

# Installing Ubuntu Linux LTS on laptops

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# Overview

- Installing Linux
  - Windows 10 or 11 (WSL)
    - If you have Windows 10 or later on your laptop device
  - Virtualbox
    - Use this with other versions of Windows and other operating systems such as MacOS
  - Dual boot
    - *Care must be taken to avoid loss of existing O.S files and data.*

Windows Subsystem for Linux – Windows 10 or better **REQUIRED**

# **APPROACH 1**

# WSL

- Enabling Windows Subsystem for Linux (WSL)
  - Control Panel → Program and Features → Turn Windows Feature on or off → Windows Subsystem for Linux
    - Alternative:
      - Start Powershell as Administrator and run cmdlet:  
*Enable-WindowsOptionalFeature -Online -FeatureName Microsoft-Windows-Subsystem-Linux*
  - Reboot computer when prompted.
  - After reboot verify that it is installed from control panel
  - *Warning: Enabling this option may require downloading from the INTERNET*

# WSL

- Install Linux distro of choice:
  - Download via **Windows store**
    - Search for Ubuntu
  - Alternative (**manually**)
    - Download AppX package on-line. E.g
      - <https://aka.ms/wsl-ubuntu-2204>
      - Other distros/versions listed at:  
<https://docs.microsoft.com/en-us/windows/wsl/install-manual>
        - (Ubuntu, Debian, Kali Linux, OpenSuse, Suse and Fedora)
    - Navigate to download folder and run Powershell cmdlet:  
*Add-AppxPackage .\{wsl-ubuntu-2204}.appx*
      - ALTERNATIVE (E.g on Windows server)
        - Change file extension of downloaded file to .zip
        - Extract renamed file to a folder
        - Add folder to PATH
    - *Installing from the store or manual download requires INTERNET*

# WSL

- Starting Linux
  - Launch from **Start Menu** or Store page.
  - Alternative
    - open **cmd** and run **ubuntu.exe**
- **First time** use will prompt for creating a user and setting a password. *Hint: username should not have a space and should be all lowercase characters*
- Performing software update and upgrade
  - `sudo apt update`
  - `sudo apt upgrade -y`

# WSL

- On WSL 2: Accessing Linux files from the Windows CMD is possible using the path/prefix
  - `\\wsl$Ubuntu-22.04\home\\Project`
- On WSL 1 only, accessing Windows files from Linux shell is simple as the windows drives are mounted under /mnt. For example:
  - `ls /mnt/c:/Users/`
- Running Linux binaries from CMD window, simply prefix the Linux command with **wsl**
- For example:
  - `wsl ls -al`

# WSL

- NOTES

- Features

- Run Linux commands directly from Windows CMD using the **wsl** command
  - **wsl** ls -al
  - Run common command-line tools such as grep, sed, awk, or other ELF-64 binaries.
  - Run Bash shell scripts and GNU/Linux command-line applications including:
    - Tools: vim, emacs, tmux
    - Languages: NodeJS, Javascript, Python, Ruby, C/C++, C# & F#, Rust, Go, etc.
    - Services: SSHD, MySQL, Apache, lighttpd, MongoDB, PostgreSQL.

# WSL

- Others
  - Run windows executable directly from inside the Linux shell
  - *Seems possible to create custom Linux distros??*
- Limitations
  - **Not recommended for running production services**
- Documentation available @
  - <https://docs.microsoft.com/en-us/windows/wsl/about>

VirtualBox or VMWare

# **APPROACH 2**

# Some Virtualization Platforms

- Personal
  - VmWare, VirtualBox
- Servers
  - Vmware ESXi, Citrix Xen, Proxmox, Hyper-V
  - VirtualBox (headless)...
- Clouds
  - Private: Openstack (KVM/libvirt), Opennebula (KVM/libvirt),
  - Public: Amazon, Google, Azure, etc..

# VirtualBox

- Download installer package from <https://virtualbox.org/>
  - *Also download the “Oracle VM VirtualBox Extension Pack” from same page/location*
- Install downloaded installer file
- Reboot computer into BIOS
  - For hosting 64bit guests on 64bit host CPUs: verify that processor virtualization support (VTx) is enabled.
- User-manual
  - <https://www.virtualbox.org/manual/UserManual.html>
  - <http://download.virtualbox.org/virtualbox/UserManual.pdf>

# Virtualbox

- Starting Virtualbox
  - Launch from Start Menu
- First time use
  - Install Extension PACK
    - File → Preferences → Extensions
      - Add downloaded file and follow prompts to install
  - Familiarise yourself with application interface
    - Virtual Machine list, snapshots, networking modes..



# VirtualBox or VMWare Player

*(Using pre-installed appliances)*

- Installing Linux using Appliances. See <https://www.osboxes.org/virtualbox-images/>
- After download, import Appliance using
  - File → Import Appliance
  - If necessary change settings of new VM
- NOTES:
  - ***No need to perform actual installation***
  - May be **security concerns...**

# VirtualBox

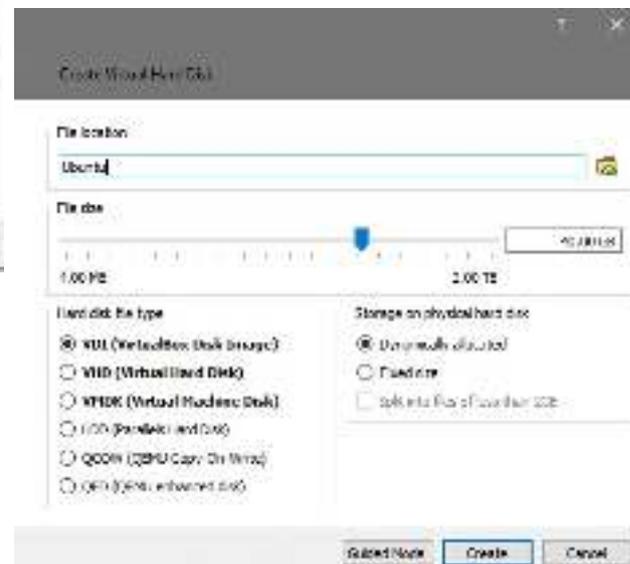
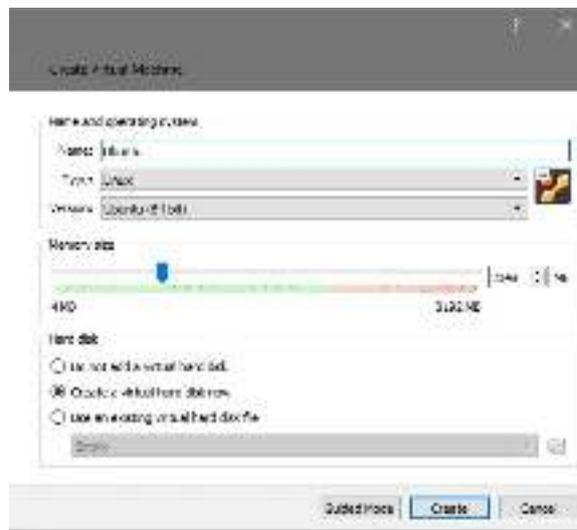
*(installing from ISO image)*

- Installing Linux from ISO image
  - Download ISO image of Ubuntu 24.04.{x} from <https://ubuntu.com/download/desktop> or
  - <https://ubuntu.com/download/server>
    - Other distros use INTERNET . For example <http://linuxfreedom.com/Distros/>
  - Create new VM
    - Click the “Add button” or “+ icon” to start wizard, type Ubuntu and select Ubuntu type, follow prompts and set the following options: 4GB ram, 2 CPU, create new hard-disk of size 40GB
    - Click “Start” button to start virtual machine
    - Select ISO image downloaded in previous step
    - Install process should start. Go-to next slide
- Notes:
  - **Never assign a VM more than ½ of total physical RAM**
  - Physical hard disk space is required.

# Virtualbox – Creating a VM



- Click the “Add” or “New” button” or “+ icon” to start wizard,
- write Ubuntu, it should set **Type** to Linux and **Version** to Ubuntu64
- Follow prompts and set the following options: 4GB ram, 2 CPU, create new hard-disk of size 40GB
- Click the “Start” button to Launch the new VM



# Virtualbox – Starting a VM



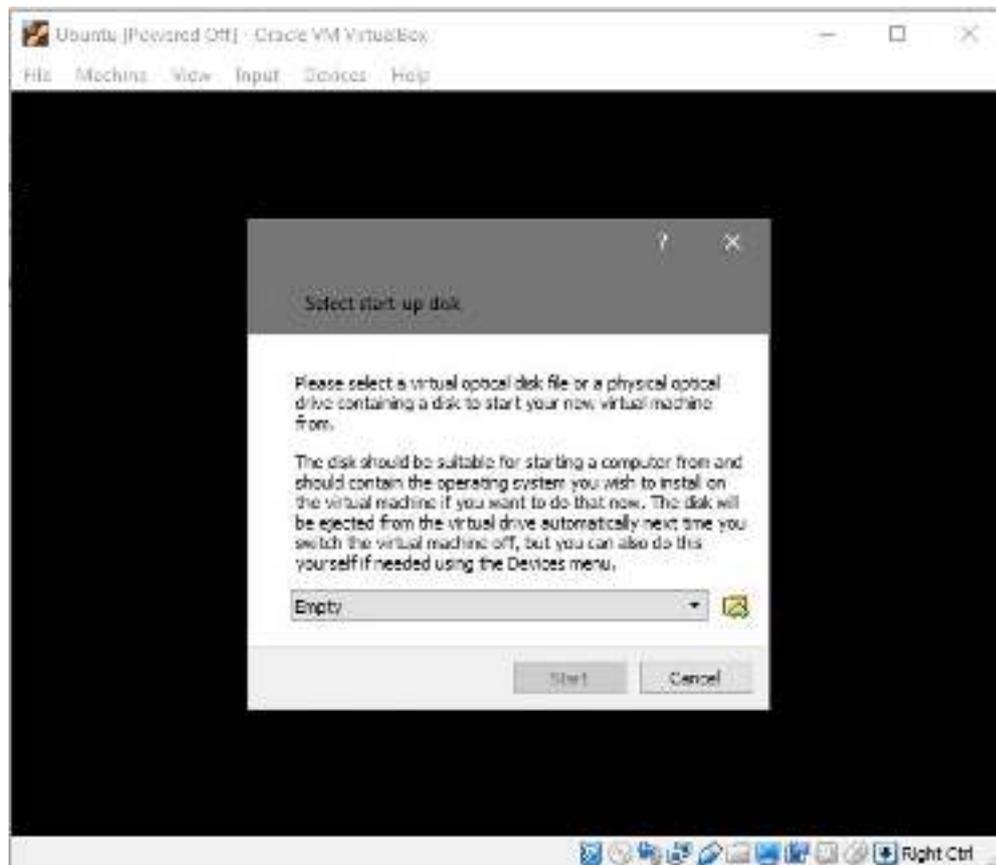
- Starting Linux

- Click the “Start” button

- First time: Request for BOOT ISO/DISK

- Navigate by clicking the folder icon at end of entry box

- Browse the Download folder for the downloaded ISO image and select it.





# Virtualbox – Starting a VM/Linux



- Starting Linux
  - Click the “Start” button
  - Login and begin to enjoy Linux

# Virtualbox – Accessing Windows files from Linux

- Steps:
  - Use the Shares TAB to setup folder mappings
  - From inside Linux then mount the shares
  - ***For more details, please see the VirtualBox user's manual.***
- To access your Linux VM from Windows requires more technical work. To get started.
  - Install putty for Terminal access over SSH
  - Install winscp for file transfer over ssh

Dual boot

# **APPROACH 3**

# Dual booting

- This is the process of installing several different O.S. on a single computer device.
  - Each O.S. is completely independent and installed to its own/dedicated partition.
    - **Requires partitioning of hard-disk or several hard-disks**
  - Only one O.S. is active or running at a time. Switching from one O.S to another requires a reboot and a boot Manager software.
    - So each O.S. maximises its use of available hardware resources.

# Dual booting

- Disk partition table (mbr vs gpt):
  - Windows drive c: should be resized (shrunk) from the Control panel → Administrative tools → Computer Management → Disk management
    - mbr is limited to a maximum of 4 primary partitions, so if may be necessary to delete a 4<sup>th</sup> partition if one exists.
- UEFI Firmware:
  - Secure boot:
    - Supposed to create a secure trust chain that boot-loader has not been tampered with.
      - Well supported on Ubuntu Linux (signed kernels), growing list of other distros that also support this.
  - UEFI O.S. Bootloaders
    - Windows (Press and hold down Shift key while shutting down)
    - GRUB (Linux) allows selection at boot-time

# Dual booting

- Preparing
  - Resize/shrink Windows partition to free up space
  - Download ISO image of Linux distro
    - Write (burn) ISO image to USB-drive using the Rufus tool from <https://rufus.ie/>
  - OR burn to DVD
- Reboot computer
- Start boot of computer from USB or DVD drive.

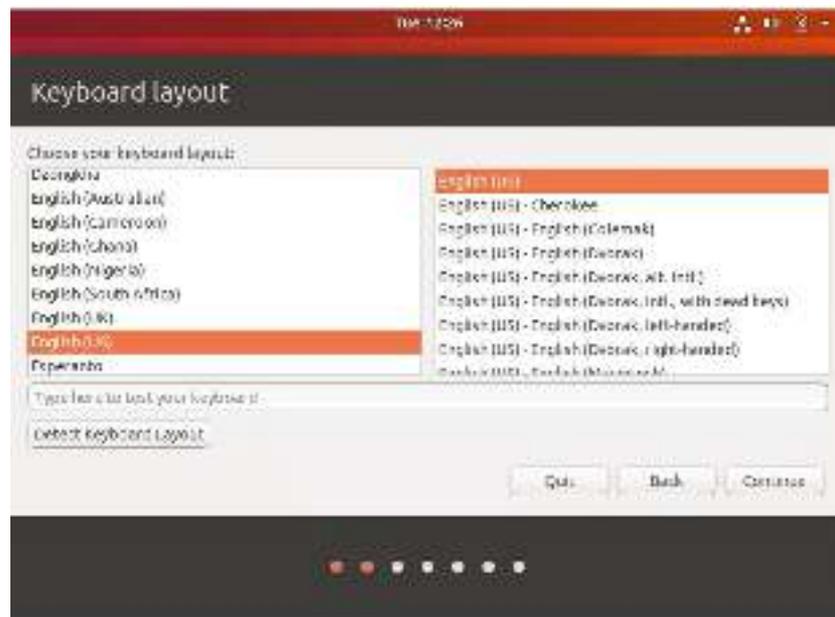


READ AND FOLLOW INSTRUCTION CAREFULLY TO AVOID LOSS OF WINDOWS O.S / DATA

# Dual boot - Installing Ubuntu Linux



- Click on “Install Ubuntu”
- Select Keyboard layout
- Select “Normal install”
- **DON'T RUSH NEXT STEP to AVOID WINDOWS DATA LOSS**

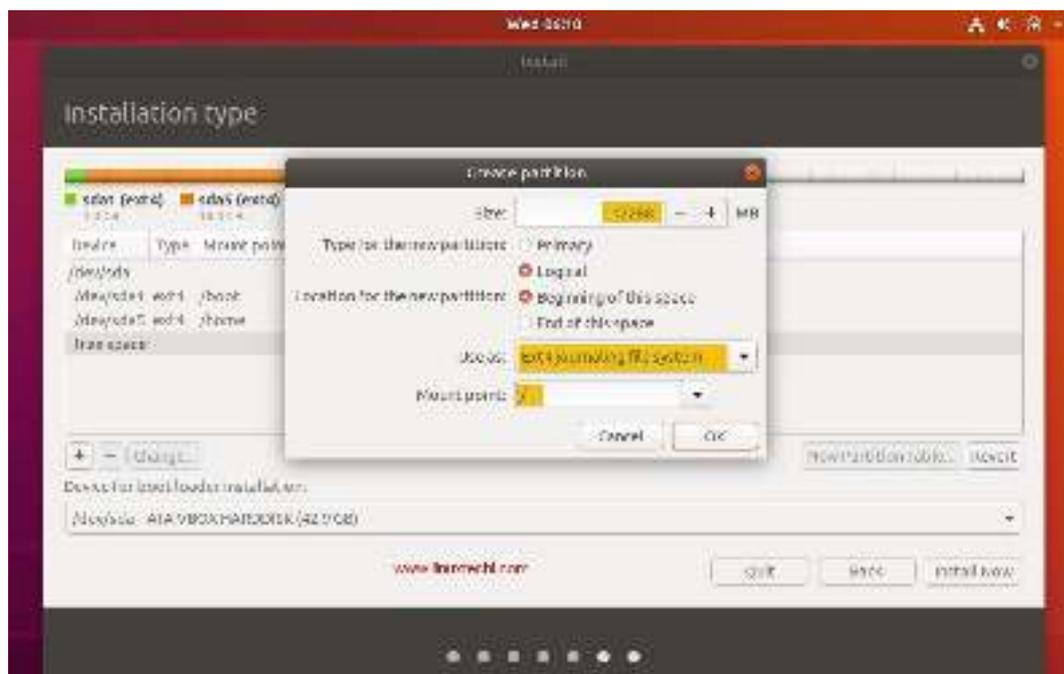


Images and details were obtained from [https://linuxhint.com/install\\_ubuntu\\_18-04\\_virtualbox/](https://linuxhint.com/install_ubuntu_18-04_virtualbox/)

# Dual boot - Installing Ubuntu Linux



- Select “Something else”
- Click + sign to add the following new partitions one after the other
  - Swap: 8GB, type swap
  - /: all free space, ext4
- Click “Install now”
- Click “Continue”



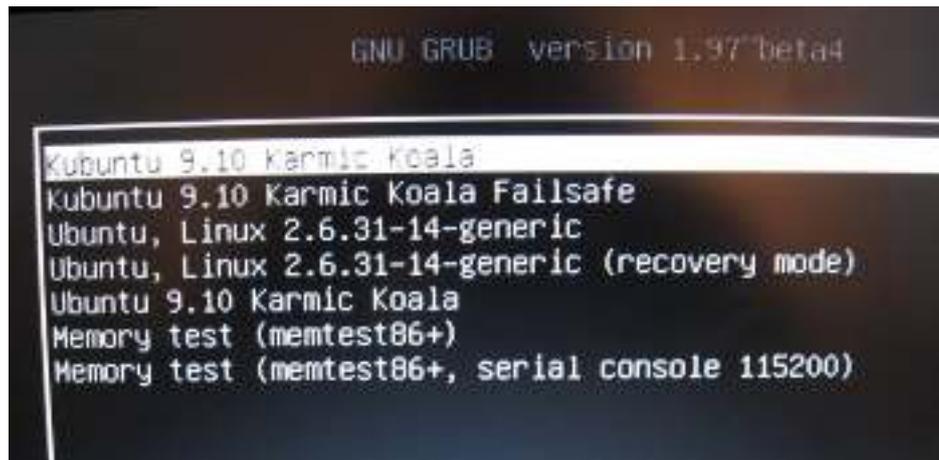
# Dual boot - Installing Ubuntu Linux



- Select Geographic location
- Create your user account
- Restart when prompted.



# Dual boot – Starting an O.S/Linux



- Reboot the computer and select suitable option from the GRUB bootloader menu.
- If system boots directly into Windows, then try
  - Shutdown Windows and wait for complete power off
  - Press the power button to start.
    - It may be necessary for you to enter BIOS/UEFI firmware and force boot manager/loader to Ubuntu.
    - OR disable Windows fast-startup or fast-boot.

# Dual boot – Accessing Windows files from Linux

- Open the Ubuntu File Manager/GUI
  - Look for the disk partitions and simply double click to access the data
- ***NOTE: Reverse of accessing your Linux partitions files from Windows may require advanced setup of WSL to avoid corrupting Linux (in which case it stop booting and functioning correctly).***