**Setting a virtual lab for LINUX**

**Step 1: Check System Requirements**

Before setting up a Linux virtual lab, ensure your PC meets these requirements:

* **RAM:** At least 4 GB (8 GB recommended for smooth performance)
* **Disk Space:** At least 50 GB free space
* **CPU:** 64-bit processor with hardware virtualization enabled in BIOS
* **Operating System:** Windows, macOS, or Linux host OS

**Tip:** You can enable virtualization in BIOS under **Advanced → Virtualization Technology / VT-x / AMD-V**.

**Step 2: Install Virtualization Software**

You need a program to run virtual machines. The most popular free choice is **Oracle VirtualBox**.

1. Go to [https://www.virtualbox.org](https://www.virtualbox.org/)
2. Download the **VirtualBox installer** for your OS.
3. Run the installer and accept default settings.
4. **Install the VirtualBox Extension Pack** (from the same website) for:
   * USB 2.0/3.0 support
   * RDP access
   * Disk encryption

**Step 3: Download Linux Virtual Machine**

You have two options:

1. **Pre-built VM Images** (easiest, ready to use)
   * Example: **CSE-LABVM** or **Ubuntu VM** from official sources.
   * File type: .OVA (Open Virtualization Format)
2. **ISO Image Installation** (manual installation)
   * Example: [Ubuntu](https://ubuntu.com/download/desktop) or [Kali Linux](https://www.kali.org/get-kali/) ISO file.
   * You’ll install Linux on the VM manually using the ISO.

**Step 4: Create a Virtual Machine in VirtualBox**

**Option A: Import Pre-Built VM**

1. Open VirtualBox → **File → Import Appliance**
2. Select .OVA file → Next
3. Set:
   * **Machine Base Folder:** Documents or any preferred location
   * **MAC Address Policy:** Generate new MAC addresses
4. Click **Import** → Wait for import to finish

**Option B: Install from ISO**

1. Open VirtualBox → **New**
2. Enter VM name (e.g., Ubuntu Lab) → Type: Linux → Version: Ubuntu (64-bit)
3. Allocate resources:
   * RAM: 2–4 GB
   * Hard Disk: 20–50 GB → Create VDI (VirtualBox Disk Image)
4. Select **ISO file** as boot disk → Start VM
5. Follow the Linux installation steps inside the VM

**Step 5: Start and Use Your Linux VM**

1. Click **Start** in VirtualBox.
2. Log in with the pre-configured credentials (if pre-built VM) or the username/password you set during installation.
3. Familiarize yourself with tools and desktop environment:
   * Terminal (command line)
   * Web browser
   * Networking tools (Wireshark, ping, traceroute)
4. **Take snapshots** to save VM state for easy rollback:
   * VirtualBox → Right-click VM → Snapshots → Take Snapshot

**Step 6: Configure VM for Networking and Labs**

* **Network Settings:** Choose NAT (default) or Bridged Adapter depending on lab requirements
* **Shared Folders:** Share files between host and VM (optional)
* **Clipboard Sharing:** Enable bidirectional copy/paste

**Step 7: Shutdown and Resume VM**

* **To Save State:** File → Close → Save the machine state
* **To Power Off:** File → Close → Power off
* **To Resume:** Just click Start → VM will boot from saved state

**Tips for a Virtual Linux Lab**

* Use **pre-built lab VMs** for Cisco or Cybersecurity labs to save time.
* Always **take snapshots** before experimenting.
* Keep your VirtualBox and Extension Pack updated.
* For multiple VMs, ensure your host has enough **RAM and CPU cores**