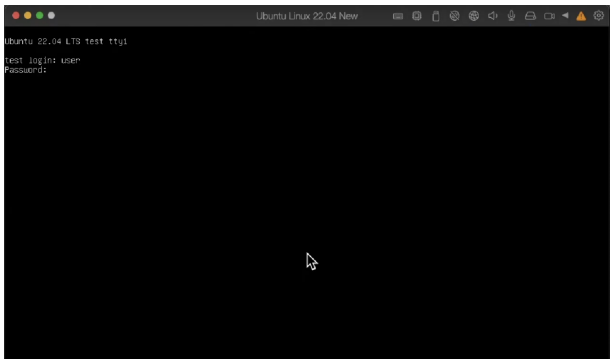
- Create username and password
- Choose computer name



3. Complete installation:

- Wait for the installation to complete
- Click Reboot Now when prompted

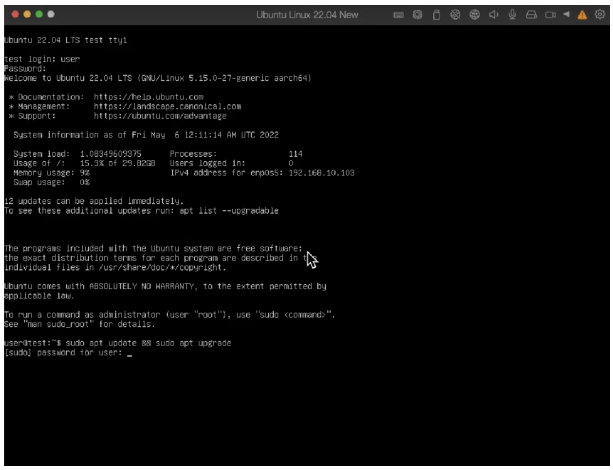




15.3 System Updates

1. You will be prompted for user and login password which you chose above.
2. Open a terminal (Ctrl+Alt+T) and run:

```
sudo apt update && sudo apt upgrade
```



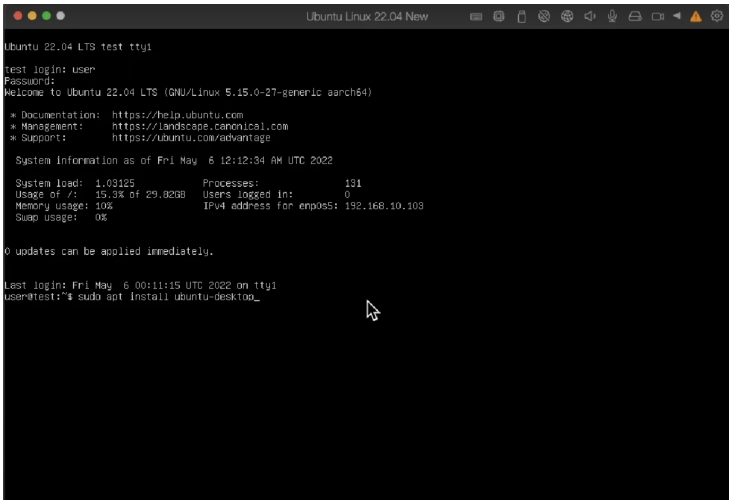
3. It will take some time to finish this step, once done, reboot using:

```
sudo reboot
```

15.4 Installing the desktop image

1. You will be prompted again for the username and password to log in
2. Install the desktop image using:

```
sudo apt install ubuntu-desktop
```

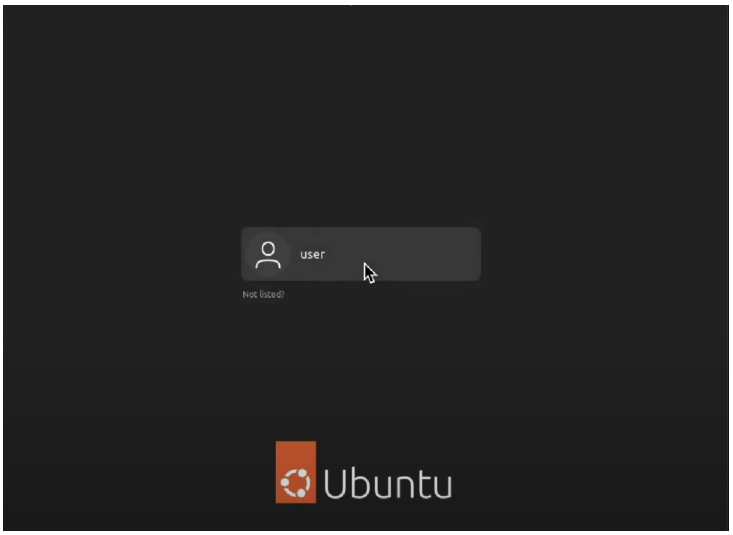


3. It will take roughly 10-15 minutes (or more depending on your internet connectivity) to finish this step, once done reboot using:

```
sudo reboot
```

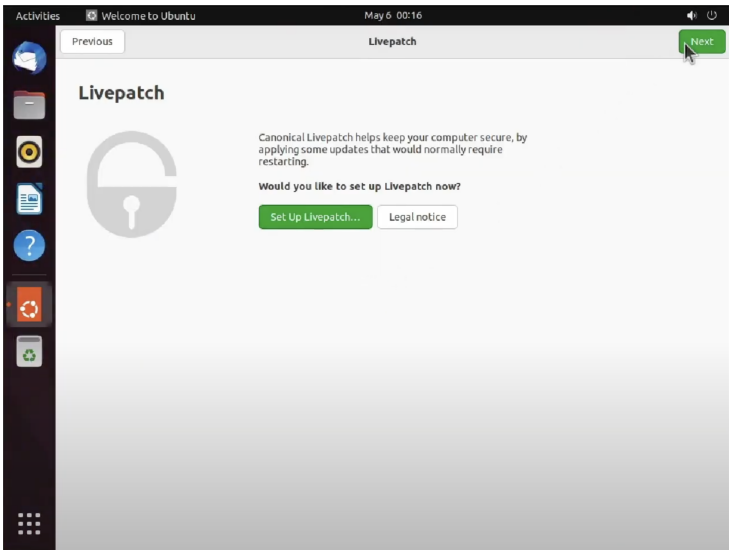
16 Finishing Up

1. Log in to Ubuntu: Enter the password you created earlier to log in.



2. Follow the on-screen prompts to finalize the setup
3. Reboot one final time to ensure everything is working correctly:

```
sudo reboot
```



17 Troubleshooting Parallels Installation

First contact TAs if there is any issue!

17.1 Common Issues

1. Performance Problems:
   - Check resource allocation
   - Verify Parallels Tools installation
   - Monitor system resources
2. Network Issues:
   - Check network adapter settings
   - Verify shared networking configuration
   - Reset network settings if needed
3. Display Problems:
   - Reinstall Parallels Tools
   - Update graphics drivers
   - Check resolution settings

18 Advanced Parallels Features (Optional | Not Required)

18.1 Coherence Mode

Coherence mode allows Ubuntu applications to run alongside macOS applications:

- Enable: **View** → **Enter Coherence**
- Configure auto-start applications
- Set up shared applications

18.2 Resource Management

- Adjust CPU allocation
- Modify RAM assignment
- Configure video memory
- Set up adaptive hypervisor

18.3 Optimization Steps

1. Configure Display:
    - Adjust resolution in Ubuntu Settings
    - Configure scaling if needed
2. Enable Integration Features:
    - Clipboard sharing
    - Drag and drop support
    - Shared folders

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19 ROS Installation

Install ROS2 Jazzy Jalisco from: https://docs.ros.org/en/jazzy/index.html