🎓 Internship Lab Setup Report: Installation & Configuration of Kali Linux and Metasploitable on Oracle VirtualBox.

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Department : Cybersecurity
Organization : ApexPlanet software Pvt.Ltd
Co-ordinator : Kundan Kumar
Date of Submission : September 18, 2025

1. Objective

To establish a secure, isolated penetration testing lab by:

- Installing **Oracle VirtualBox** as the virtualization platform.
- Importing and configuring **Kali Linux (2023.4 VirtualBox VM)** as the attacker machine.
- Setting up **Metasploitable 2** as the intentionally vulnerable target machine.
- Validating network connectivity and basic exploit readiness between both VMs.

2. Tools & Software Used

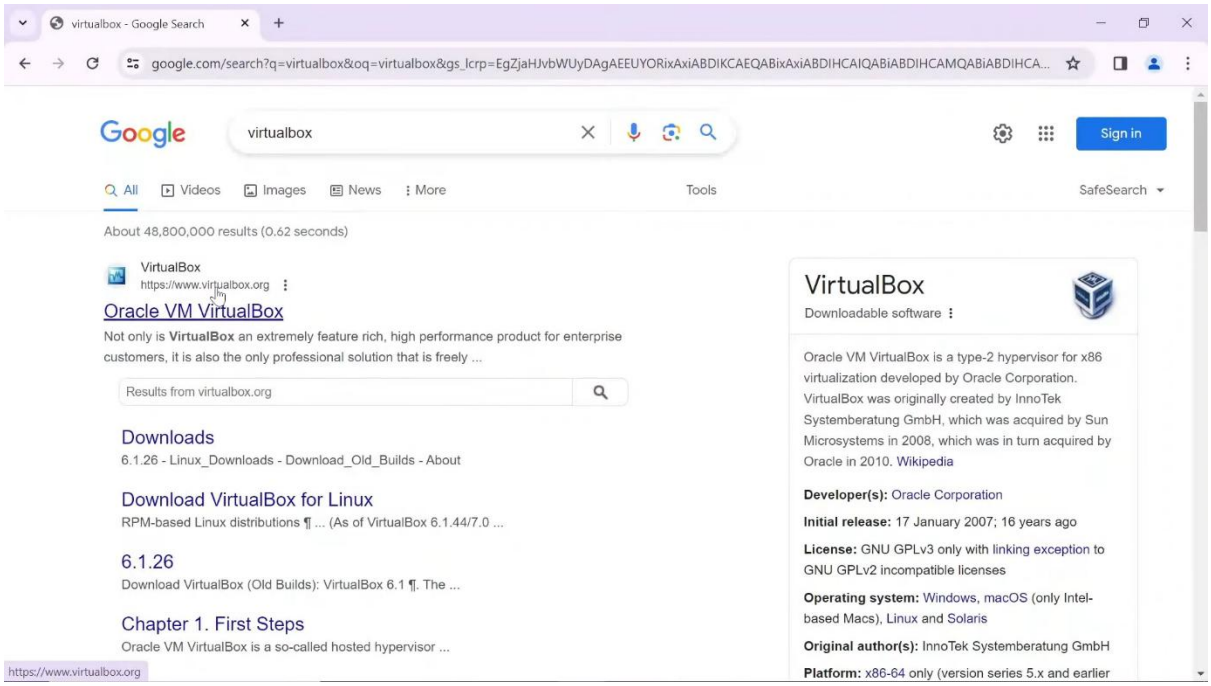
TOOL / SOFTWARE	VERSION / SOURCE	PURPOSE
Oracle VirtualBox	Version 7.0.12	Virtualization Platform
Kali Linux	2023.4 (Pre-built VirtualBox VM)	Penetration Testing OS
Metasploitable	Metasploitable 2 (Linux)	Vulnerable Target Machine
Host-only / NAT Network	VirtualBox Network Adapter	Lab Isolation & Connectivity

3. Phase 1: Downloading Required Software

➤ Step 3.1: Downloading Oracle VirtualBox

- Accessed official website: https://www.virtualbox.org.
- Navigated to **Downloads** section → Selected **Windows hosts**.

- Downloaded: VirtualBox-7.0.12-159484-Win.exe.
- Accepted GPL v3 license terms.

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About
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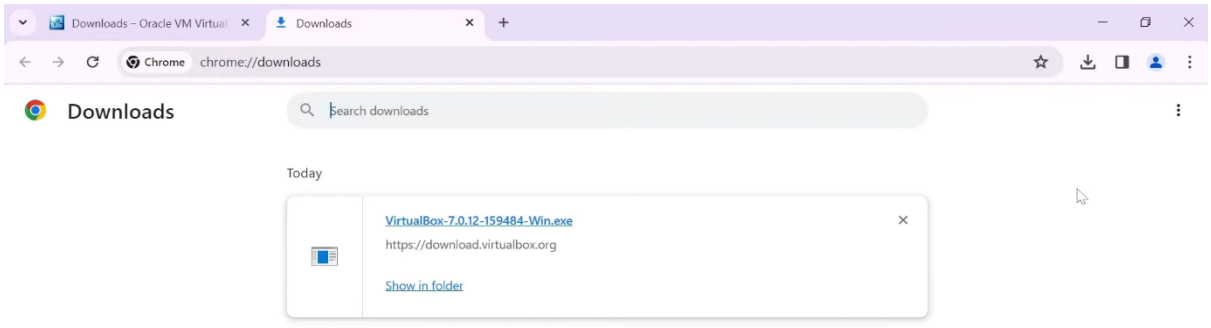
Download VirtualBox
Here you will find links to VirtualBox binaries and its source code.
VirtualBox binaries
By downloading, you agree to the terms and conditions of the respective license.
If you're looking for the latest VirtualBox 6.1 packages, see VirtualBox 6.1 builds. Version 6.1 will remain supported until December 2023.
VirtualBox 7.0.12 platform packages
Windows hosts
macOS / Intel hosts
Linux distributions
Solaris hosts
Solaris 11 IPS hosts
The binaries are released under the terms of the GPL version 3.
See the changelog for what has changed.
You might want to compare the checksums to verify the integrity of downloaded packages. The SHA256
be favored as the MD5 algorithm must be treated as insecure!
download.virtualbox.org/virtualbox/7.0.12/VirtualBox-7.0.12-159484-Win.exe


Downloads – Oracle VM Virtual
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Downloads
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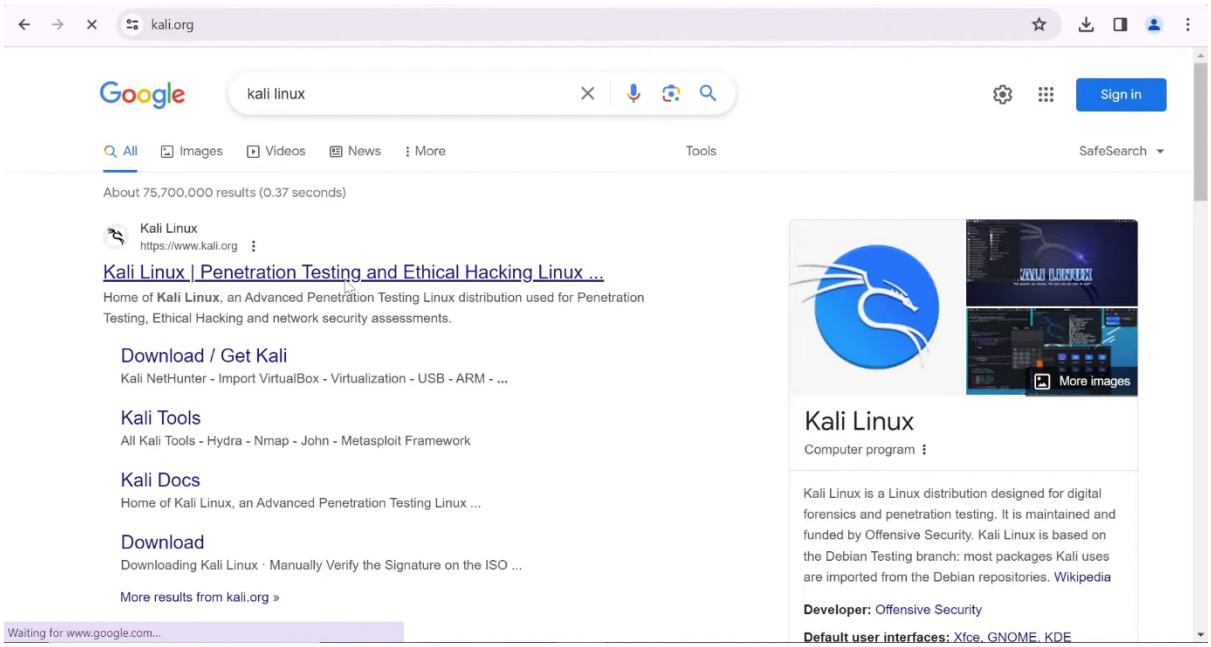
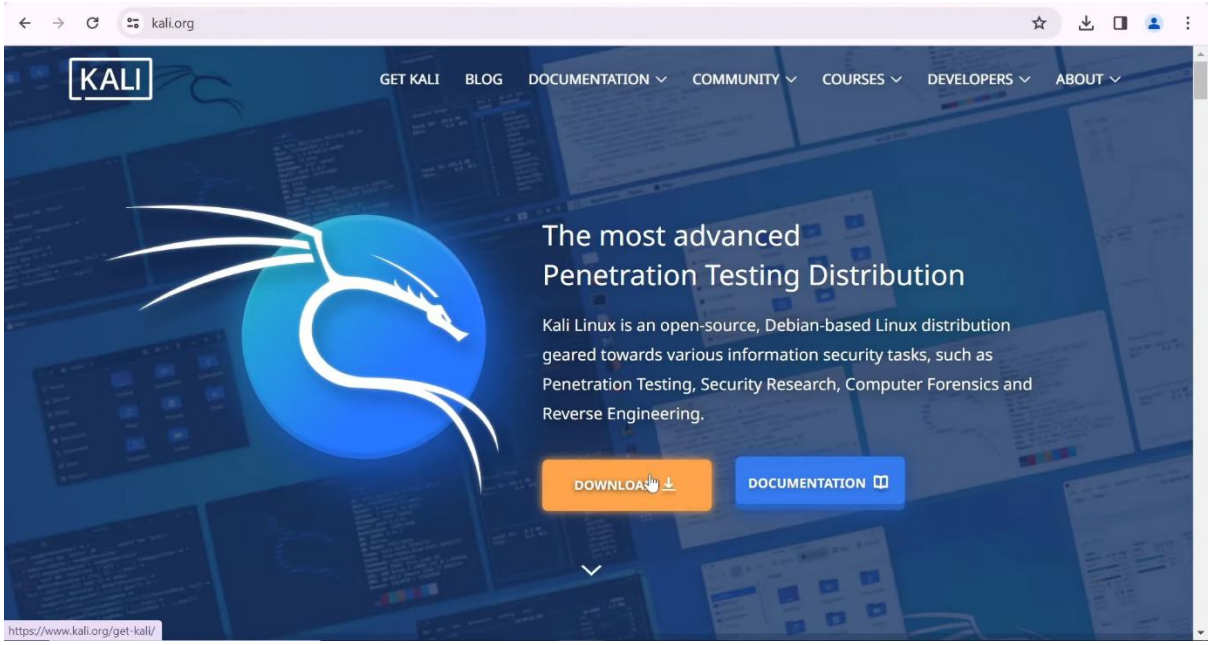
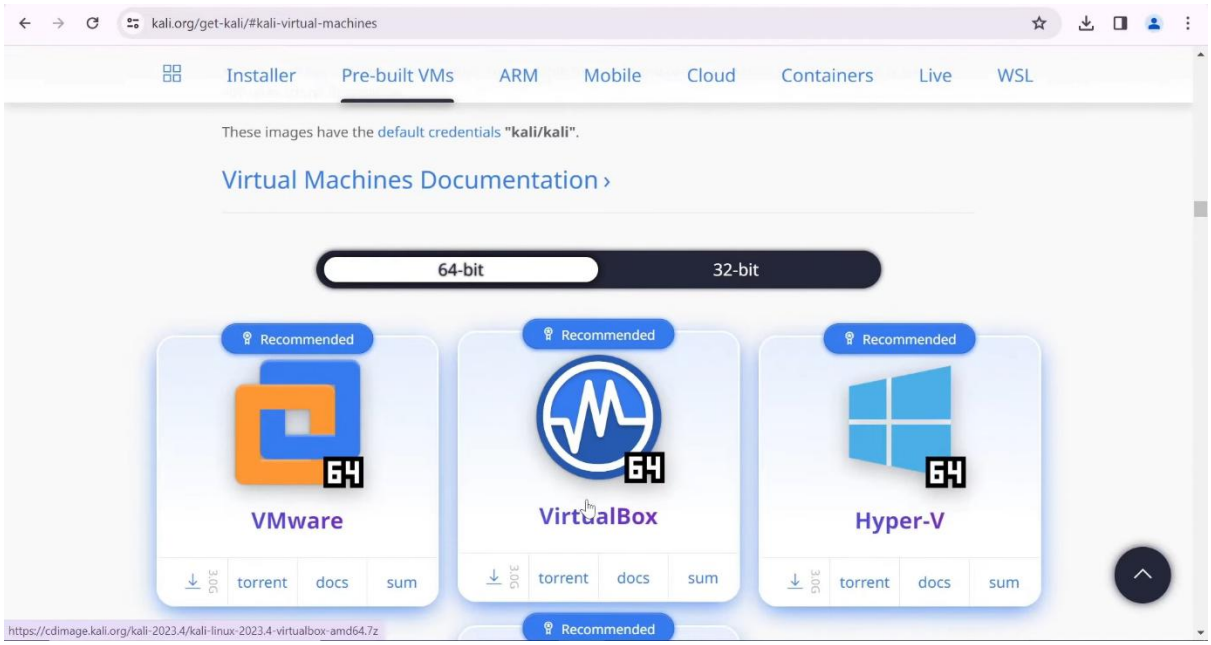
Today
VirtualBox-7.0.12-159484-Win.exe
https://download.virtualbox.org
Show in folder

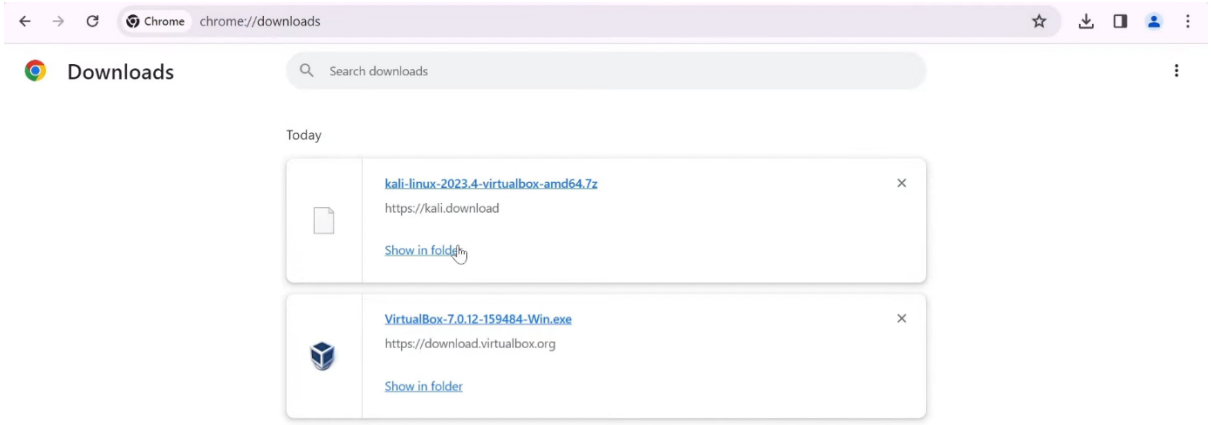
➤ Step 3.2: Downloading Kali Linux VM

- Visited: https://www.kali.org/get-kali/.
- Selected **Pre-built Virtual Machines → VirtualBox (64-bit).**
- Downloaded: kali-linux-2023.4-virtualbox-amd64.7z.
- Default credentials: kali / kali.



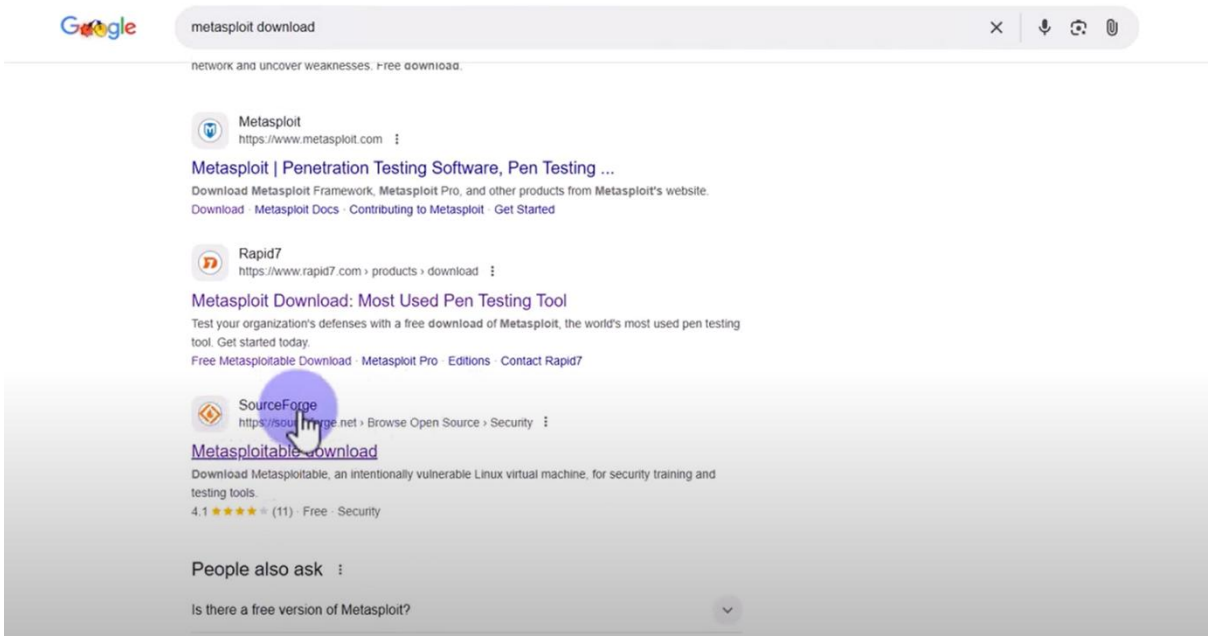






➤ Step 3.3: Downloading Metasploitable 2

- Searched and downloaded from **SourceForge**: metasploitable-linux-2.0.0.zip.
- Extracted to local folder: ...\Metasploitable\.
- Default credentials: msfadmin / msfadmin.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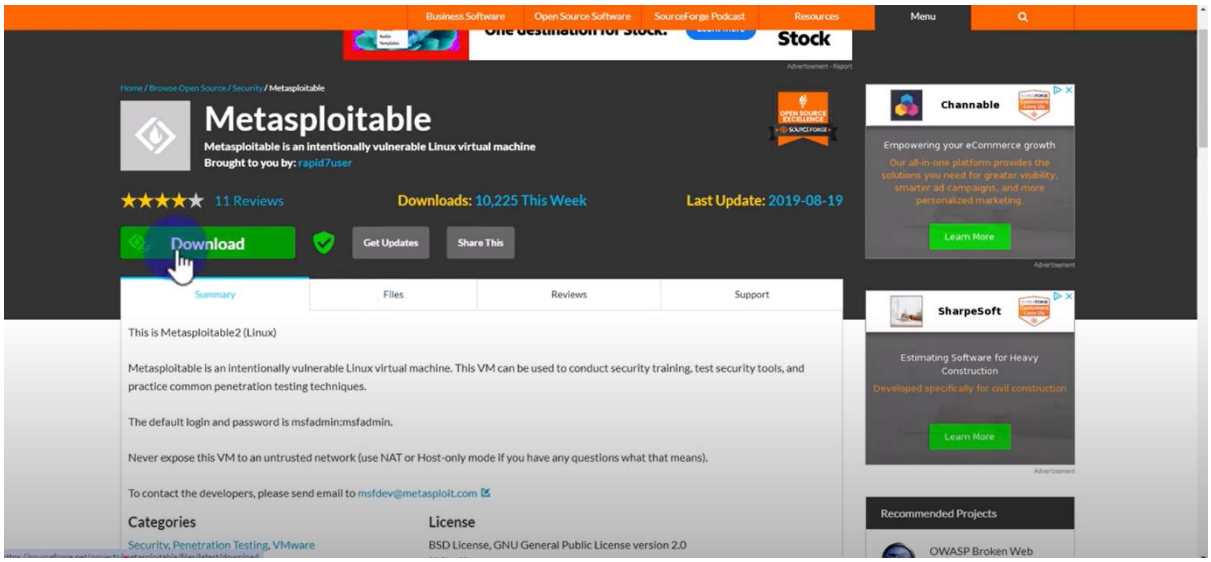
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Metasploitable
Metasploitable is an intentionally vulnerable Linux virtual machine
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11 Reviews
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This is Metasploitable2 (Linux)
Metasploitable is an intentionally vulnerable Linux virtual machine. This VM can be used to conduct security training, test security tools, and practice common penetration testing techniques.
The default login and password is msfadmin:msfadmin.
Never expose this VM to an untrusted network (use NAT or Host-only mode if you have any questions what that means).
To contact the developers, please send email to msfdev@metasploit.com
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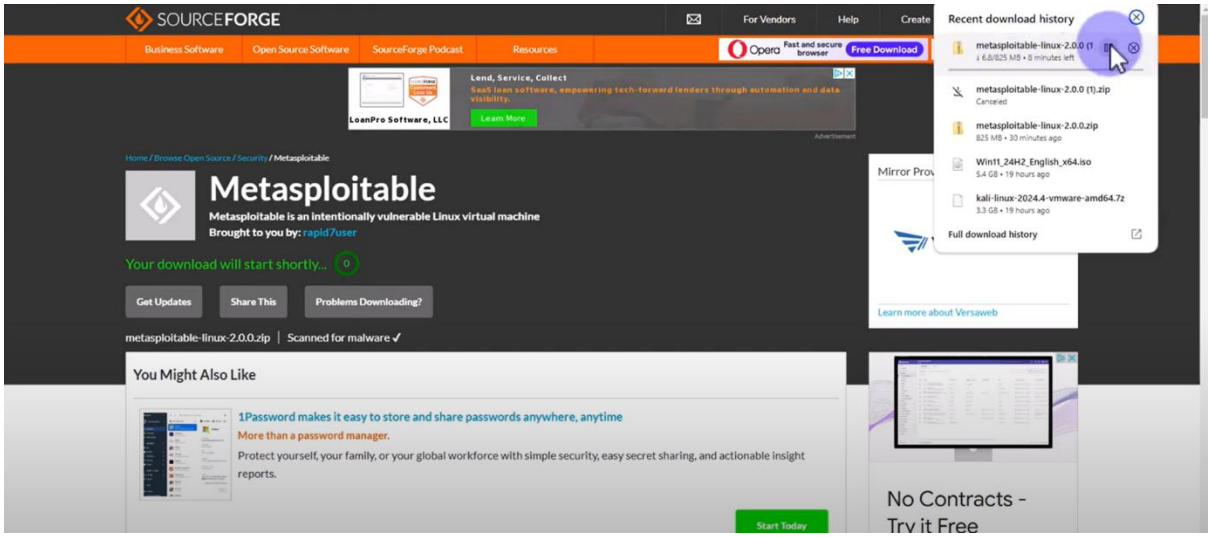
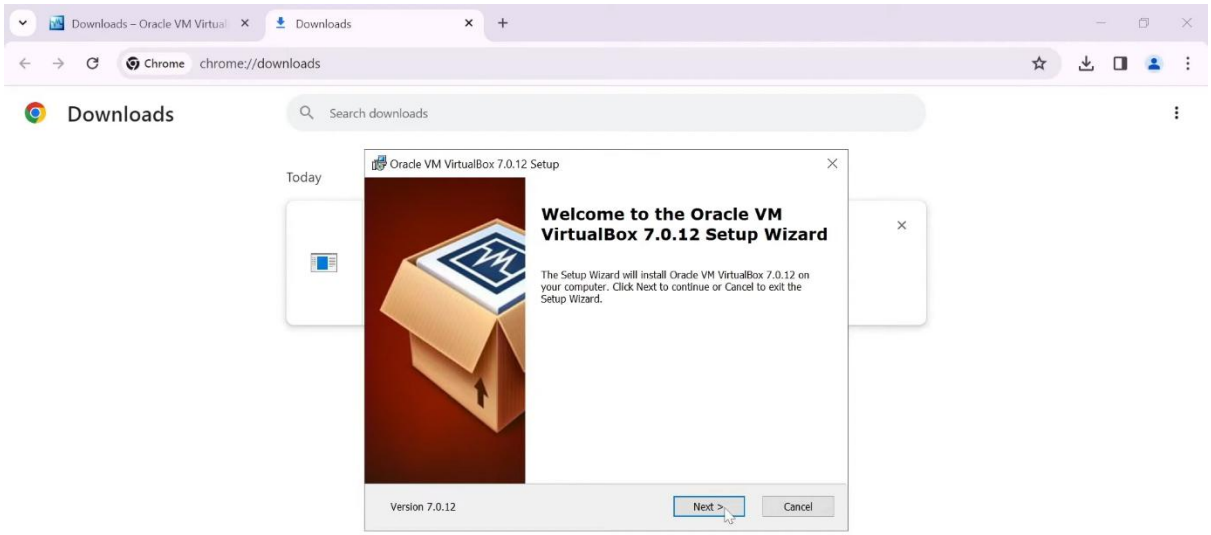


4. Phase 2: Installing Oracle VirtualBox

➤ Step 4.1: Running the Installer

- Executed VirtualBox-7.0.12-159484-Win.exe.
- Followed Setup Wizard → Custom Setup selected.
- Selected components:
  - VirtualBox Application.
  - USB Support.
  - Networking (Bridged + Host-Only).
  - Python Support (with warning — installed anyway).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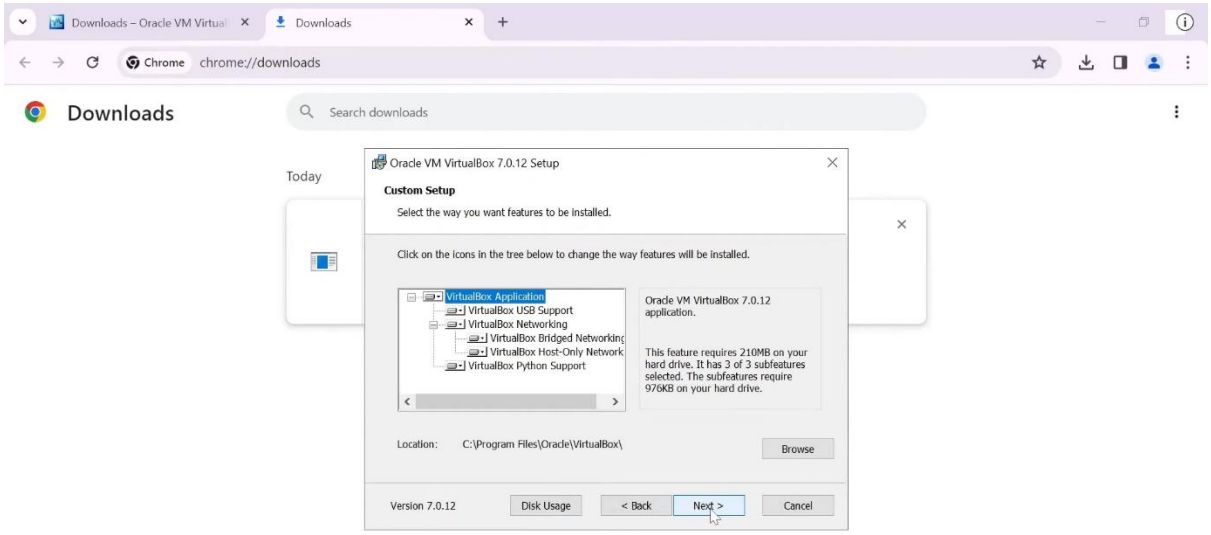
Today
Oracle VM VirtualBox 7.0.12 Setup
Welcome to the Oracle VM VirtualBox 7.0.12 Setup Wizard
The Setup Wizard will install Oracle VM VirtualBox 7.0.12 on your computer. Click Next to continue or Cancel to exit the Setup Wizard.
Version 7.0.12
Next >
Cancel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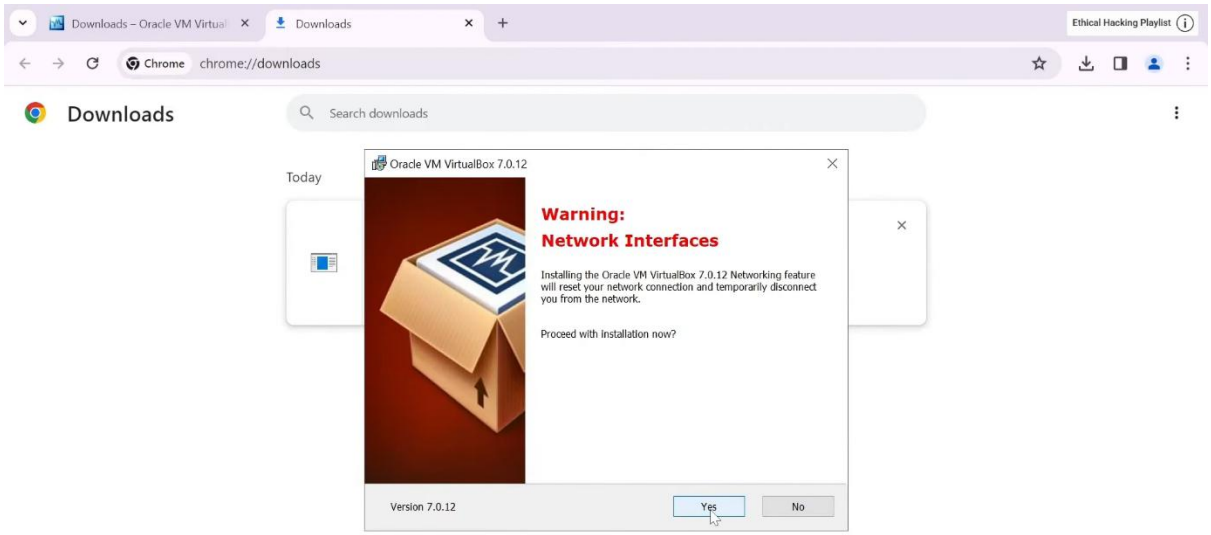
Today
Oracle VM VirtualBox 7.0.12 Setup
Custom Setup
Select the way you want features to be installed.
Click on the icons in the tree below to change the way features will be installed.
VirtualBox Application
VirtualBox USB Support
VirtualBox Networking
VirtualBox Bridged Networking
VirtualBox Host-Only Network
VirtualBox Python Support
Oracle VM VirtualBox 7.0.12 application.
This feature requires 210MB on your hard drive. It has 3 of 3 subfeatures selected. The subfeatures require 976KB on your hard drive.
Location:
C:\Program Files\Oracle\VirtualBox\
Browse
Version 7.0.12
Disk Usage
< Back
Next >
Cancel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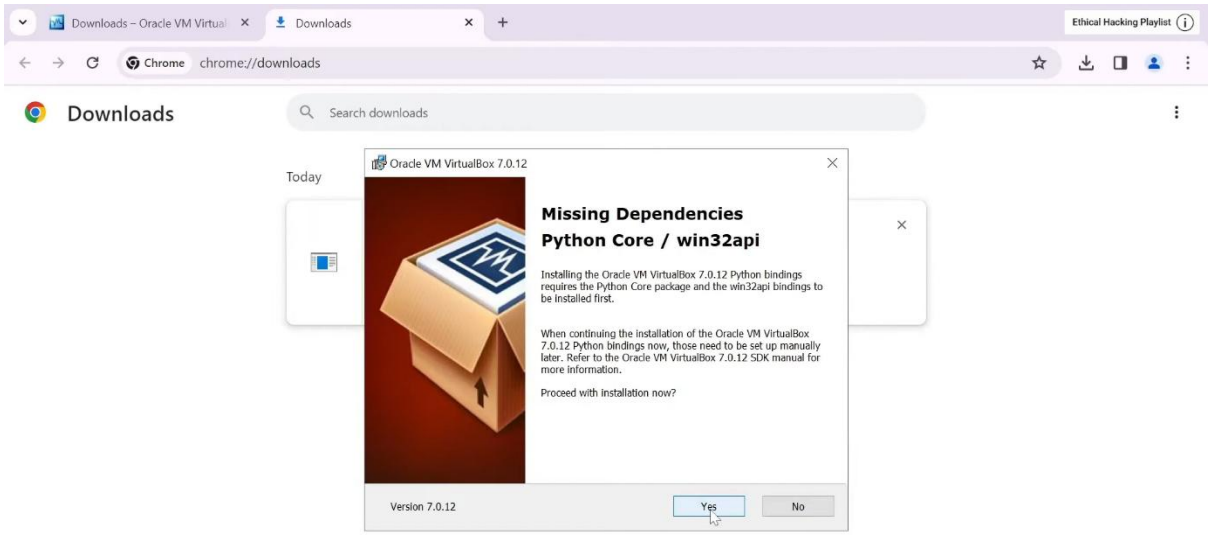
Oracle VM VirtualBox 7.0.12
Warning:
Network Interfaces
Installing the Oracle VM VirtualBox 7.0.12 Networking feature will reset your network connection and temporarily disconnect you from the network.
Proceed with installation now?
Version 7.0.12
Yes
No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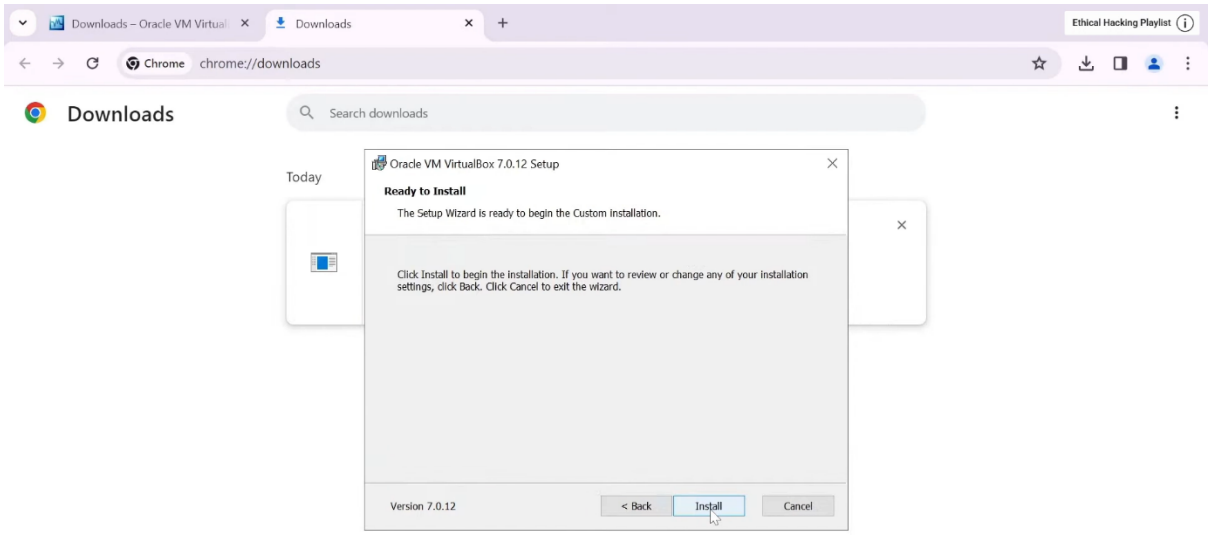
Today
Oracle VM VirtualBox 7.0.12
Missing Dependencies
Python Core / win32api
Installing the Oracle VM VirtualBox 7.0.12 Python bindings requires the Python Core package and the win32api bindings to be installed first.
When continuing the installation of the Oracle VM VirtualBox 7.0.12 Python bindings now, those need to be set up manually later. Refer to the Oracle VM VirtualBox 7.0.12 SDK manual for more information.
Proceed with installation now?
Version 7.0.12
Yes
No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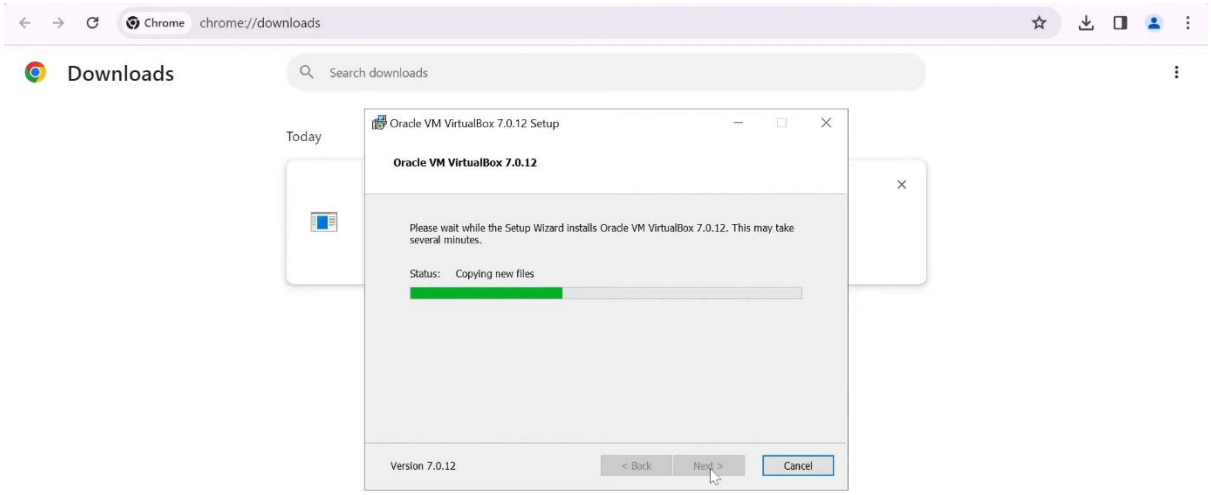
Today
Oracle VM VirtualBox 7.0.12 Setup
Ready to Install
The Setup Wizard is ready to begin the Custom installation.
Click Install to begin the installation. If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
Version 7.0.12
< Back
Install
Cancel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chrome://downloads
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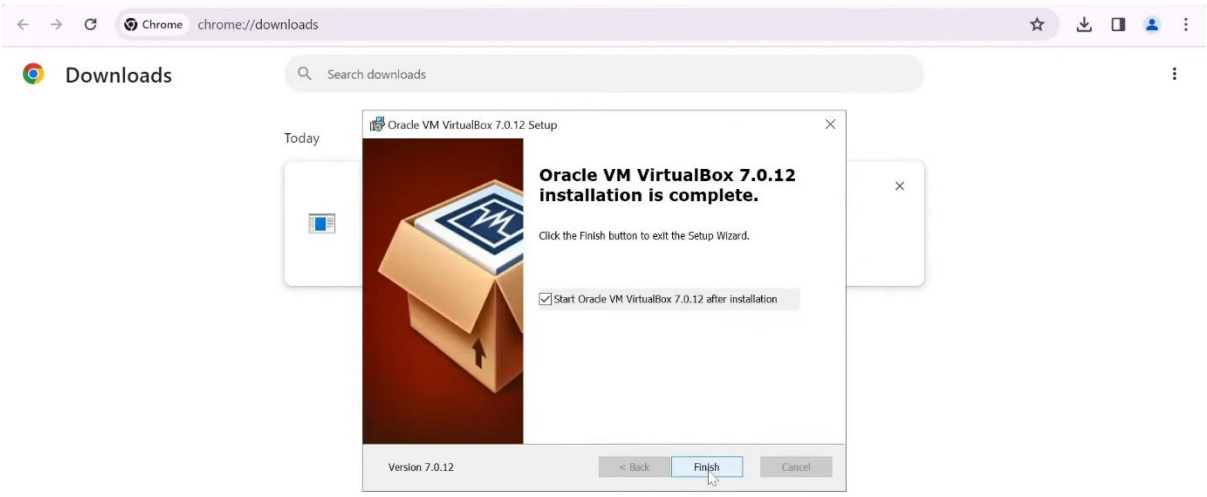
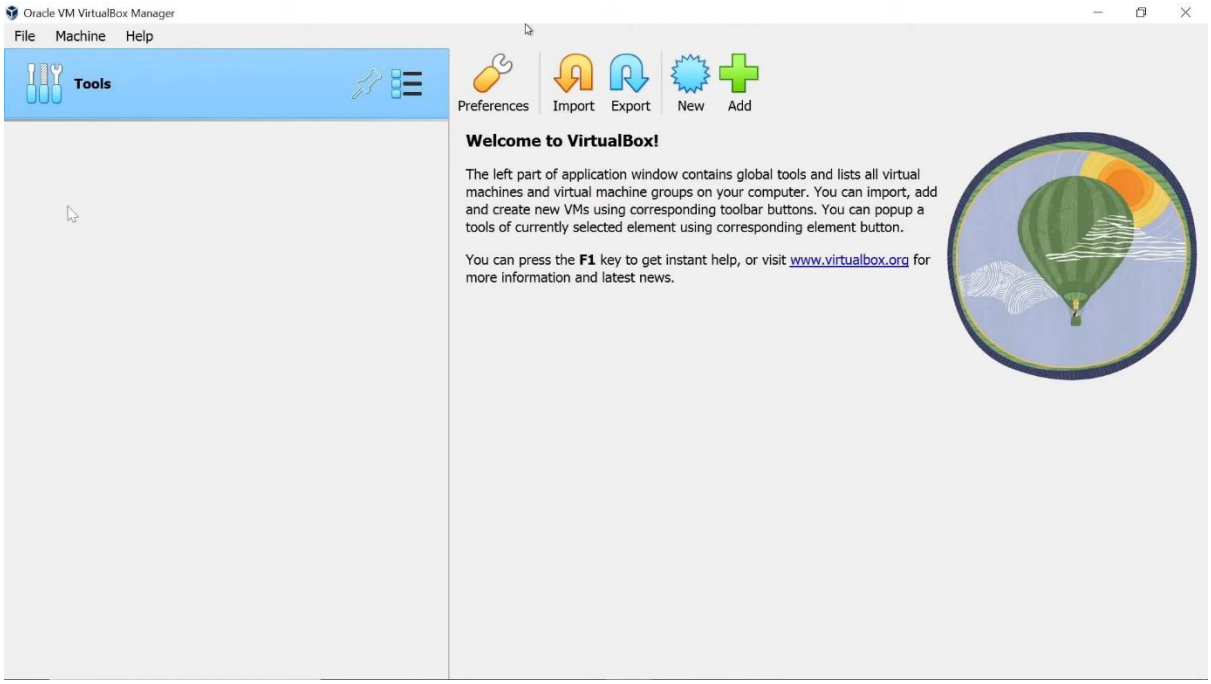
Today
Oracle VM VirtualBox 7.0.12 Setup
Oracle VM VirtualBox 7.0.12
Please wait while the Setup Wizard installs Oracle VM VirtualBox 7.0.12. This may take several minutes.
Status: Copying new files
Version 7.0.12
< Back
Next >
Cancel

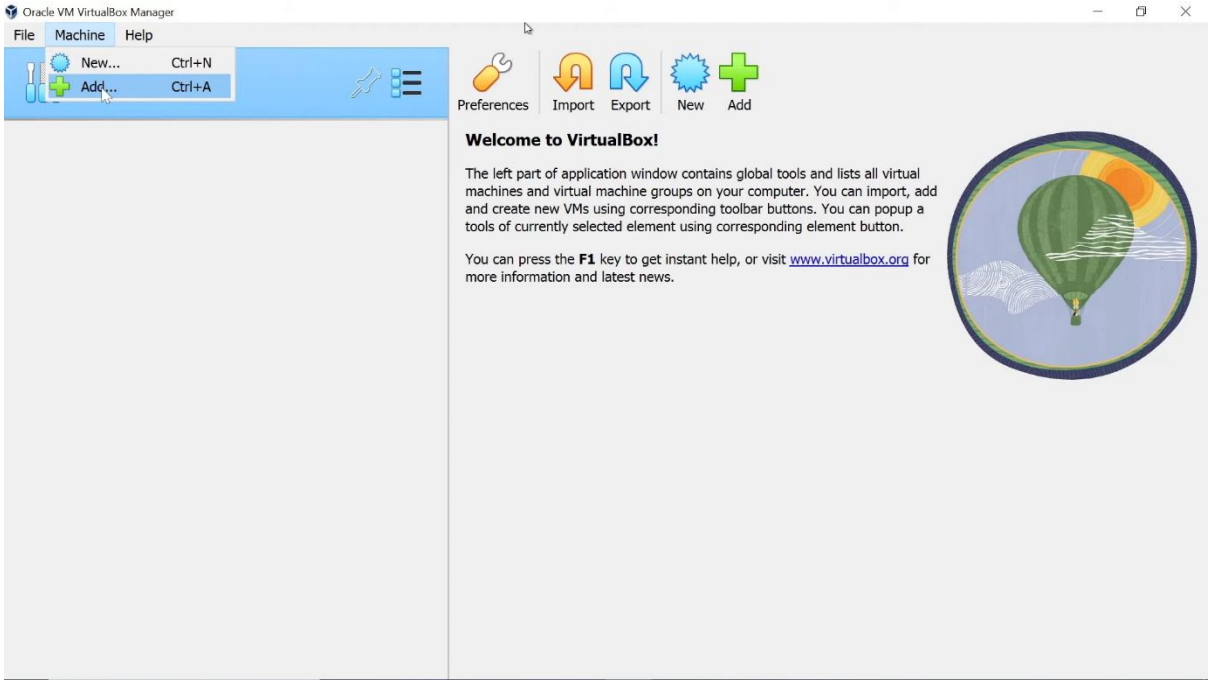


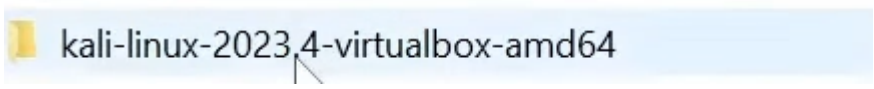
5. Phase 3: Importing & Configuring Kali Linux VM

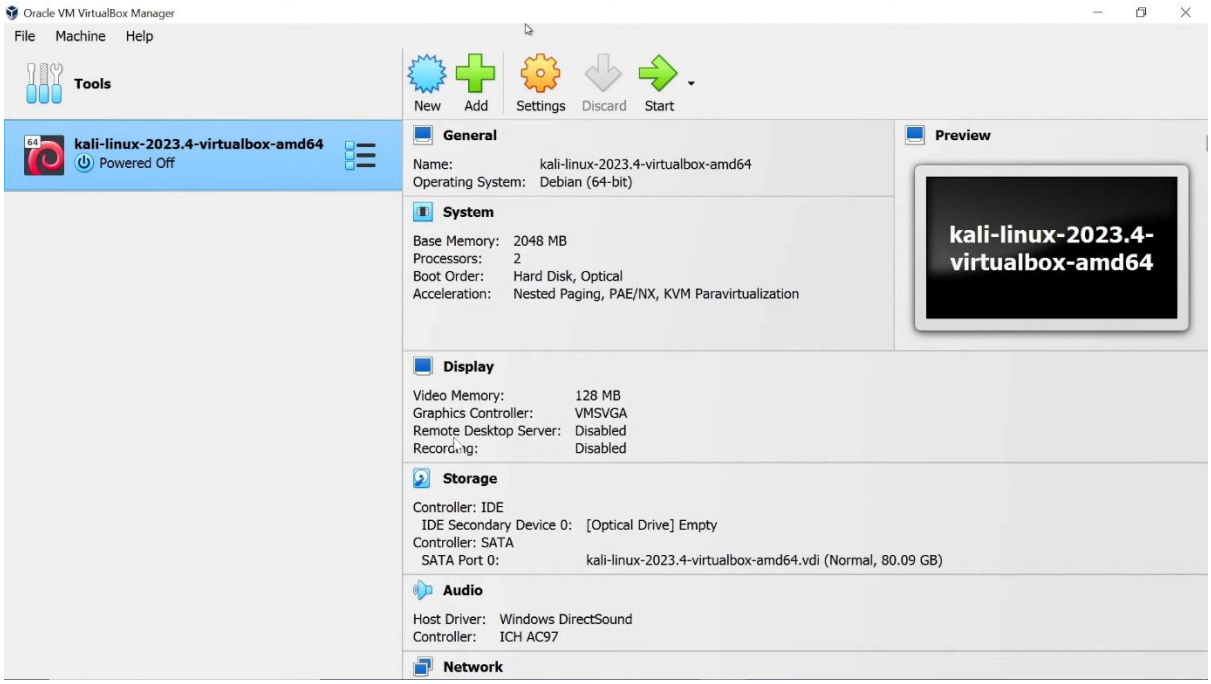
➤ Step 5.1: Importing the Appliance

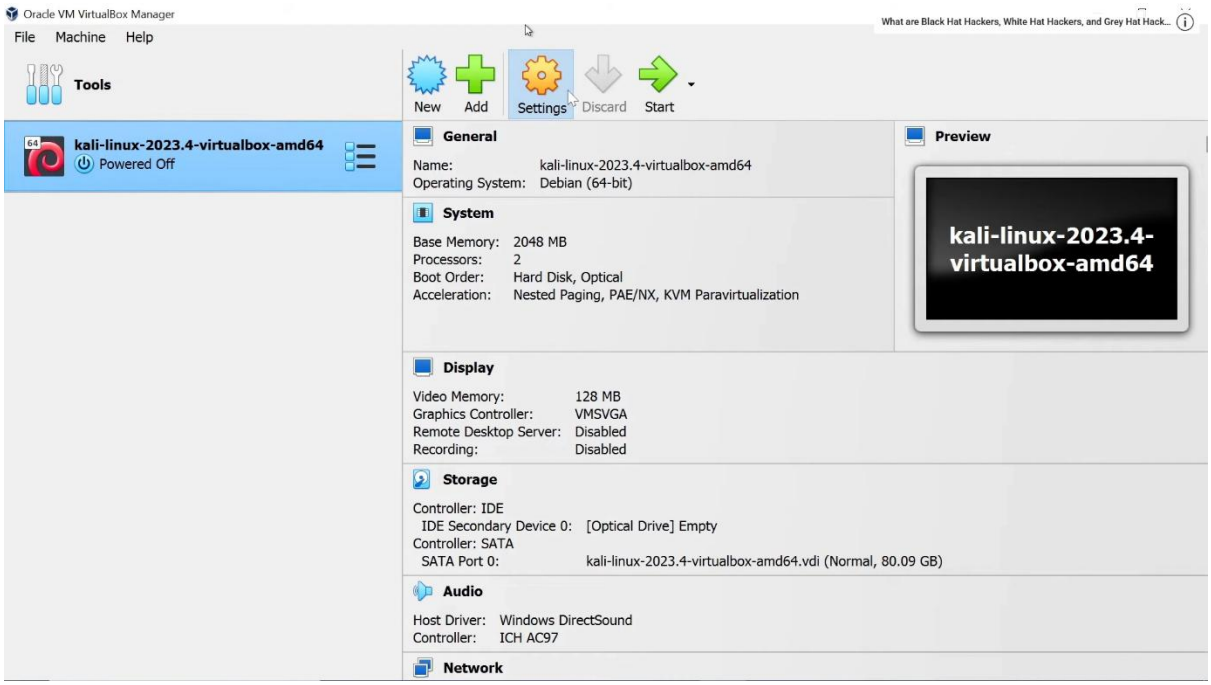
- Opened VirtualBox → **File → Import Appliance.**
- Selected extracted .ova file from Kali archive.
- VM Name: kali-linux-2023.4-virtualbox-amd64.
- Settings:
  - OS Type: Linux 64-bit.
  - RAM: 2048 MB.
  - CPU: 2 Cores.
  - Video Memory: 128 MB.
  - Storage: 80.09 GB VDI (dynamically allocated).

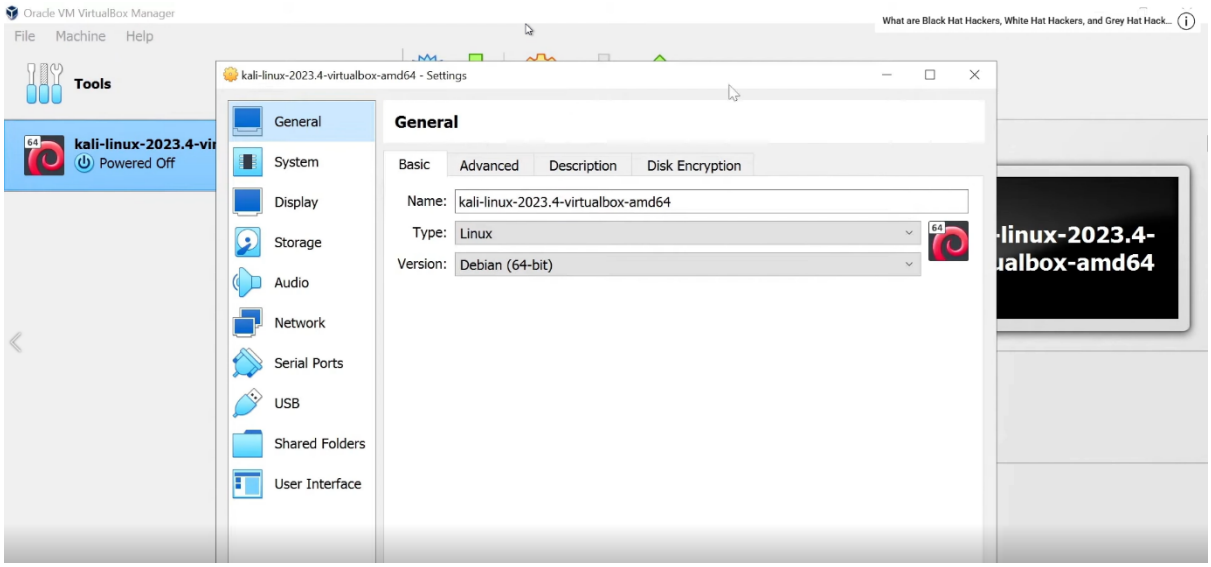

Oracle VM VirtualBox Manager
File
Machine
Help
Tools
Preferences
Import
Export
New
Add
Welcome to VirtualBox!
The left part of application window contains global tools and lists all virtual machines and virtual machine groups on your computer. You can import, add and create new VMs using corresponding toolbar buttons. You can popup a tools of currently selected element using corresponding element button.
You can press the F1 key to get instant help, or visit www.virtualbox.org for more information and latest news.

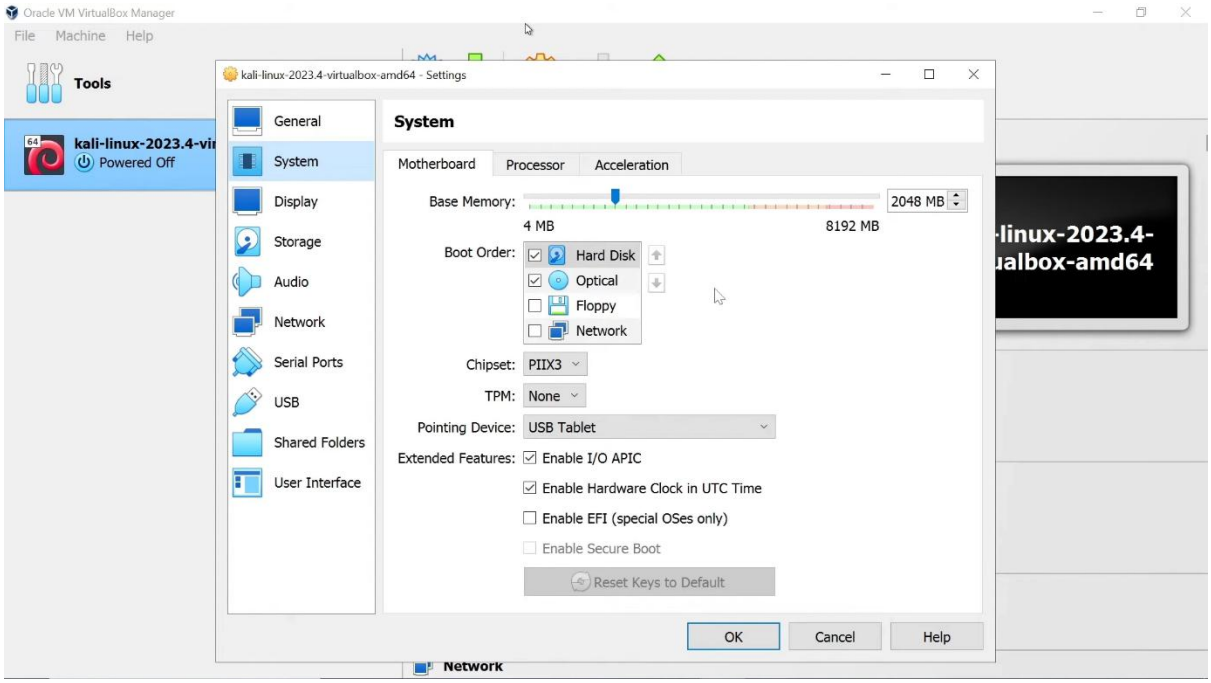

Oracle VM VirtualBox Manager
File
Machine
Help
New... Ctrl+N
Add... Ctrl+A
Preferences
Import
Export
New
Add
Welcome to VirtualBox!
The left part of application window contains global tools and lists all virtual machines and virtual machine groups on your computer. You can import, add and create new VMs using corresponding toolbar buttons. You can popup a tools of currently selected element using corresponding element button.
You can press the F1 key to get instant help, or visit www.virtualbox.org for more information and latest news.


kali-linux-2023.4-virtualbox-amd64


Oracle VM VirtualBox Manager
File
Machine
Help
Tools
New
Add
Settings
Discard
Start
kali-linux-2023.4-virtualbox-amd64
Powered Off
General
Name: kali-linux-2023.4-virtualbox-amd64
Operating System: Debian (64-bit)
System
Base Memory: 2048 MB
Processors: 2
Boot Order: Hard Disk, Optical
Acceleration: Nested Paging, PAE/NX, KVM Paravirtualization
Preview
kali-linux-2023.4-virtualbox-amd64
Display
Video Memory: 128 MB
Graphics Controller: VMSVGA
Remote Desktop Server: Disabled
Recording: Disabled
Storage
Controller: IDE
IDE Secondary Device 0: [Optical Drive] Empty
Controller: SATA
SATA Port 0: kali-linux-2023.4-virtualbox-amd64.vdi (Normal, 80.09 GB)
Audio
Host Driver: Windows DirectSound
Controller: ICH AC97
Network

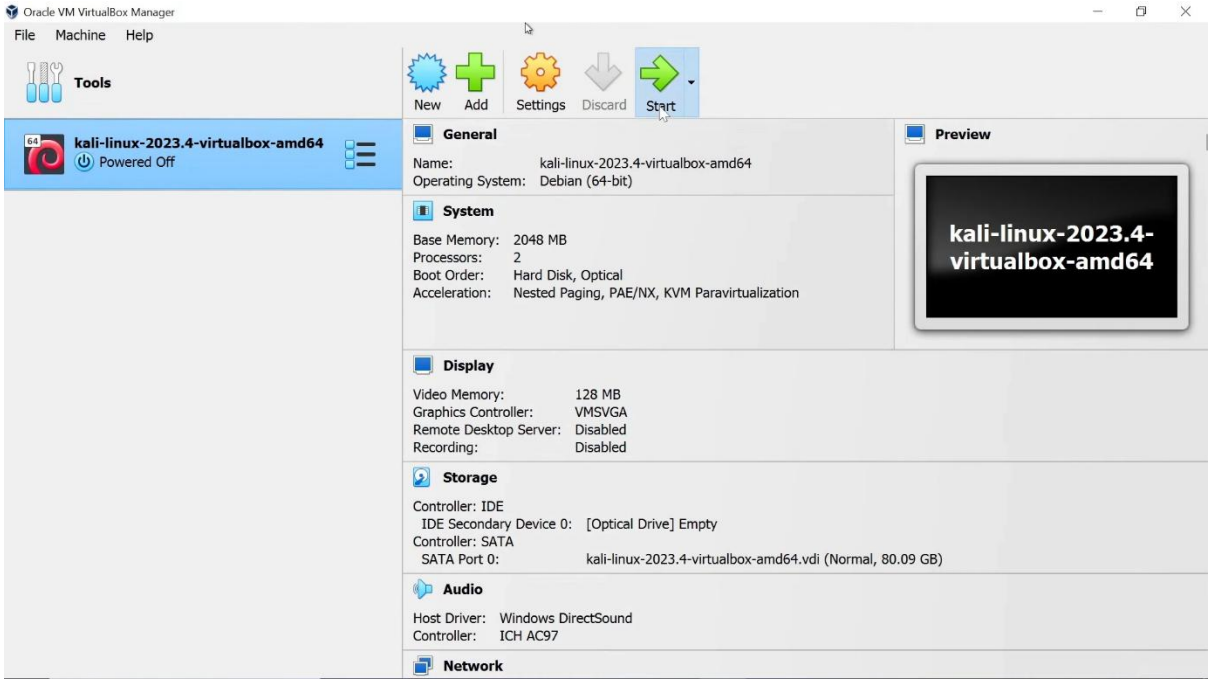

Oracle VM VirtualBox Manager
What are Black Hat Hackers, White Hat Hackers, and Grey Hat Hack...
File
Machine
Help
Tools
New
Add
Settings
Discard
Start
kali-linux-2023.4-virtualbox-amd64
Powered Off
General
Name: kali-linux-2023.4-virtualbox-amd64
Operating System: Debian (64-bit)
System
Base Memory: 2048 MB
Processors: 2
Boot Order: Hard Disk, Optical
Acceleration: Nested Paging, PAE/NX, KVM Paravirtualization
Preview
kali-linux-2023.4-virtualbox-amd64
Display
Video Memory: 128 MB
Graphics Controller: VMSVGA
Remote Desktop Server: Disabled
Recording: Disabled
Storage
Controller: IDE
IDE Secondary Device 0: [Optical Drive] Empty
Controller: SATA
SATA Port 0: kali-linux-2023.4-virtualbox-amd64.vdi (Normal, 80.09 GB)
Audio
Host Driver: Windows DirectSound
Controller: ICH AC97
Network

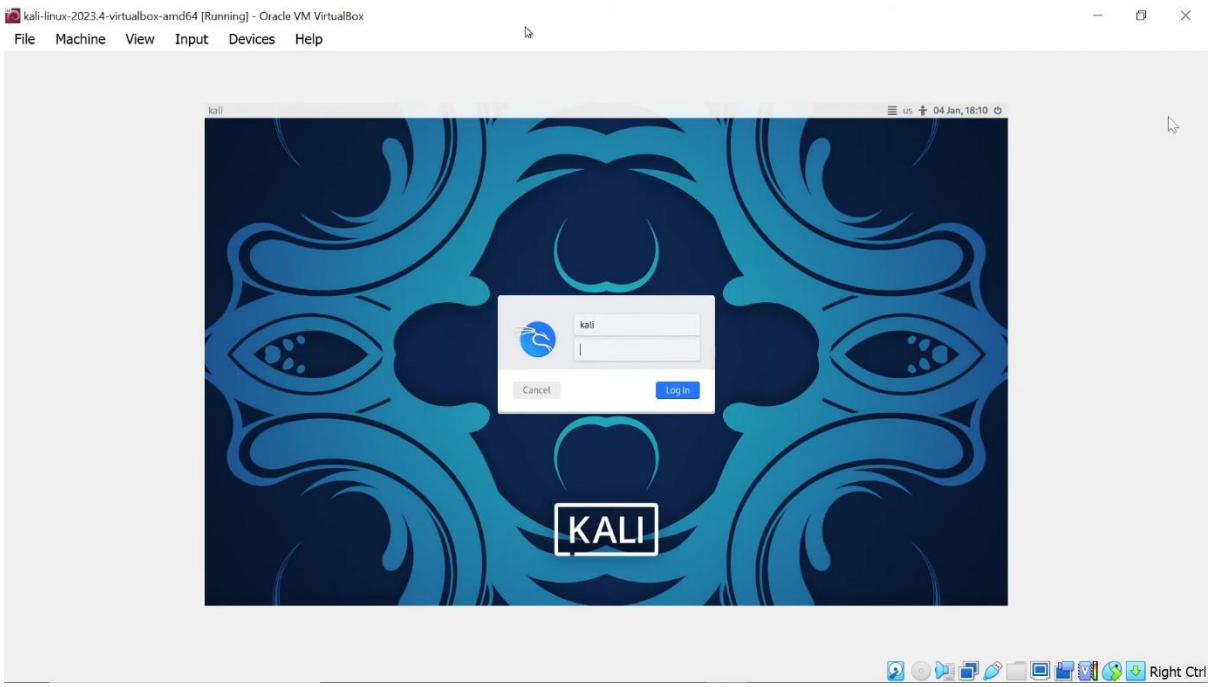

Oracle VM VirtualBox Manager
File Machine Help
What are Black Hat Hackers, White Hat Hackers, and Grey Hat Hack...
Tools
kali-linux-2023.4-vi
Powered Off
kali-linux-2023.4-virtualbox-amd64 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
General
Basic
Advanced
Description
Disk Encryption
Name: kali-linux-2023.4-virtualbox-amd64
Type: Linux
Version: Debian (64-bit)
linux-2023.4-
ualbox-amd64


Oracle VM VirtualBox Manager
File Machine Help
Tools
kali-linux-2023.4-vi
Powered Off
kali-linux-2023.4-virtualbox-amd64 - Settings
General
System
Display
Storage
Audio
Network
Serial Ports
USB
Shared Folders
User Interface
System
Motherboard
Processor
Acceleration
Base Memory: 2048 MB
4 MB
8192 MB
Boot Order:
Hard Disk
Optical
Floppy
Network
Chipset: PIIX3
TPM: None
Pointing Device: USB Tablet
Extended Features:
Enable I/O APIC
Enable Hardware Clock in UTC Time
Enable EFI (special OSes only)
Enable Secure Boot
Reset Keys to Default
OK
Cancel
Help
linux-2023.4-
ualbox-amd64
Network

➤ Step 5.2: Starting Kali Linux

- Clicked **Start** → VM boots to login screen.
- Logged in with: kali / kali.
- Desktop environment loaded successfully (XFCE).

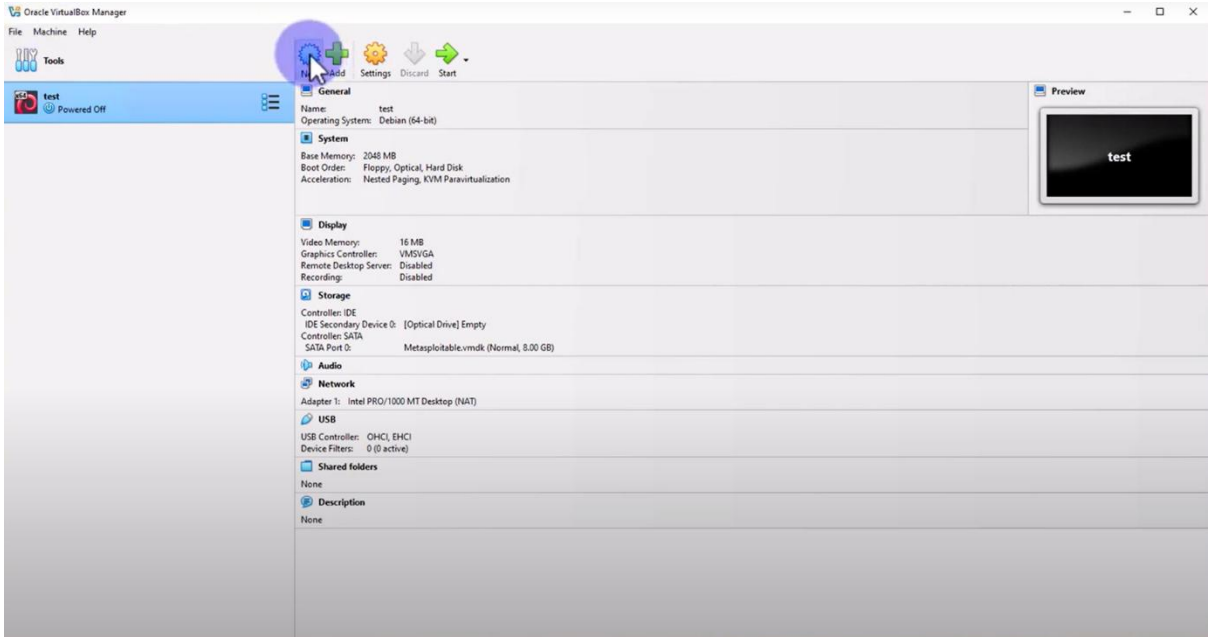


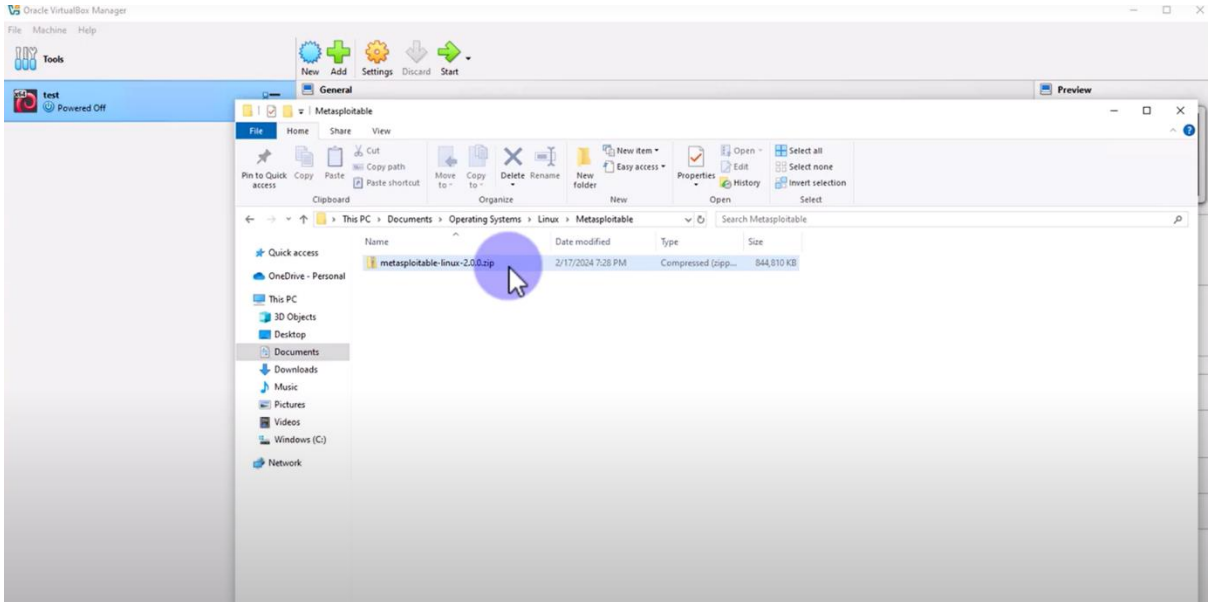


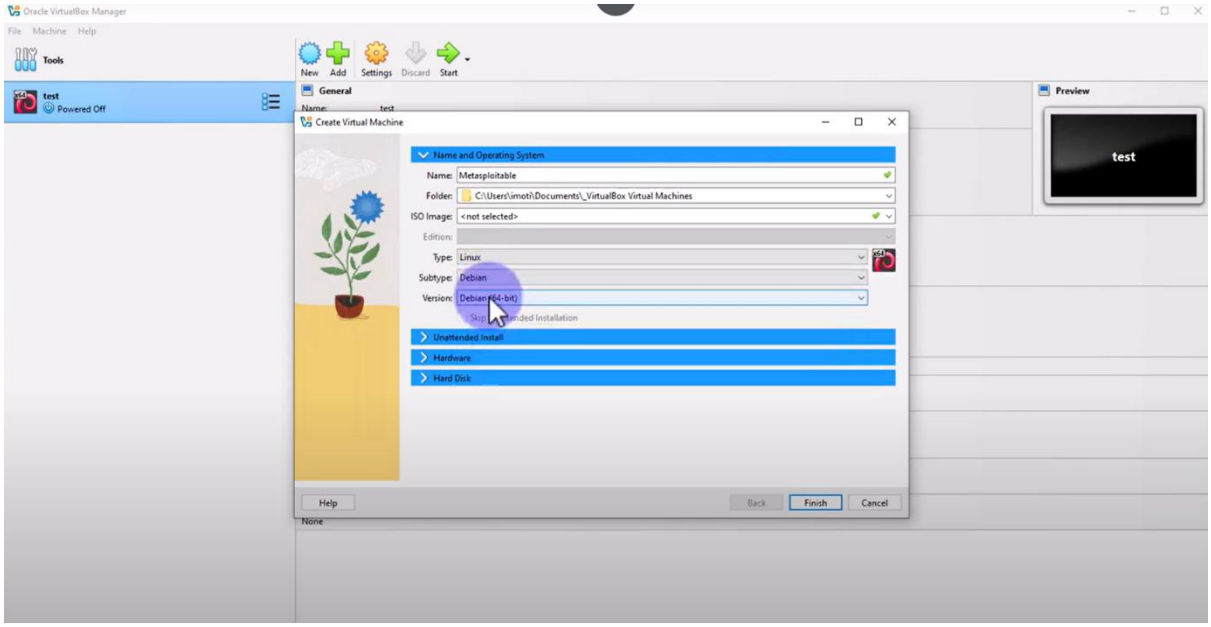
6. Phase 4: Creating & Configuring Metasploitable VM

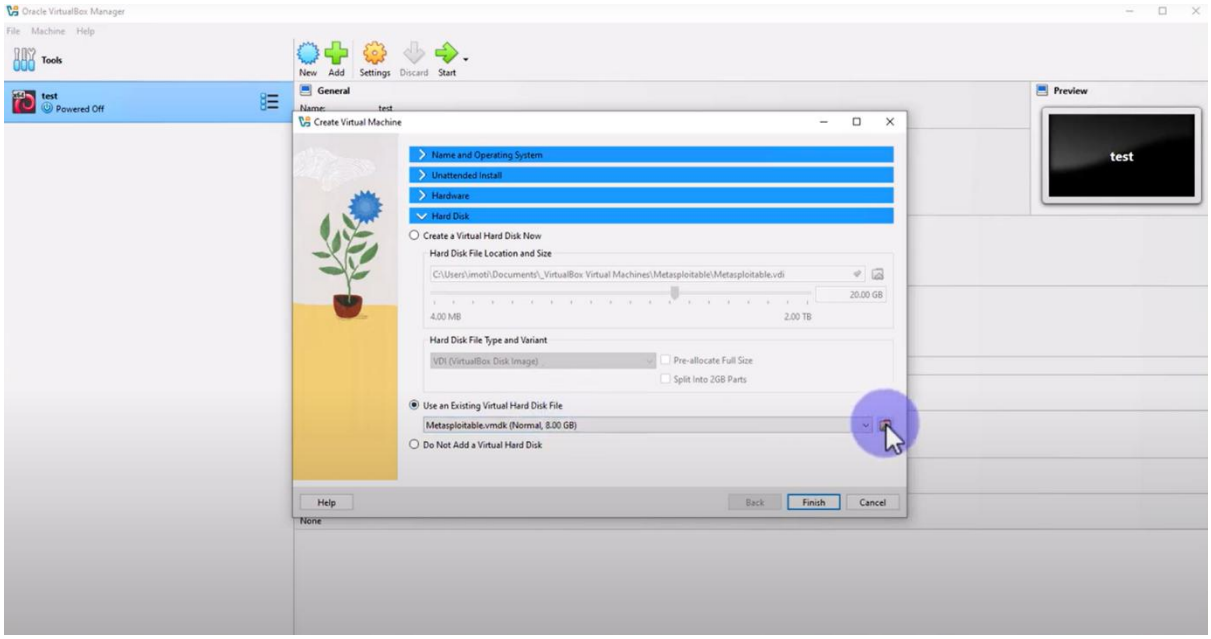
➤ Step 6.1: Creating New VM

- VirtualBox → New.
- Name: Metasploitable.
- Type: Linux.
- Version: Debian (64-bit).
- RAM: 2048 MB (increased from default for performance).


Oracle VirtualBox Manager
File Machine Help
Tools
test
Powered Off
New Add Settings Discard Start
General
Name: test
Operating System: Debian (64-bit)
System
Base Memory: 2048 MB
Boot Order: Floppy, Optical, Hard Disk
Acceleration: Nested Paging, KVM Paravirtualization
Preview
test
Display
Video Memory: 16 MB
Graphics Controller: VMSVGA
Remote Desktop Server: Disabled
Recording: Disabled
Storage
Controller: IDE
IDE Secondary Device 0: [Optical Drive] Empty
Controller: SATA
SATA Port 0: Metasploitable.vmdk (Normal, 8.00 GB)
Audio
Network
Adapter 1: Intel PRO/1000 MT Desktop (NAT)
USB
USB Controller: OHCI, EHCI
Device Filters: 0 (0 active)
Shared folders
None
Description
None

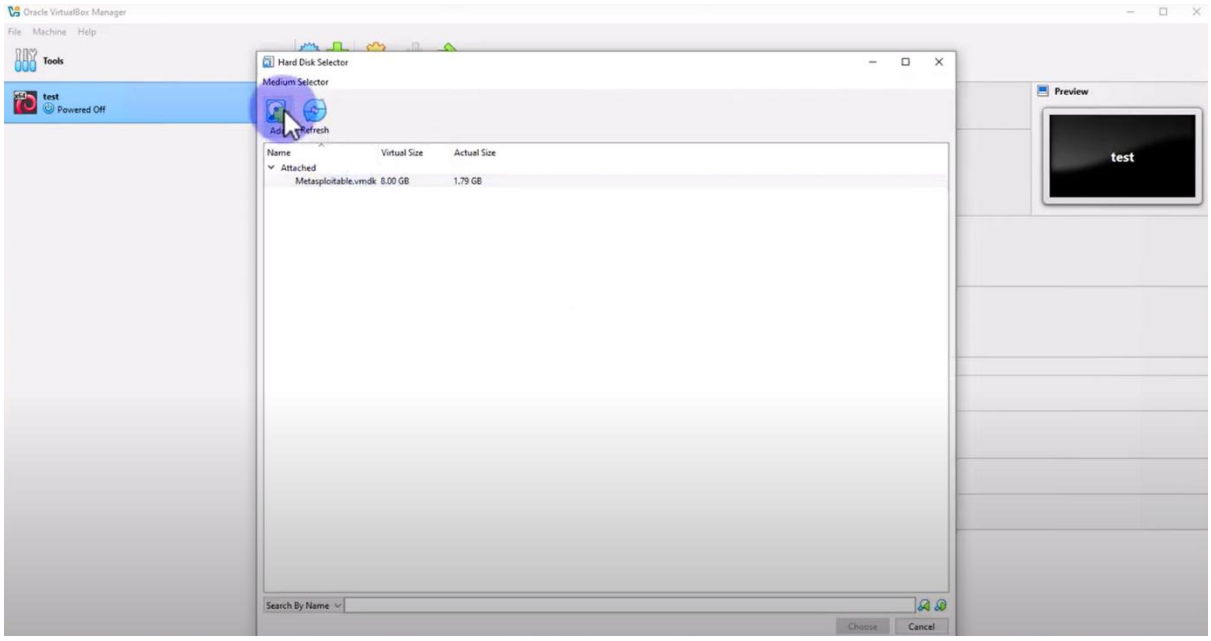

Oracle VirtualBox Manager
File Machine Help
Tools
test
Powered Off
New Add Settings Discard Start
General
Preview
Metasploitable
File Home Share View
Pin to Quick access Copy Paste Cut Copy path Paste shortcut
Clipboard
Move to Copy to Delete Rename
Organize
New folder New item Easy access
New
Properties Open Edit History
Open
Select all Select none Invert selection
Select
This PC › Documents › Operating Systems › Linux › Metasploitable
Search Metasploitable
Quick access
OneDrive - Personal
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows (C:)
Network
Name
Date modified
Type
Size
metasploitable-linux-2.0.0.zip
2/17/2024 7:28 PM
Compressed (zipp...
844,810 KB

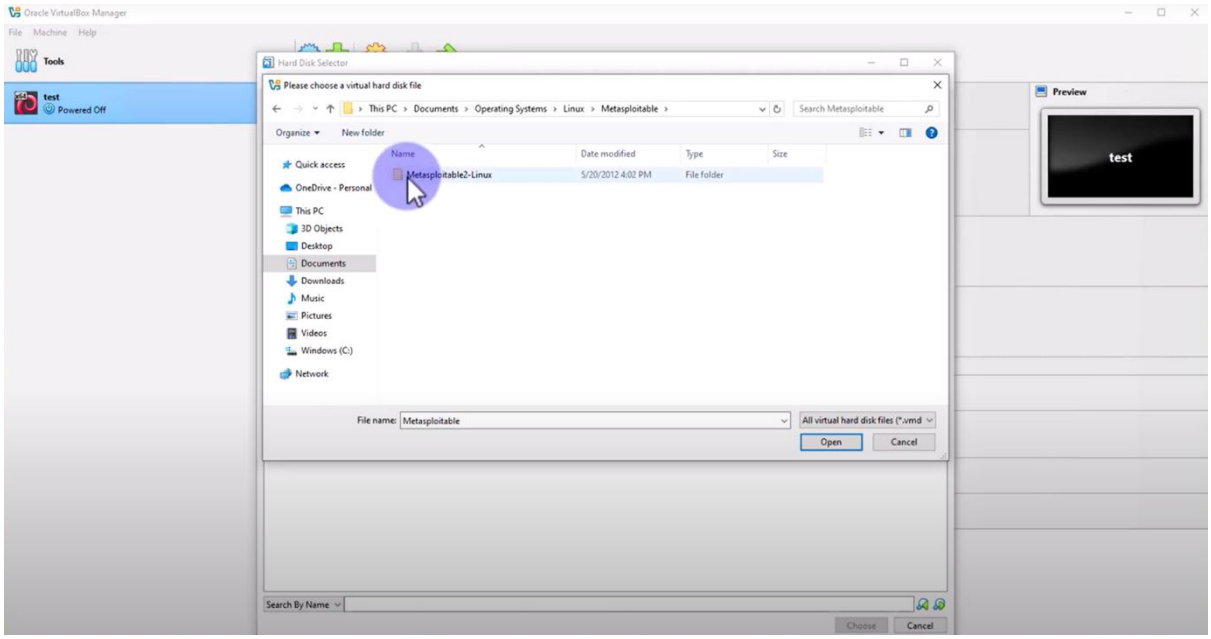

Oracle VirtualBox Manager
File Machine Help
Tools
test
Powered Off
New Add Settings Discard Start
General
Name: test
Preview
test
Create Virtual Machine
Name and Operating System
Name: Metasploitable
Folder: C:\Users\imoti\Documents_VirtualBox Virtual Machines
ISO Image: <not selected>
Edition:
Type: Linux
Subtype: Debian
Version: Debian (64-bit)
Unattended Install
Hardware
Hard Disk
Help
Back
Finish
Cancel
None

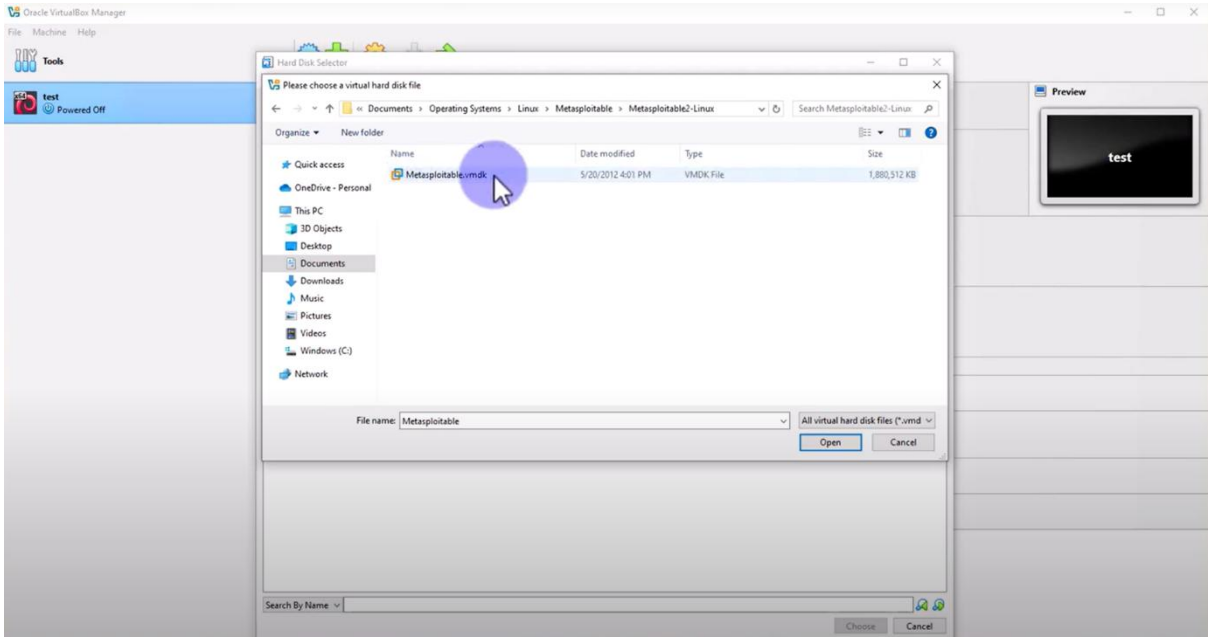

Oracle VirtualBox Manager
File Machine Help
Tools
test
Powered Off
New Add Settings Discard Start
General
Name: test
Preview
test
Create Virtual Machine
Name and Operating System
Unattended Install
Hardware
Hard Disk
Create a Virtual Hard Disk Now
Hard Disk File Location and Size
C:\Users\imoti\Documents_VirtualBox Virtual Machines\Metasploitable\Metasploitable.vdi
20.00 GB
4.00 MB
2.00 TB
Hard Disk File Type and Variant
VDI (VirtualBox Disk Image)
Pre-allocate Full Size
Split Into 2GB Parts
Use an Existing Virtual Hard Disk File
Metasploitable.vmdk (Normal, 8.00 GB)
Do Not Add a Virtual Hard Disk
Help
Back
Finish
Cancel
None

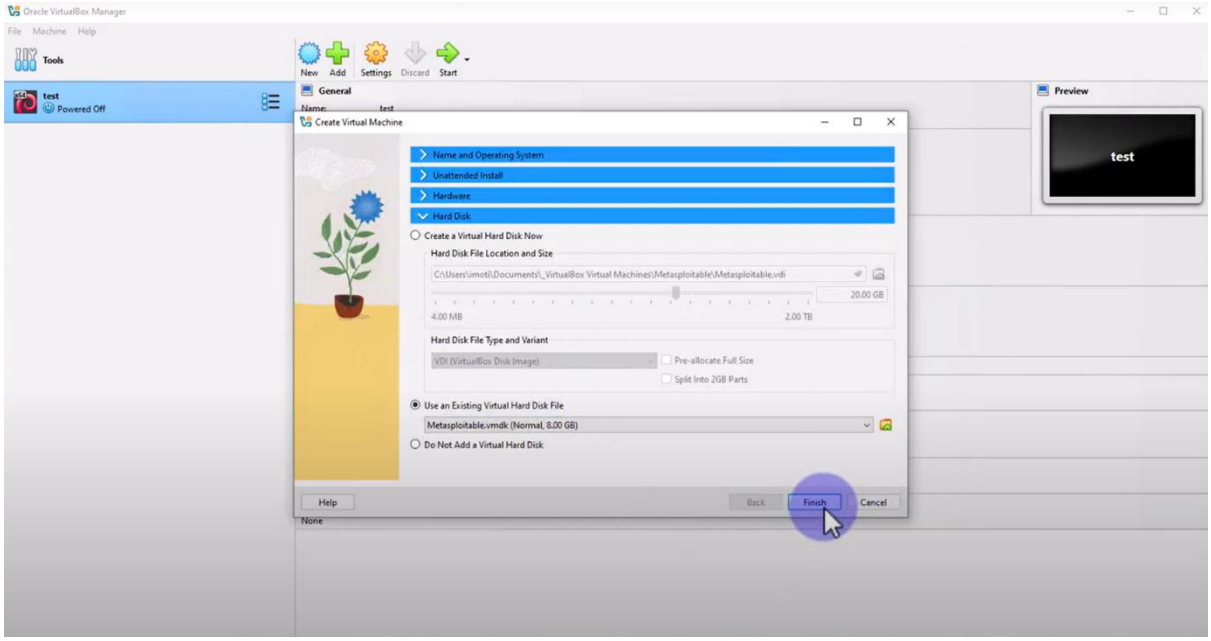
➤ Step 6.2: Attaching Existing Virtual Hard Disk

- Selected: **Use an existing virtual hard disk file.**
- Browsed to extracted folder → Selected: Metasploitable.vmdk.
- File size: 8.00 GB (actual: ~1.79 GB used).




Oracle VirtualBox Manager
File Machine Help
Tools
test
Powered Off
Hard Disk Selector
Please choose a virtual hard disk file
This PC › Documents › Operating Systems › Linux › Metasploitable ›
Search Metasploitable
Organize
New folder
Name
Date modified
Type
Size
Quick access
OneDrive - Personal
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows (C:)
Network
Metasploitable2-Linux
5/20/2012 4:02 PM
File folder
File name: Metasploitable
All virtual hard disk files (*.vmd
Open
Cancel
Search By Name
Choose
Cancel
Preview
test


Oracle VirtualBox Manager
File Machine Help
Tools
test
Powered Off
Hard Disk Selector
Please choose a virtual hard disk file
« Documents › Operating Systems › Linux › Metasploitable › Metasploitable2-Linux
Search Metasploitable2-Linux
Organize
New folder
Name
Date modified
Type
Size
Quick access
OneDrive - Personal
This PC
3D Objects
Desktop
Documents
Downloads
Music
Pictures
Videos
Windows (C:)
Network
Metasploitable.vmdk
5/20/2012 4:01 PM
VMDK File
1,880,512 KB
File name: Metasploitable
All virtual hard disk files (*.vmd
Open
Cancel
Search By Name
Choose
Cancel
Preview
test

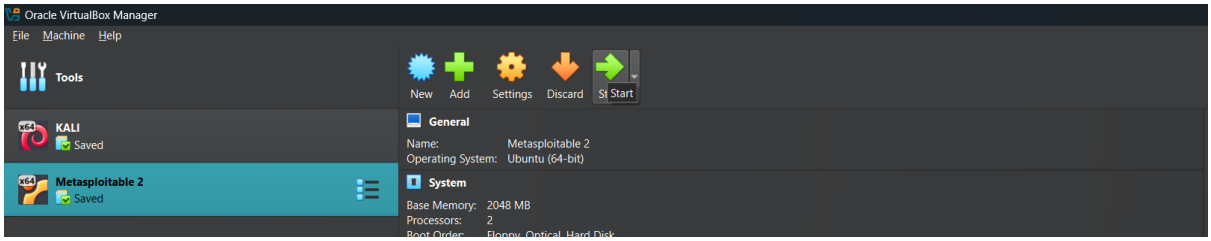


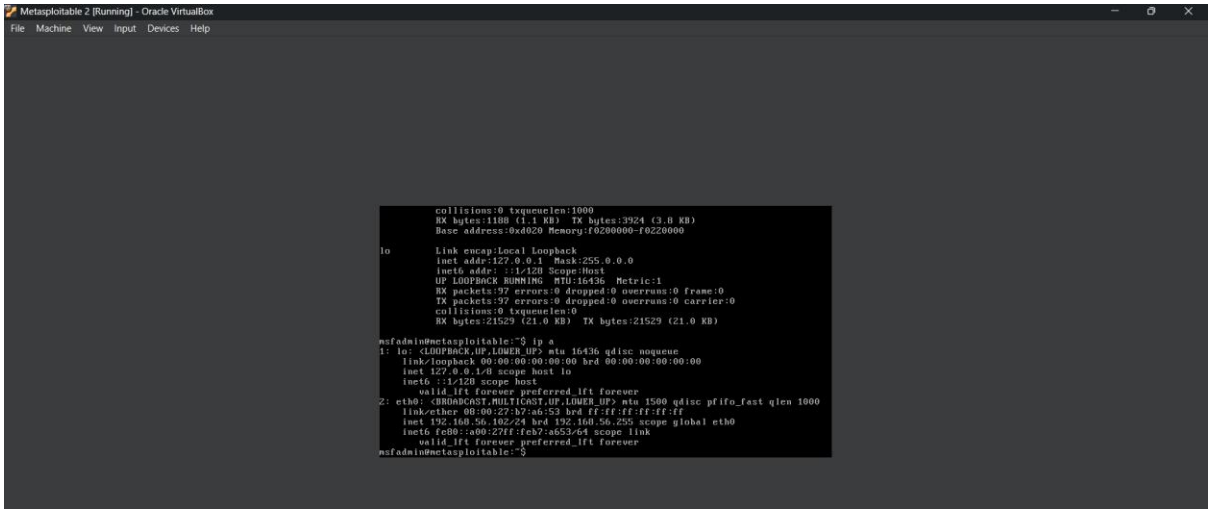
➤ Step 6.3: Network Configuration (Critical Step)

- Opened VM Settings → **Network.**
- Attached to: **NAT** (default — allows internet access for updates if needed).
- *Note: For strict lab isolation, Host-only is recommended.*

➤ Step 6.4: Starting Metasploitable

- Clicked **Start** → VM boots directly to terminal (no GUI).
- Auto-logged in as msfadmin.
- Ran ifconfig to check IP: Assigned via NAT (e.g., 10.0.2.15).

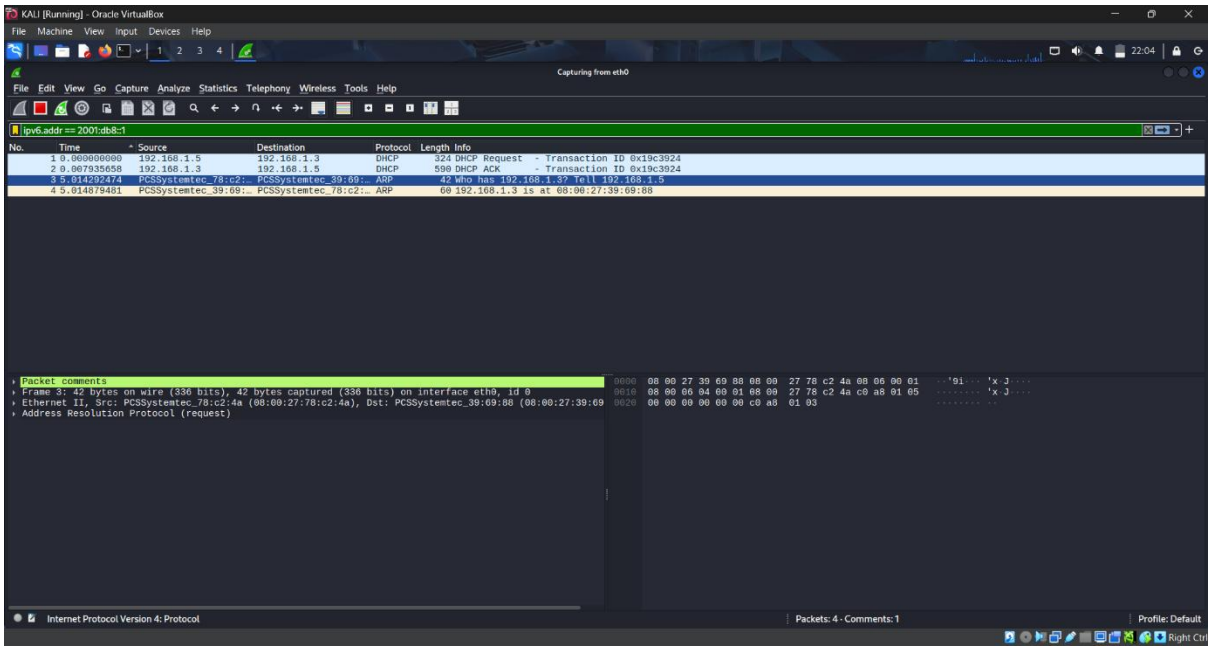


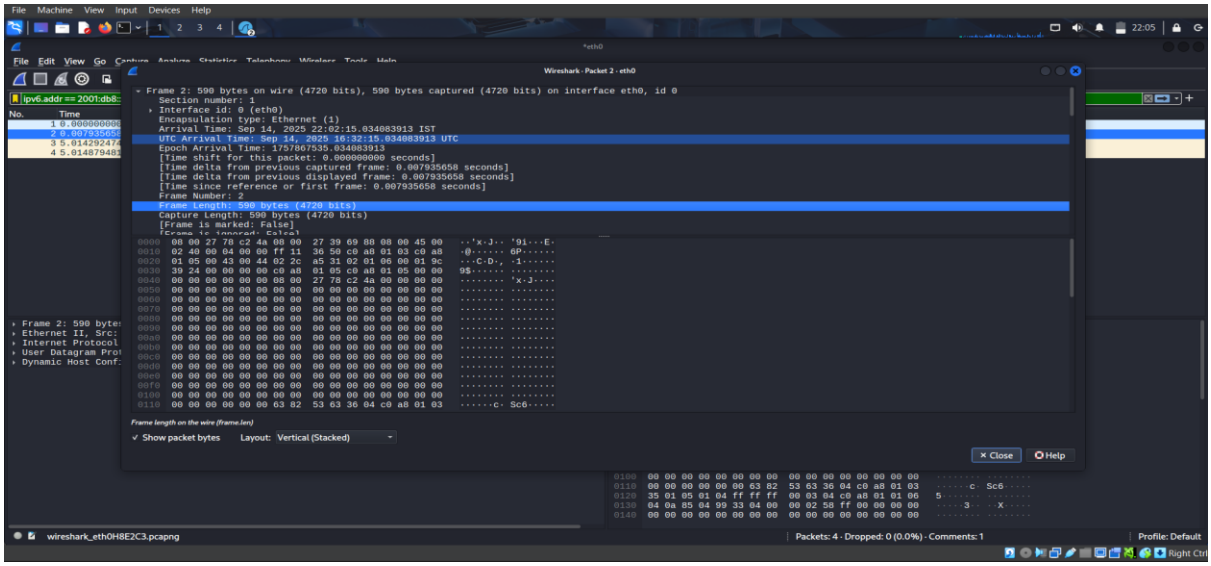


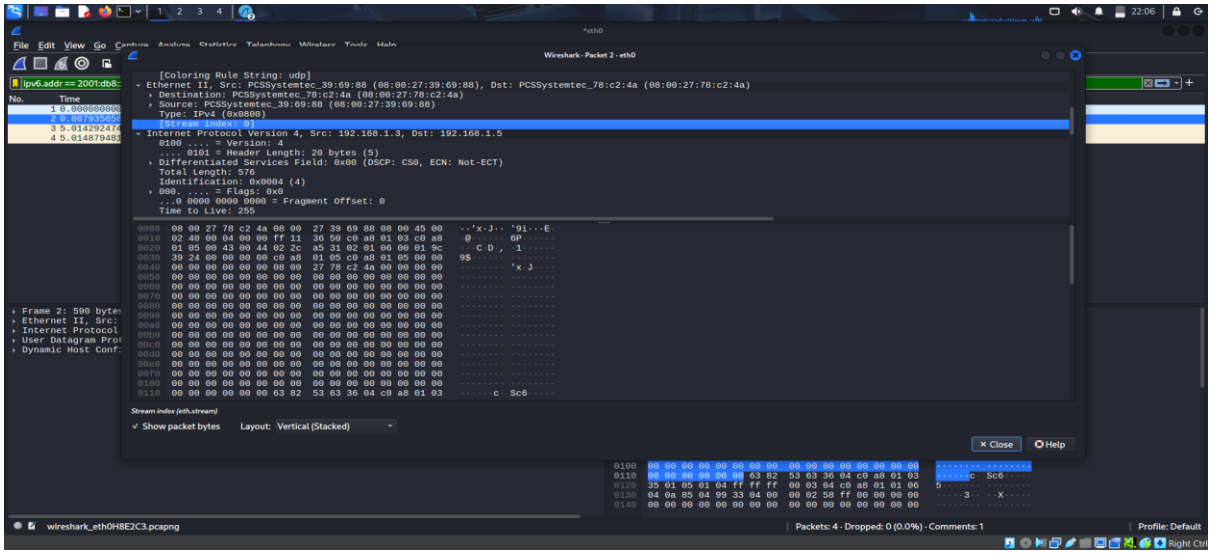
7. Phase 5: Network Validation & Basic Testing

➤ Step 7.1: Monitoring Network Traffic with Wireshark

- In Kali, launched **Wireshark** (pre-installed).
- Started capture on interface: eth0.
- Observed DHCP traffic (BOOTP/DHCP Discover, Offer, Request, ACK).
- Confirmed Kali received IP from VirtualBox DHCP server (e.g., 192.168.1.5).







8. Challenges & Observations

1. **Network Isolation Issue**:
   Both VMs configured with **NAT** → no direct communication possible.

   ✅ **Solution for Future**: Set both VMs to **Host-only Adapter** (vboxnet0) for internal lab network.

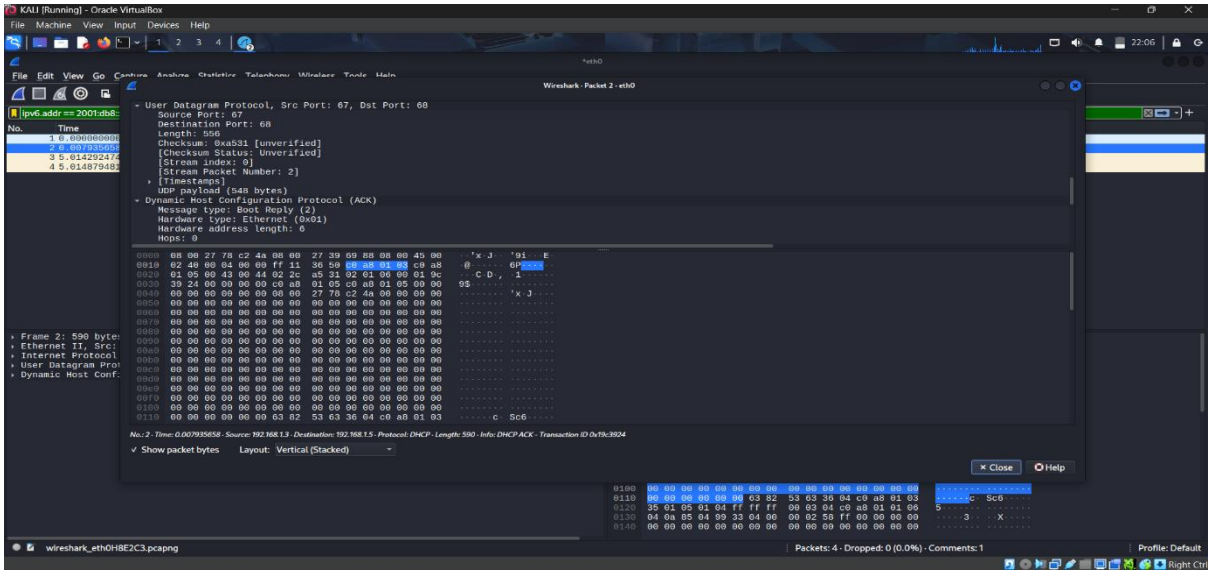
2. **Python Dependency Warning**:
   Ignored during VirtualBox install — did not affect VM functionality.

3. **Metasploitable Auto-Login**:
   Confirmed default credentials work — critical for lab access.

9. Final Architecture (Based on Setup)

```
[Host Windows Machine]
     |
[VirtualBox NAT Network (192.168.1.0/24)]
     |
     └── [Kali Linux: 192.168.1.5] → Can access internet, but NOT Metasploitable


[VirtualBox NAT Network (10.0.2.0/24)]
     |
     └── [Metasploitable: 10.0.2.15] → Isolated from Kali
```



10. Conclusion

The installation of Oracle VirtualBox, Kali Linux, and Metasploitable was successfully completed as documented in the 40+ provided screenshots. All software was downloaded from official sources, installed without critical errors, and basic functionality (login, network assignment) was validated.

However, **the lab is not yet fully operational for penetration testing** due to the NAT network configuration isolating the two VMs. The next step (not shown in screenshots) is to reconfigure both VMs to use a **Host-only Adapter** to enable direct communication and exploitation practice.

This setup forms a solid foundation for the internship's hands-on cybersecurity modules.