Virtualization

What is Virtualization?

Virtualization is the process of creating virtual instances of computer systems (OS, networks, servers) using software such as:

- **VirtualBox** (Free and beginner-friendly)
- **VMware Workstation Player** (Free for personal use)
- Hyper-V (Microsoft In-build Technology for windows)

These tools allow you to run multiple operating systems (like Kali Linux, Windows, Metasploitable) on one physical machine.

Types of Virtualization:

1) **Hardware Virtualization** (also called Server Virtualization):
   - Uses a **hypervisor** to run multiple OS instances on one physical server.
   - Example: VMware, VirtualBox, Hyper-V.
2) **Operating System Virtualization**:
   - Allows multiple user spaces (containers) to run on a single OS kernel.
   - Example: Docker, LXC.
3) **Storage Virtualization**:
   - Combines multiple physical storage devices into one virtual storage pool.
4) **Network Virtualization**:
   - Abstracts physical network resources into virtual ones for better control and efficiency.

Benefits of Virtualization:

- Better resource utilization
- Cost savings on hardware
- Easier backup, recovery, and migration
- Isolated testing environments

Why Use Virtualization for a Hacking Lab?

- Safe environment to test tools and exploits
- No need for multiple physical machines
- Easy to reset snapshots if something goes wrong
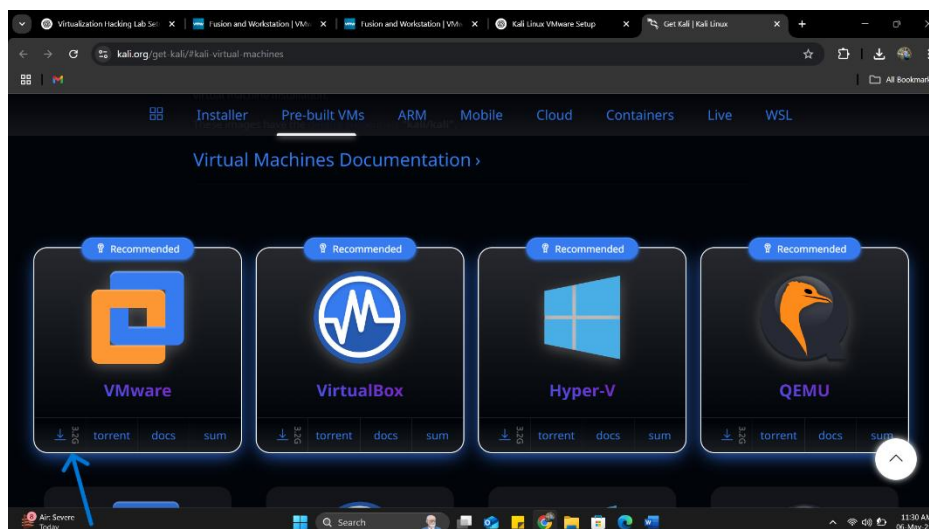- Practice real-world scenarios like exploiting vulnerable systems

Step-by-Step Setup:

**Step 1:** Install The VMware from This given website - https://www.vmware.com/products/desktop-hypervisor/workstation-and-fusion
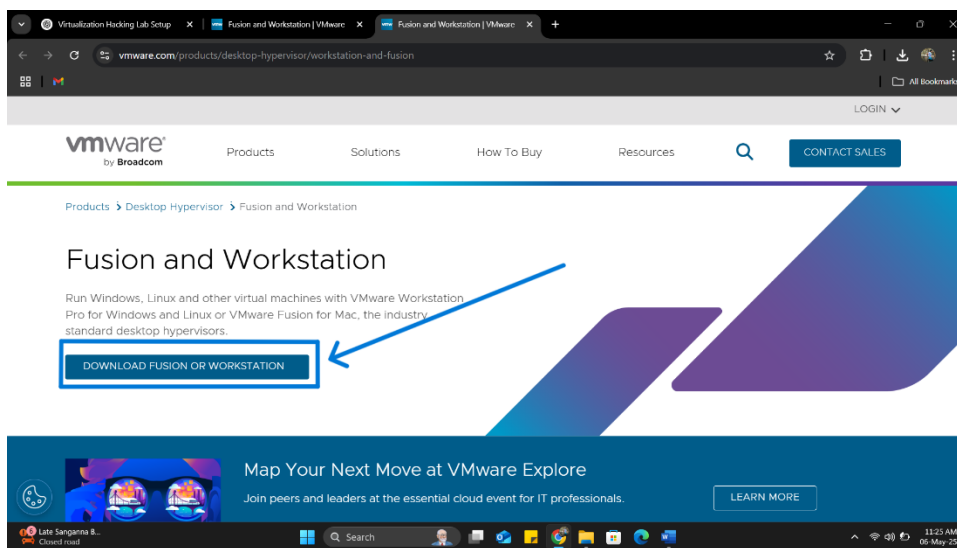
Step 2: Now Download Kali Linux - https://www.kali.org/get-kali/#kali-virtual-machines

Step 3: Extract the .7z file using 7-Zip or WinRAR.

Step 4: Customize VM Settings.

- Click Customize Hardware.
- Increase RAM, processors, and enable virtualization if needed.
- Under Network Adapter, choose NAT or Bridged.
- Add a USB controller, sound card, etc., if needed.
- Finish and click Close.
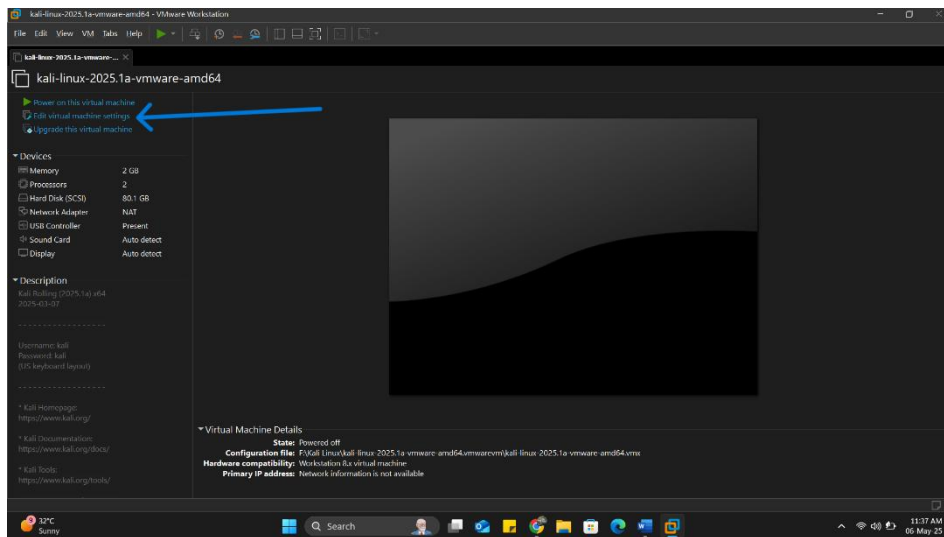
Step 5: Finish Installation, reboot the VM.

Step 6: Update Kali Linux.

Open Terminal and run:

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