Configure Linux on a Virtual Machine

What Is a Virtual Machine (VM)?

A Virtual Machine (VM) is a software-based computer system that emulates a physical computer.
It allows you to run multiple operating systems (OS) — like Linux, Windows, or macOS — on the same physical machine simultaneously.
For example:

- You can have Windows as your main (host) operating system.
- Then, install Linux inside a Virtual Machine — running it like an app on Windows.

What Is a Virtual Machine (VM)?

A VM:

- Creates an isolated environment inside your host OS.
- Lets you test, develop, and experiment without affecting your main system.
- Allows you to run different OSes at once (e.g., Ubuntu inside Windows).
- Uses a hypervisor (e.g., VirtualBox, VMware, Hyper-V) to manage and allocate resources (CPU, RAM, disk, etc.) to virtual systems.

System Requirements for Running a VM

To run a Linux VM smoothly, your computer should meet these minimum requirements:

Component	Minimum	Recommended
CPU	64-bit processor (dual-core)	Quad-core or higher
RAM	4 GB	8 GB or more
Disk Space	20 GB free	50 GB+ free
Virtualization Support	Enabled in BIOS/UEFI	Must be enabled
Internet	Optional	Recommended for updates

Step 1: Choose a Virtualization Software (Hypervisor)

There are many, but here are the most popular free ones:

1. VirtualBox (by Oracle) — Free and beginner-friendly
   🔗 https://www.virtualbox.org
2. VMware Workstation Player — Free for personal use
   🔗 https://www.vmware.com/products/workstation-player.html
3. Hyper-V (Windows built-in option) — For Windows Pro/Enterprise users only

👉 We'll use VirtualBox in this guide (it's easy and widely supported).

Step 2: Download a Linux Distribution ISO

A Linux ISO file is the installation image (like a bootable CD). Common beginner-friendly choices:

- Ubuntu → https://ubuntu.com/download
- Fedora → https://getfedora.org
- Debian → https://www.debian.org/download

Download the ISO file and save it somewhere you can find it later.

Step 3: Install and Set Up VirtualBox

1. Install VirtualBox

- Download and install VirtualBox from its official website.
- Follow the installation wizard (Next → Next → Finish).

2. Launch VirtualBox

- Open the app and click "New" to create a new virtual machine.

3. Create the Virtual Machine

- Name: e.g., "Ubuntu Linux"
- Type: Linux
- Version: Ubuntu (64-bit) or whichever distro you downloaded
- Click Next

4. Assign Memory (RAM)

- Allocate at least 2048 MB (2 GB) — or more if your system allows.

5. Create a Virtual Hard Disk

- Choose “Create a virtual hard disk now.”
- File type: VDI (VirtualBox Disk Image)
- Storage: Dynamically allocated
- Size: 20 GB or more

Click Create.

Step 4: Mount the Linux ISO File

1. Select your new VM in VirtualBox.
2. Click Settings → Storage.
3. Under “Controller: IDE”, click the empty disk icon.
4. Click the small CD icon → Choose a disk file → locate and select your downloaded Linux ISO.
5. Click **OK**.

Now your VM is set up to boot from the Linux installer ISO.

Step 5: Boot and Install Linux

1. Select your VM and click Start.
2. It will boot from the ISO (like starting a new computer with a Linux CD).
3. Follow the on-screen instructions:
    - Choose your language.
    - Click “Install Ubuntu” (or equivalent).
    - Choose installation type: Erase disk and install Linux (affects only the virtual disk, not your host PC).
    - Set your username and password.
4. Wait for installation to complete.
5. Once done, reboot the VM.
6. When asked, remove the ISO (VirtualBox may prompt this automatically).

Step 6: Post-Installation Configuration

After logging in to your new Linux VM:

1. Update system packages

```
sudo apt update && sudo apt upgrade -y
```

2. Install Guest Additions for better performance:

- In VirtualBox menu → Devices → Insert Guest Additions CD image
- Follow on-screen prompts to install it.

This enables:

- Better screen resolution
- Clipboard sharing (copy-paste between host and VM)
- Shared folders and drag-and-drop

Step 7: Optional Enhancements

- Enable shared folders to access host files in the VM.
- Install developer tools:

```
sudo apt install build-essential git curl -y
```

- Take snapshots in VirtualBox before big changes — easy rollback points.

Summary

Step	Action	Purpose
1	Install VirtualBox	Create virtual environment
2	Download Linux ISO	Get Linux installer
3	Create a new VM	Allocate resources
4	Mount ISO	Boot from Linux image
5	Install Linux	Set up OS
6	Update & configure	Optimize performance
7	Enhance & use	Develop, learn, or test safely

The End.