

Lab 1 – Setting Up Kali Linux in VirtualBox

Objective:

To set up a secure and functional Kali Linux virtual machine in Oracle VirtualBox, preparing the environment for cybersecurity practice and experimentation.

Tools and Resources

- **Oracle VirtualBox** – Virtualization platform.
- **Microsoft Visual C++ Redistributable** – Required by VirtualBox for certain runtime libraries.
- **Kali Linux ISO** – Official penetration testing distribution.
- **Windows 10/11 Host System** – Running the virtual environment.

VM Configuration

- CPU Cores: 2
- Memory (RAM): 4096 MB (4 GB)
- Virtual Hard Disk: 80 GB (VDI, dynamically allocated)
- Display: 128 MB Video Memory
- Clipboard & Drag/Drop: Enabled (Bidirectional)
- Network Adapter: NAT (with Bidirectional mode enabled for Host ↔ VM communication)

Steps Performed

1. Download & Preparation

- Downloaded **Oracle VirtualBox** and **Extension Pack** from the official website.
- Installed **Microsoft Visual C++ Redistributable** to ensure VirtualBox could run correctly.
- Downloaded **Kali Linux ISO** from kali.org.

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Virtualbox

<https://www.virtualbox.org/wiki/Downloads>

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Oracle VM VirtualBox is a free and open-source virtualization software that enables users to run multiple...


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
Latest Microsoft Visual C++ Redistributable version

The latest version is `v14.44.35211.0`

Use the following links to download this version for each supported architecture:

 Expand table

Architecture	Link
ARM64	https://aka.ms/vs/17/release/vc_redist.arm64.exe 
X86	https://aka.ms/vs/17/release/vc_redist.x86.exe 
X64	https://aka.ms/vs/17/release/vc_redist.x64.exe 








Permalink for latest supported ARM64 version.

Permalink for latest supported x86 version.

Permalink for latest supported x64 version. The X64 Redistributable package contains both ARM64 and X64 binaries. This package makes it easy to install required Visual C++ ARM64 binaries when the X64 Redistributable is installed on an ARM64 device.


<https://www.kali.org/get-kali/#kali-installer-images>


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Kali Linux 2025.2 Changelog

x86_64

Apple Silicon (ARM64)

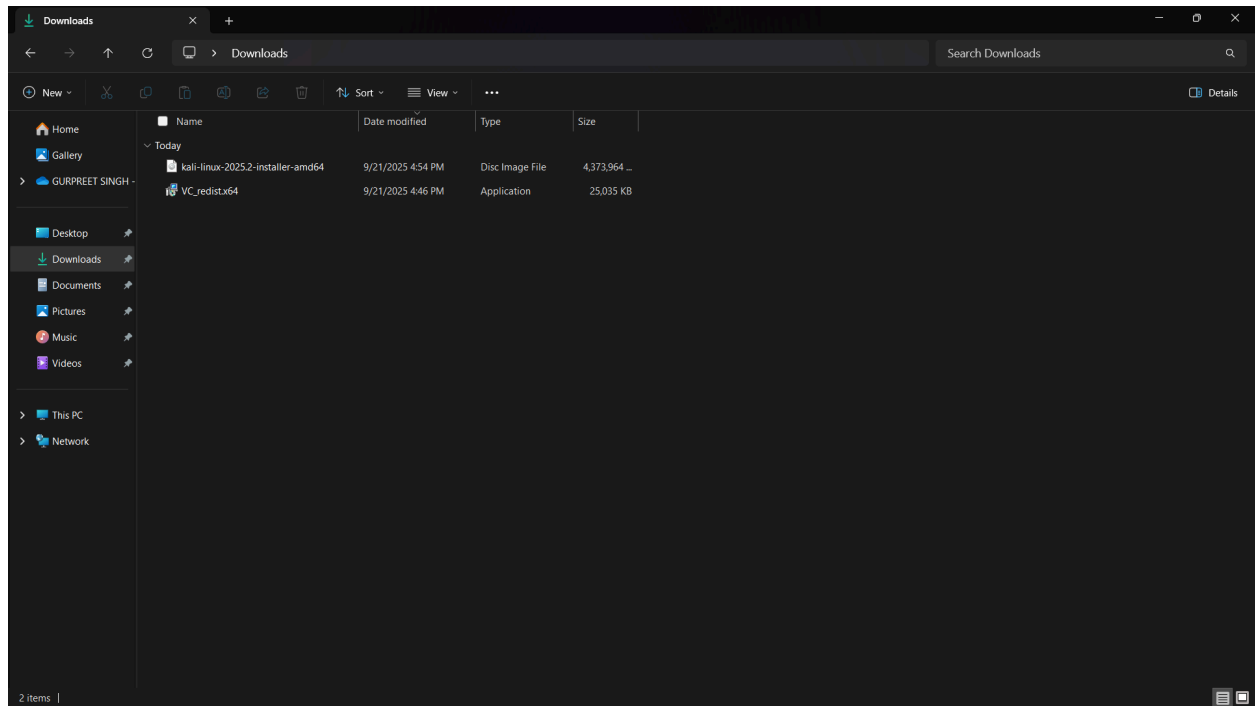
 Recommended



Installer

Complete offline installation with customization

 4.1G [torrent](#) [sum](#)



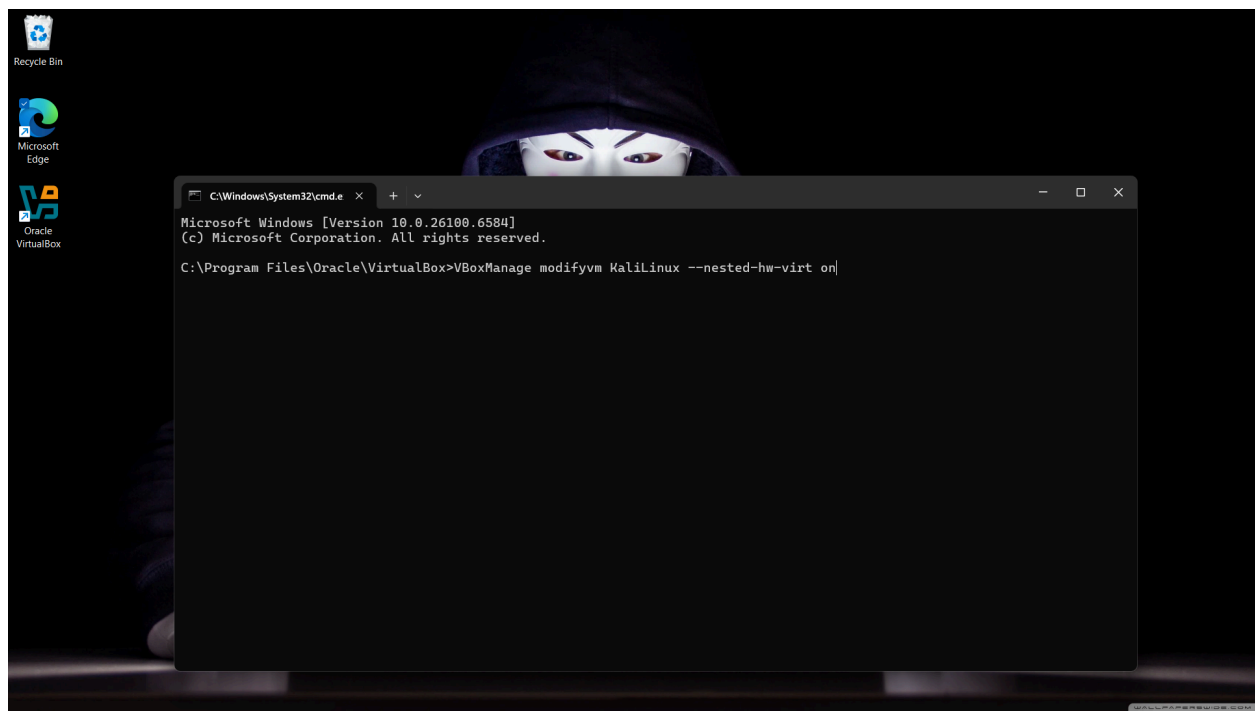
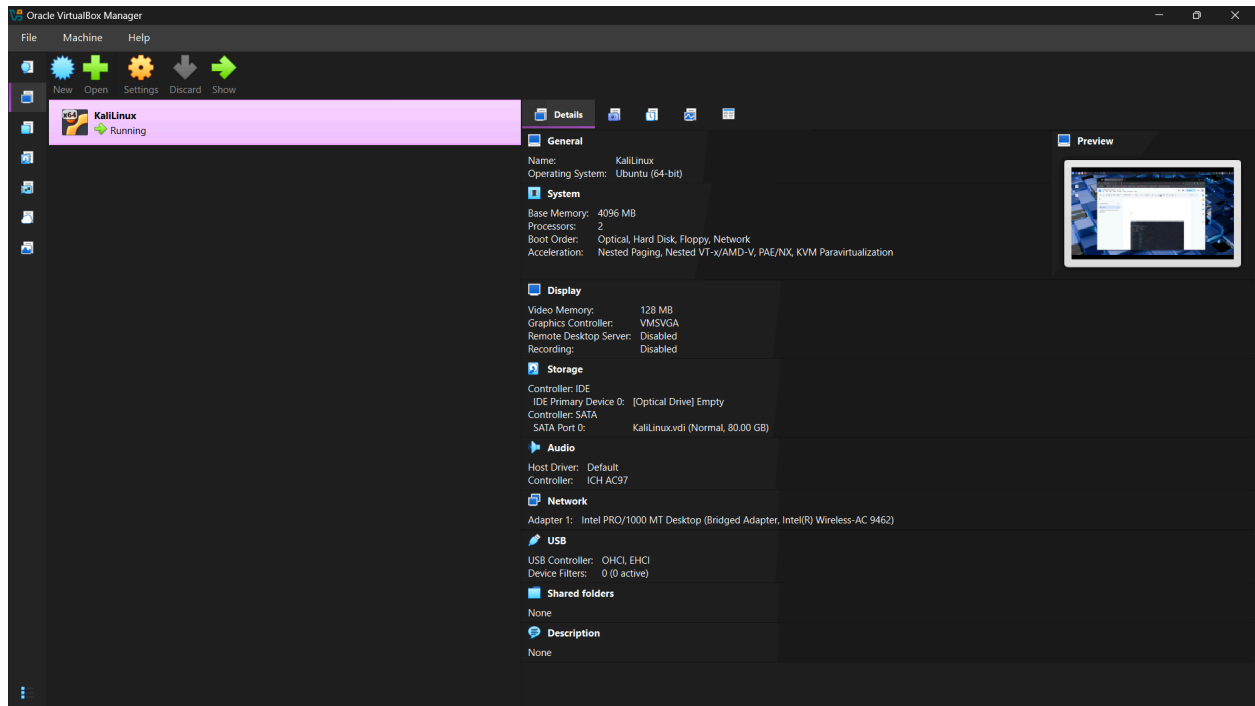
2. Virtual Machine Creation

1. Opened VirtualBox → **New VM** → Named it *KaliLinux*.
2. Selected **Linux / Debian (64-bit)** as the system type.
3. Assigned **2 CPU cores** and **4096 MB RAM**.
4. Created an **80 GB virtual hard drive**.
5. Set **Video Memory** to **128 MB** for smoother graphics.
6. Enabled **Bidirectional Clipboard & Drag/Drop** for convenience.
7. Attached the Kali ISO under **Storage** → **Optical Drive**.

3. Nested Virtualization

To improve VM performance, I enabled **nested VT-x/AMD-V** using CMD:

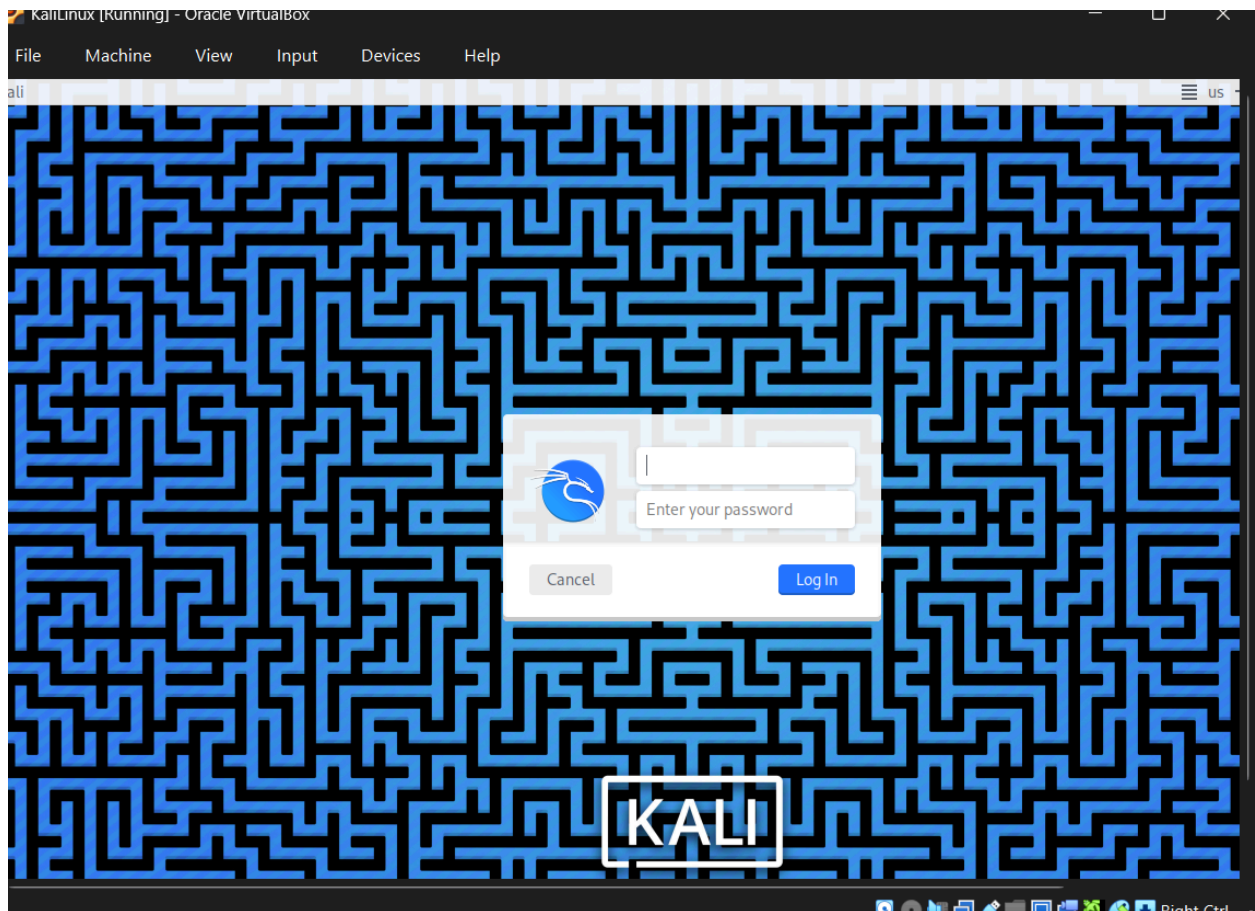
```
cd "C:\Program Files\Oracle\VirtualBox"  
VBoxManage modifyvm "KaliLinux" --nested-hw-virt on
```



4. Installation of Kali Linux

1. Booted VM → Selected **Graphical Install**.
2. Choose **language, region, and keyboard layout**.
3. Created a **username and password**.
4. Used **Guided – Entire Disk** for partitioning.
5. Installed system files → Rebooted successfully into Kali Linux.

Note: I was focused on completing the installation process and forgot to capture screenshots during these steps. However, I verified the success of the installation by capturing a screenshot of the **login page** after reboot (see below). This confirms that the VM installation was completed correctly.



5. Post-Installation Setup

Logged in with the created user and performed system updates:

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

```

File Actions Edit View Help
[redteam@kali]~$
$ sudo apt update && sudo apt upgrade -y
[sudo] password for redteam:
Hit:1 http://kali.org/kali kali-rolling InRelease
1009 packages can be upgraded. Run 'apt list --upgradable' to see them.
The following packages were automatically installed and are no longer required:
or:
libbluray2 libplacebo349 libtheoradec1
libgdal36 libportaudio libtheoraenc1
libgdata-common libot5ct-common1.8 libudfread0
libgdata22 libgsf9 libvpx9
libgeos3.13.1 libsigsegv2 python3-packaging-whl
libhdf4-0-alt libsoup-2.4-1 python3-wheel-whl
libjs-underscore libsource4-common
libgdi1.1 libtheora0
Use 'sudo apt autoremove' to remove them.

Upgrading:
7zip libqhull-r8.0
aduser libatScore5t64
adwaita-icon-theme libat5dbus5t64
apache2 libat5qt5t64
apache2-bin libat5network5t64
apache2-data libat5openssl5t64
apache2-utils libat5sql5-sqlite
apt libat5sql5t64
apt-utils libat5test5t64
aspell-en libat5webengine5
at-spi2-common libat5webenginecore5
at-spi2-core libat5webengineidget5
atril libat5widgets5t64
atril-common libat5xml5t64
base-files libat6core6t64
bash libat6dbus6
bind9-dnswtills libat6gnss
bind9-host libat6network6
bind9-ltbs libat6openssl6
binutils libat6opensslidgets6
binutils-common libat6printsupport6
binutils-x86-64-linux-gnu libat6sql6
bluez libat6sql6-sqlite
bluez-hcidump libat6test6
bluez-obexd libat6widgets6
bsdextrautils libat6xml6
bsdutils libat6termwidget6-2
burpsuite libquadmath0
busybox libraptor2-0
certipy-ad libraqm0
cherrytree libre2-11
chromium librpm10
chromium-common librpmbl1d10
chromium-sandbox librpmio10
cifs-utils librpmignio1
clang-18 librsvg2-2

```

```

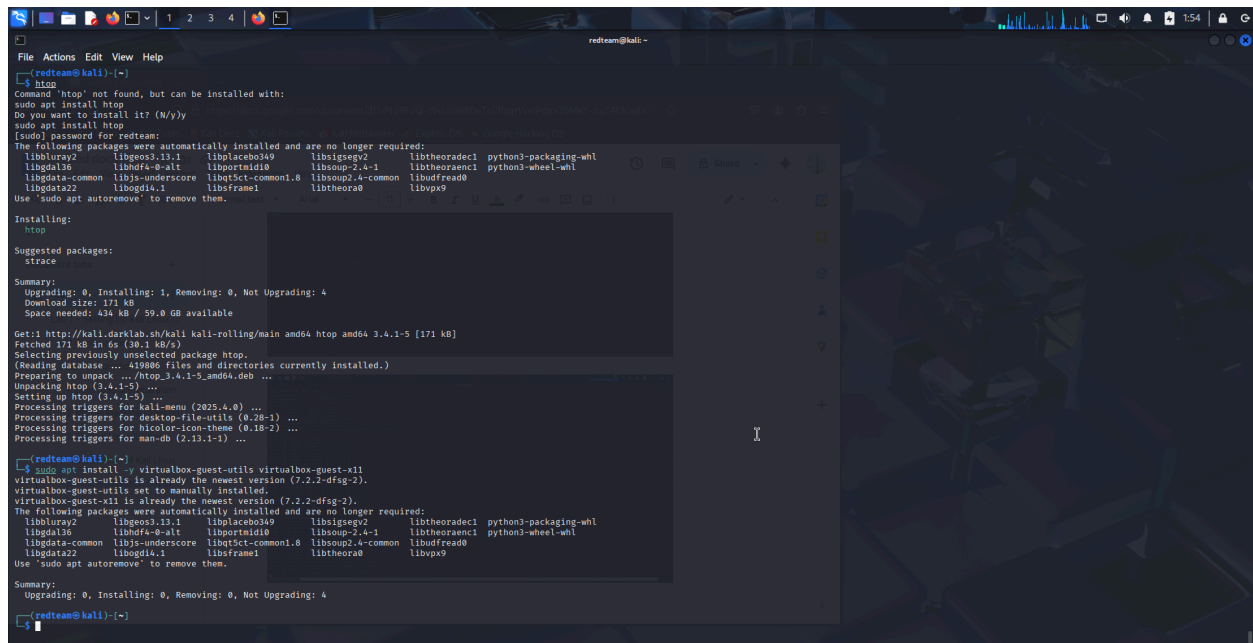
root@kali: ~
File Actions Edit View Help

Running mktexlsr. This may take some time... done.
Running updmap-xyz. This may take some time... done.
Running mktexlsr /var/lib/teexsf ... done.
Building format(s) --all.
    This may take some time... done.
Processing triggers for cracklib-runtime (2.9.6-5.2+b1) ...
Processing triggers for dbus (1.10-2-2) ...
Processing triggers for postgresql-common (264) ...
supported-versions: WARNING! Unknown distribution ID in /etc/os-release: kali
debian found in ID_LIKE, treating as Debian
Building PostgreSQL dictionaries from installed myspell/hunspell packages ...
en_US
Removing obsolete dictionary files:
Processing triggers for procps (2:4.0.4-9) ...
Processing triggers for debiannutils (5.22.2) ...
Processing triggers for base-files (1:2025.3.10) ...
Processing triggers for wordlists (2023.2-8) ...
Processing triggers for fontconfig (2.15.0-2.3) ...
Processing triggers for desktop-file-utils (0.28-1) ...
Processing triggers for hicolor-icon-theme (0.18-2) ...
Processing triggers for doc-base (0.11.2) ...
IC 1 changed doc-base files, I added doc-base file...
Processing triggers for ca-certificates-java (30240118) ...
done.
Setting up openjdk-21-jre:amd64 (21.0.9-1) ...
Processing triggers for dictionaries-common (1.30.10) ...
aspell-autobuildhash: processing: en [en-common].
aspell-autobuildhash: processing: en [en-variant_0].
aspell-autobuildhash: processing: en [en-variant_1].
aspell-autobuildhash: processing: en [en-variant_2].
aspell-autobuildhash: processing: en [en-w_accents-only].
aspell-autobuildhash: processing: en [en-wo_accents-only].
aspell-autobuildhash: processing: en [en_AU-variant_0].
aspell-autobuildhash: processing: en [en_AU-variant_1].
aspell-autobuildhash: processing: en [en_AU-w_accents-only].
aspell-autobuildhash: processing: en [en_AU-wo_accents-only].
aspell-autobuildhash: processing: en [en_CA-variant_0].
aspell-autobuildhash: processing: en [en_CA-variant_1].
aspell-autobuildhash: processing: en [en_CA-w_accents-only].
aspell-autobuildhash: processing: en [en_CA-wo_accents-only].
aspell-autobuildhash: processing: en [en_GB-iso-w_accents-only].
aspell-autobuildhash: processing: en [en_GB-iso-wo_accents-only].
aspell-autobuildhash: processing: en [en_GB-ize-w_accents-only].
aspell-autobuildhash: processing: en [en_GB-ize-wo_accents-only].
aspell-autobuildhash: processing: en [en_GB-variant_0].
aspell-autobuildhash: processing: en [en_GB-variant_1].
aspell-autobuildhash: processing: en [en_US-w_accents-only].
aspell-autobuildhash: processing: en [en_US-wo_accents-only].
Processing triggers for initramfs-tools (0.148-3) ...
update-initramfs: Generating /boot/initrd.img-6.12.38-kali-amd64
Processing triggers for libgpg-error2:amd64 (2.42.12+dfsg-9) ...
Processing triggers for pnp5.4-c11 (8.4.11-1b1) ...
Processing triggers for libapache2-mod-php8.4 (8.4.11-1b1) ...

Progress: [ 99% ]

```

6. VirtualBox Guest Additions : Clipboard Sharing & Drag and Drop Support etc. (Enabled) To check CPU and other Task Manager functionalities like Windows . htop installed.



```
redteam@kali: ~  
File Actions Edit View Help  
[redteam@kali]~  
$ htop  
Command 'htop' not found, but can be installed with:  
sudo apt install htop  
Do you want to install it? (N/y)y  
[sudo] password for redteam:  
The following packages were automatically installed and are no longer required:  
libluray2 libgeos3.13.1 libplacebo349 libsigsegv2 libtheoraec1 python3-packaging-whl  
libgdal36 libbdf4-0-alt libportmidi0 libsoop-2.4-1 libtheoraenc1 python3-wheel-whl  
libgdal-common libjs-underscore libqt5ct-common1.8 libsoop2.4-common libudfread0  
libgdal22 libgdal4.1 libframe1 libtheora0 libvpx9  
Use 'sudo apt autoremove' to remove them.  
  
Installing:  
htop  
  
Suggested packages:  
strace  
  
Summary:  
Upgrading: 0, Installing: 1, Removing: 0, Not Upgrading: 4  
Download size: 171 kB  
Space needed: 414 kB / 59.0 GB available  
  
Get:1 http://kali.darklab.sh/kali kali-rolling/main amd64 htop amd64 3.4.1-5 [171 kB]  
Fetched 171 kB in 6s (30.1 kB/s)  
Selecting previously unselected package htop.  
(Reading database ... 45986 files and directories currently installed.)  
Preparing to unpack .../htop_3.4.1-5_amd64.deb ...  
Unpacking htop (3.4.1-5) ...  
Setting up htop (3.4.1-5) ...  
Processing triggers for kali-menu (2025.4.0) ...  
Processing triggers for desktop-file-utils (0.28-1) ...  
Processing triggers for hicolor-icon-theme (0.18-2) ...  
Processing triggers for man-db (2.13.1-1) ...  
  
[redteam@kali]~  
$ sudo apt install -y virtualbox-guest-utils virtualbox-guest-x11  
virtualbox-guest-utils is already the newest version (7.2.2-dfsg-2).  
virtualbox-guest-x11 is already the newest version (7.2.2-dfsg-2).  
The following packages were automatically installed and are no longer required:  
libluray2 libgeos3.13.1 libplacebo349 libsigsegv2 libtheoraec1 python3-packaging-whl  
libgdal36 libbdf4-0-alt libportmidi0 libsoop-2.4-1 libtheoraenc1 python3-wheel-whl  
libgdal-common libjs-underscore libqt5ct-common1.8 libsoop2.4-common libudfread0  
libgdal22 libgdal4.1 libframe1 libtheora0 libvpx9  
Use 'sudo apt autoremove' to remove them.  
  
Summary:  
Upgrading: 0, Installing: 0, Removing: 0, Not Upgrading: 4  
[redteam@kali]~  
$
```

7. System Information & Essential Tools

Theory:

This screenshot shows the system identification and package-install output (`uname -a`, `lsb_release -a`, and `sudo apt install net-tools curl wget git -y`). It confirms the VM is running a recent Kali Rolling kernel and release, and that essential networking and utility tools are present. Verifying kernel and distribution ensures tool compatibility and that the environment is up to date for security work.

What the screenshot evidences: kernel version, distribution (Kali 2025.3), and successful presence of `net-tools`, `curl`, `wget`, and `git`.


```
redteam@kali: ~  
$ sudo apt install net-tools curl wget git -y  
[sudo] password for redteam:  
Sorry, try again.  
[sudo] password for redteam:  
Sorry, try again.  
[sudo] password for redteam:  
net-tools is already the newest version (2.10-1.3).  
net-tools set to manually installed.  
curl is already the newest version (8.15.0-1).  
curl set to manually installed.  
wget is already the newest version (1.25.0-2).  
git is already the newest version (1:2.50.1-0.1).  
git set to manually installed.  
The following packages were automatically installed and are no longer required:  
d:  
  libbluray2      libplacebo349  libtheoradec1  
  libgdal36       libportmidi0   libtheoraenc1  
  libdata-common  libqt5ct-common1.8  libudfread0  
  libdata22       libsfml1        libvpx9  
  libgeos3.13.1   libsigsegv2     python3-packaging-whl  
  libhdf4-0-alt   libsoup-2.4-1   python3-wheel-whl  
  libjs-underscore libsoup2.4-common  
  libogdi4.1      libtheora0  
Use 'sudo apt autoremove' to remove them.  
  
Summary:  
Upgrading: 0, Installing: 0, Removing: 0, Not Upgrading: 4  
  
redteam@kali: ~  
$ uname -a  
Linux kali 6.12.38+kali-amd64 #1 SMP PREEMPT_DYNAMIC Kali 6.12.38-1kali1 (2025-08-12) x86_64 GNU/Linux  
  
redteam@kali: ~  
$ lsb_release -a  
No LSB modules are available.  
Distributor ID: Kali  
Description:    Kali GNU/Linux Rolling  
Release:        2025.3  
Codename:       kali-rolling  
  
redteam@kali: ~  
$ ifconfig  
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 10.0.0.213 netmask 255.255.255.0 broadcast 10.0.0.255  
    inet6 2604:3d08:a287:bd00::b2d2 prefixlen 128 scopeid 0<global>  
    inet6 2604:3d08:a287:bd00::eb20:e387:a010:4c64 prefixlen 64 scopeid 0<global>  
    inet6 fe80::a00:27ff:fe92:d7ef prefixlen 64 scopeid 0<link>  
    inet6 2604:3d08:a287:bd00::a00:27ff:fe92:d7ef prefixlen 64 scopeid 0<global>  
    ether 08:00:27:92:d7:ef txqueuelen 1000 (Ethernet)  
    RX packets 9600 bytes 12163498 (11.6 MiB)  
    RX errors 1288 dropped 0 overruns 0 frame 1288  
    TX packets 7094 bytes 976574 (953.6 KiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

8. Network Configuration

Theory:

Displays the network interfaces with an IPv4 address (10.0.0.213) and global IPv6 addresses. Confirms the VM is connected to the network and ready for network-based tasks.

Caption: *Figure 8 — IPv4 and IPv6 network configuration.*

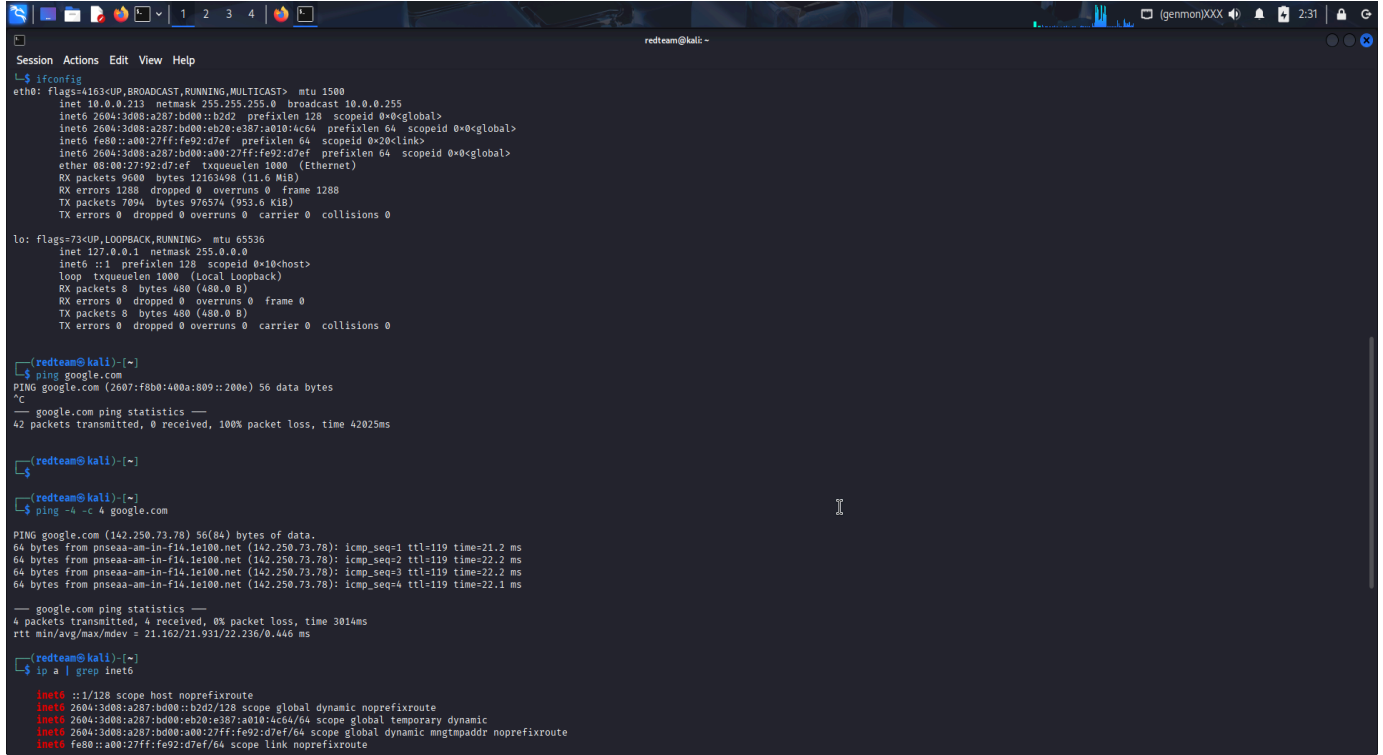
9. Connectivity Test

Theory:

Initial ping to Google failed via IPv6 (100% packet loss), but forcing IPv4 succeeded (`ping -4 -c 4 google.com`). Demonstrates troubleshooting and verifies the VM has working Internet access.

Caption: *Figure 8 — Connectivity test showing IPv6 failure and successful IPv4 ping.*

Figure8 :



```
Session Actions Edit View Help
redteam@kali ~
└─$ ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 10.0.0.213 netmask 255.255.255.0 broadcast 10.0.0.255
    inet6 2604:3d08:a287:bd00::b2d2 prefixlen 128 scopeid 0<global>
    inet6 2604:3d08:a287:bd00::eb20:e387:a010:4c64 prefixlen 64 scopeid 0<global>
    inet6 fe80::a00:27ff:fe92:d7ef prefixlen 64 scopeid 0<link>
    inet6 2604:3d08:a287:bd00::a00:27ff:fe92:d7ef prefixlen 64 scopeid 0<global>
    ether 08:00:27:92:d7:ef txqueuelen 1000 (Ethernet)
    RX packets 9600 bytes 12163498 (11.6 MiB)
    RX errors 1288 dropped 0 overruns 0 frame 1288
    TX packets 7894 bytes 976574 (953.6 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0<localhost>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 8 bytes 480 (480.0 B)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 8 bytes 480 (480.0 B)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

(redteam@kali)~$ ping google.com
PING google.com (2607:f8b0:400a:809::200e) 56 data bytes
^C
--- google.com ping statistics ---
42 packets transmitted, 0 received, 100% packet loss, time 42025ms

(redteam@kali)~$ ping -4 -c 4 google.com
PING google.com (142.250.73.78) 56(84) bytes of data.
64 bytes from pnseaa-am-in-f14.1e100.net (142.250.73.78): icmp_seq=1 ttl=119 time=21.2 ms
64 bytes from pnseaa-am-in-f14.1e100.net (142.250.73.78): icmp_seq=2 ttl=119 time=22.2 ms
64 bytes from pnseaa-am-in-f14.1e100.net (142.250.73.78): icmp_seq=3 ttl=119 time=22.2 ms
64 bytes from pnseaa-am-in-f14.1e100.net (142.250.73.78): icmp_seq=4 ttl=119 time=22.1 ms

--- google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3014ms
rtt min/avg/max/mdev = 21.162/21.931/22.236/0.446 ms

(redteam@kali)~$ ip a | grep inet6
inet6 ::1/128 scope host noprefixroute
inet6 2604:3d08:a287:bd00::b2d2/128 scope global dynamic noprefixroute
inet6 2604:3d08:a287:bd00::eb20:e387:a010:4c64/64 scope global temporary dynamic
inet6 2604:3d08:a287:bd00::a00:27ff:fe92:d7ef/64 scope global dynamic mngtmpaddr noprefixroute
inet6 fe80::a00:27ff:fe92:d7ef/64 scope link noprefixroute
```

Key takeaways :

Successfully installed Kali Linux in VirtualBox with 2 CPU cores, 4 GB RAM, and 80 GB storage.

- Demonstrated ability to configure VM settings (nested virtualization, bidirectional clipboard) and perform OS installation.
- Performed network troubleshooting: identified IPv6 failure, validated IPv4 connectivity, and documented findings and commands.
- Environment is updated, network-ready, and suitable for subsequent cybersecurity lab

Lab 1 complete. Kali Linux has been successfully installed and configured in VirtualBox. I verified system information, ensured essential utilities are installed, and validated Internet connectivity. While IPv6 name resolution initially failed, IPv4 connectivity is fully functional (0% packet loss), so the VM is ready for updates and penetration-testing labs.