

SNIFFING



MODULE 8 SNIFFING

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What is Sniffing

Sniffing is the process of monitoring and capturing data packets that are flowing across a computer network. Think of it like "eavesdropping" on network conversations — you're listening to the data that computers are sending to each other.

Key points:

- It's often done using a tool called a **packet sniffer** (like Wireshark).
- Sniffing can be **legitimate** (e.g., for network troubleshooting or security monitoring).
- It can also be **malicious** (e.g., hackers sniffing to steal passwords, emails, or credit card numbers).
- In insecure networks (like public Wi-Fi), sniffing is much easier because data often travels unencrypted

Types of Sniffing

Passive Sniffing

Passive sniffing refers to the process where a device listens quietly to network traffic **without interacting** with it or altering it.

It **captures data packets** as they travel across a network, but **does not create or modify** any network traffic.

Because it's completely silent, **nobody knows** the sniffer is there unless they are specifically scanning for it.

- **Meaning:** Just quietly listening to network traffic without affecting it.
- **Where it happens:** Works mostly in **hub-based networks** (older technology where all devices share the same network signals).
- **Purpose:** Capture everything flowing through the network.
- **Detection:** Very hard to detect because the sniffer doesn't send any signals or cause any changes.

Example: Someone using Wireshark on an open public Wi-Fi to capture usernames and passwords without touching or changing the network

Active Sniffing

Active sniffing is when an attacker **interferes with the network** to capture data packets that **would not naturally pass** by their device.

It's different from passive sniffing because **it generates network traffic** or **tricks** devices into sending data through the attacker's machine.

In modern **switch-based networks**, passive sniffing alone won't work — **active techniques** are needed to sniff traffic

- **Meaning:** Actively sending fake network traffic or modifying communication to capture more data.
- **Where it happens:** Needed in **switch-based networks** (modern networks that send data directly between devices).
- **Purpose:** Trick the network to send traffic to the attacker's machine.
- **Detection:** Easier to detect because it involves suspicious traffic (like fake ARP messages).

Techniques used in active sniffing:

- **ARP Spoofing:** Sending fake ARP messages to redirect traffic.
- ARP = Address Resolution Protocol (maps IP addresses to MAC addresses)
- The attacker pretends to be another device (e.g., the gateway).

- The victim sends all traffic to the attacker, who can then monitor or alter it.
-
- **MAC Flooding:** Overloading the switch's memory so it behaves like a hub.
 - Floods the switch with many fake MAC addresses.
 - Switch memory overflows.
 - The switch fails open — it sends all traffic everywhere.
 - Now passive sniffing becomes possible!
-
- **DNS Spoofing:** Redirecting domain name queries to fake sites.
 - The attacker sets up a rogue DHCP server.
 - Victims connect and get IP settings from the attacker, making all their traffic visible.
-

Example: A hacker launches ARP spoofing to intercept data between two computers in a corporate office.

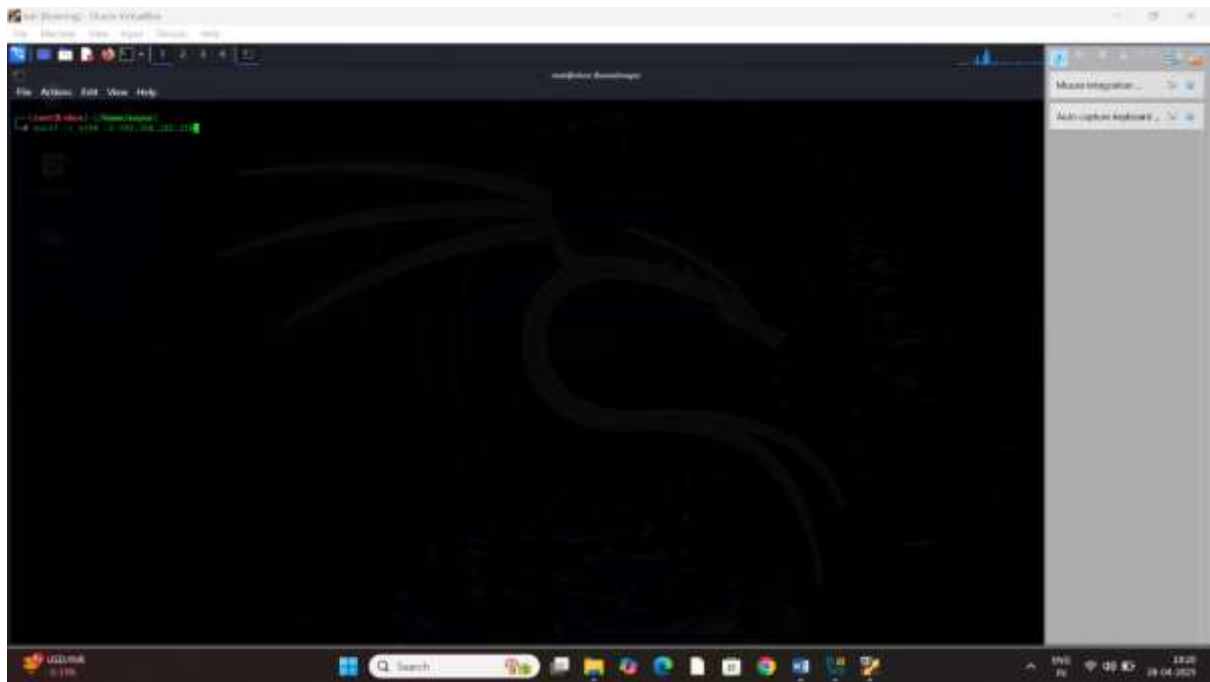
Tools for Active Sniffing

- ☐ **Cain & Abel** (good for ARP poisoning)
- ☐ **Bettercap** (modern and powerful)

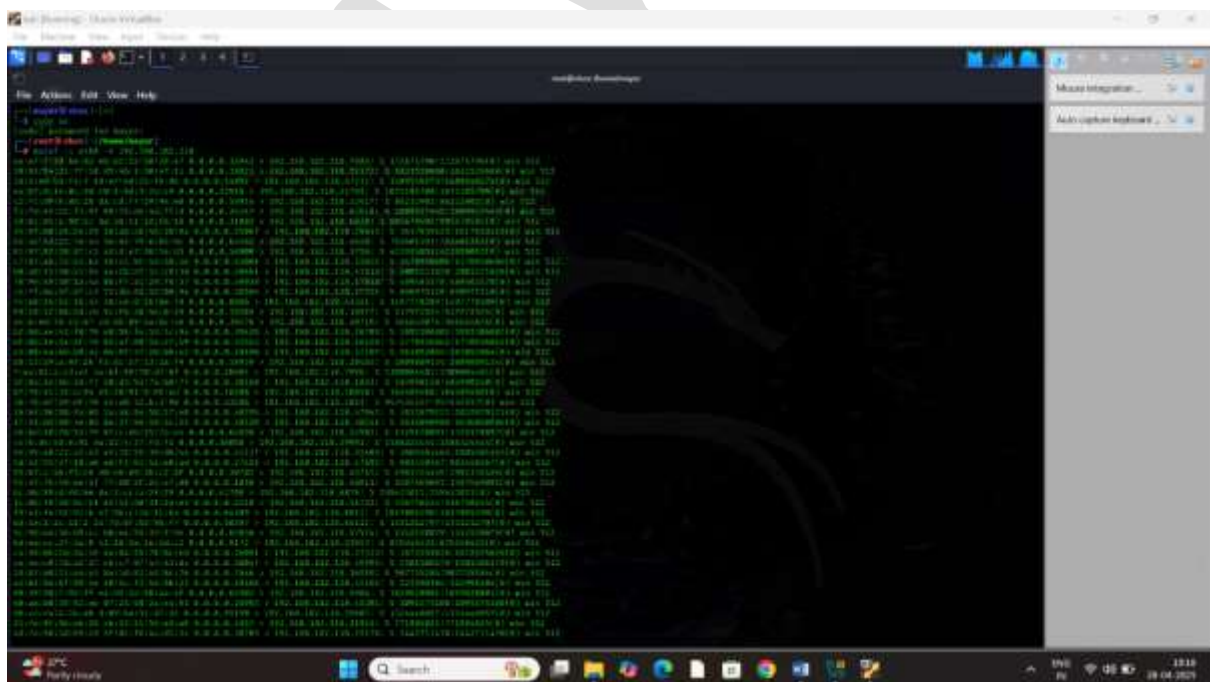
Task 1 Perform mac flooding using macof

Step1: open the kali terminal type the command

Command: `macof -i eth0 -d 192.168.182.135`



Result:



How to protect the mac flooding attack

Defense Technique

How It Helps

Port Security (on switches)

Limit the number of MAC addresses allowed on a port. Only pre-approved MAC addresses are allowed.

Dynamic ARP Inspection (DAI)

Validates ARP packets to prevent spoofing that often follows MAC flooding.

Sticky MAC Addresses

Learn and "lock" real MAC addresses to specific ports automatically, then monitor changes.

Private VLANs

Isolate ports from each other at Layer 2, preventing attackers from easily sniffing data.

Switch Hardening

Disable unused ports, enable BPDU Guard, Root Guard, DHCP Snooping, etc.

Monitoring and Alerts

Use tools to detect unusual MAC address changes or table overflows.

Up-to-date Firmware

Regularly update switch firmware to fix known vulnerabilities.

Task 2 Perform DHCP starvation attack using Yersinia.

What is Yersinia

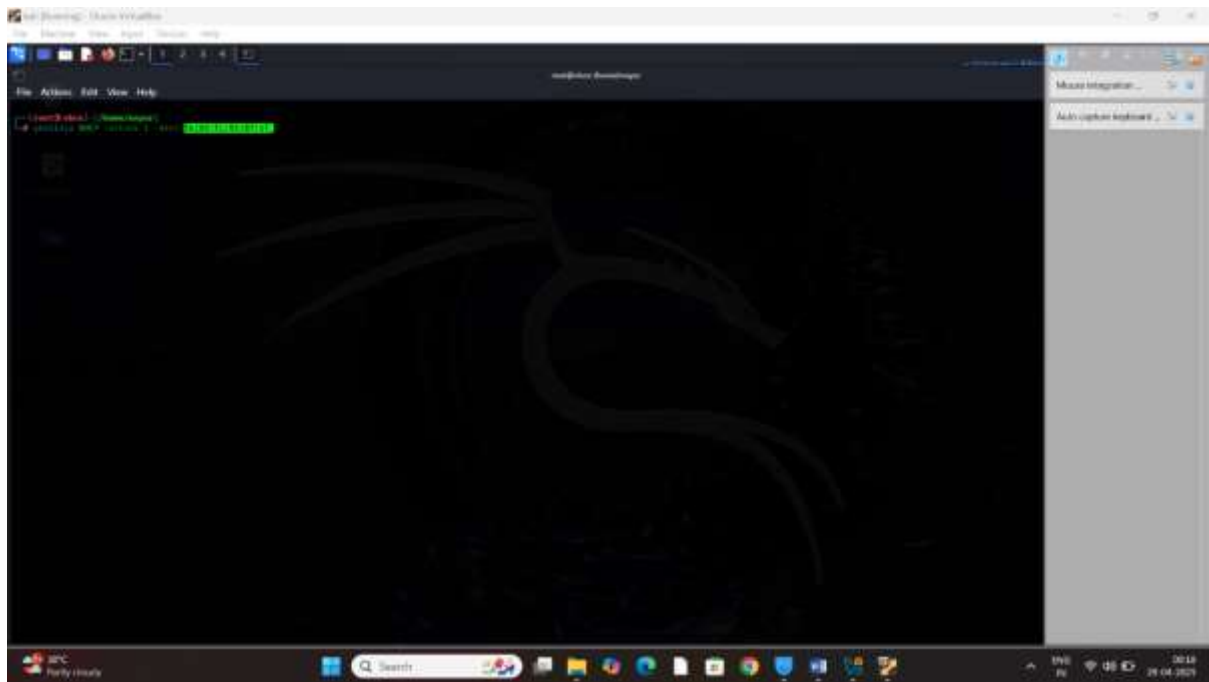
- **Yersinia** is an **open-source network attack tool**.
- It targets **Layer 2 network protocols** (switching protocols like STP, CDP, DTP, etc.).
- It's mainly used to **test** or **exploit** vulnerabilities in network infrastructure (like switches and routers).

In short:

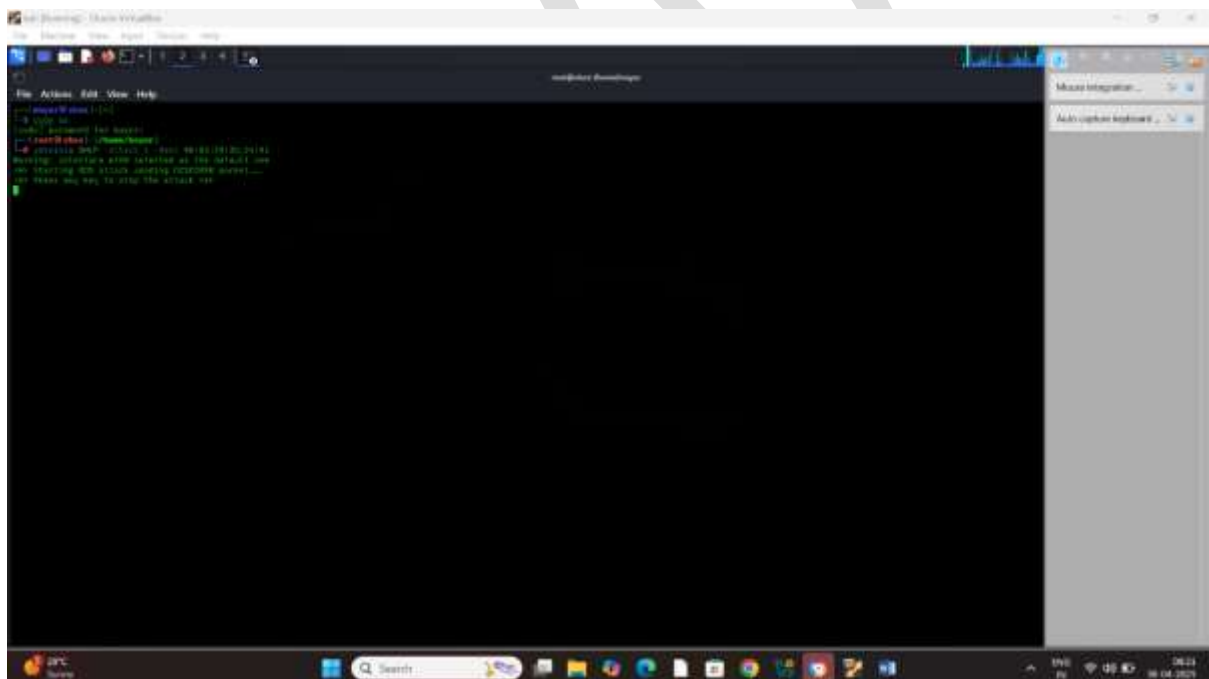
Yersinia is a tool that hackers — or penetration testers — use to **attack** or **stress-test** network protocols at the **Data Link Layer (Layer 2)** of the OSI model.

Step1: open the kali terminal type the command

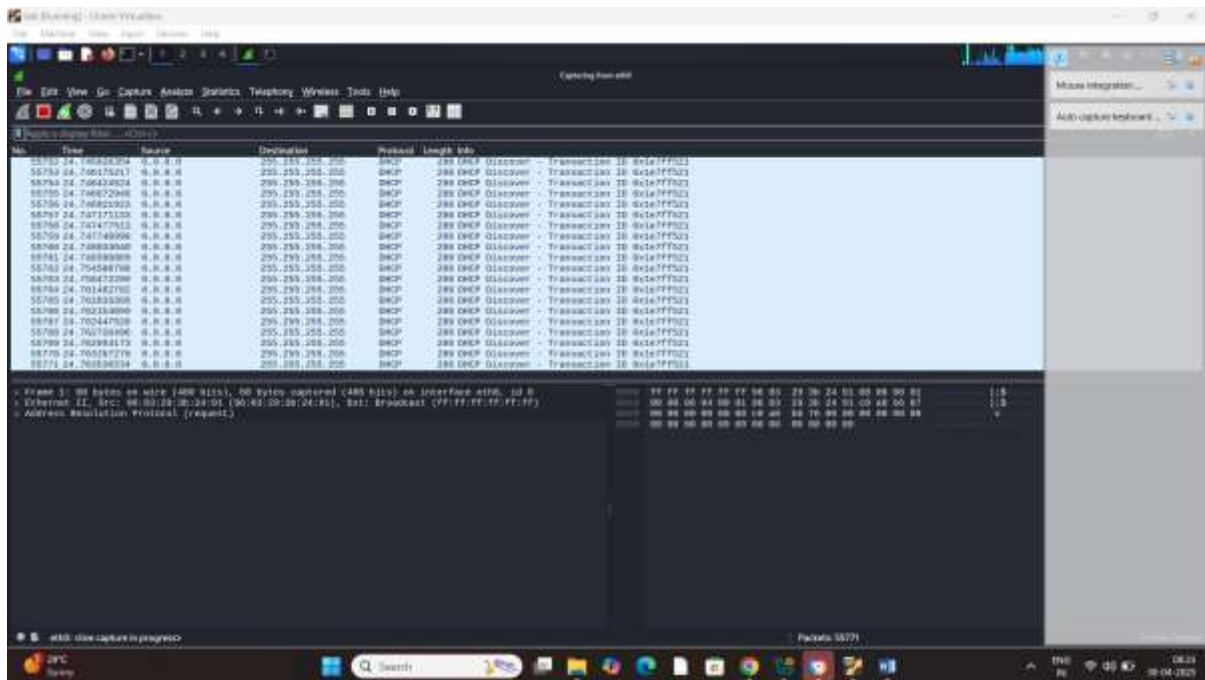
Command: Yersinia DHCP -attack 1 -dest 192.168.182.135



Result:



Step2: run the wireshark/way because is monitoring and capturing all data packet in flwoing in the network



How to protect DHCP starvation attack

To **practically protect against DHCP starvation attacks** in a real-world environment, you need to apply **switch-level security controls**, monitor network behavior, and limit the attack surface. Here's a **practical approach you can implement step-by-step**, especially in small to mid-sized enterprise networks:

- 🔒 **1. Enable DHCP Snooping (on Managed Switches)**
- 🔑 **2. Configure Port Security (MAC Address Limiting)**
- 👁️ **3. Monitor DHCP Traffic (with IDS/IPS or Wireshark)**

❓ 4. Use VLAN Segmentation

🚫 5. Block Rogue DHCP Servers

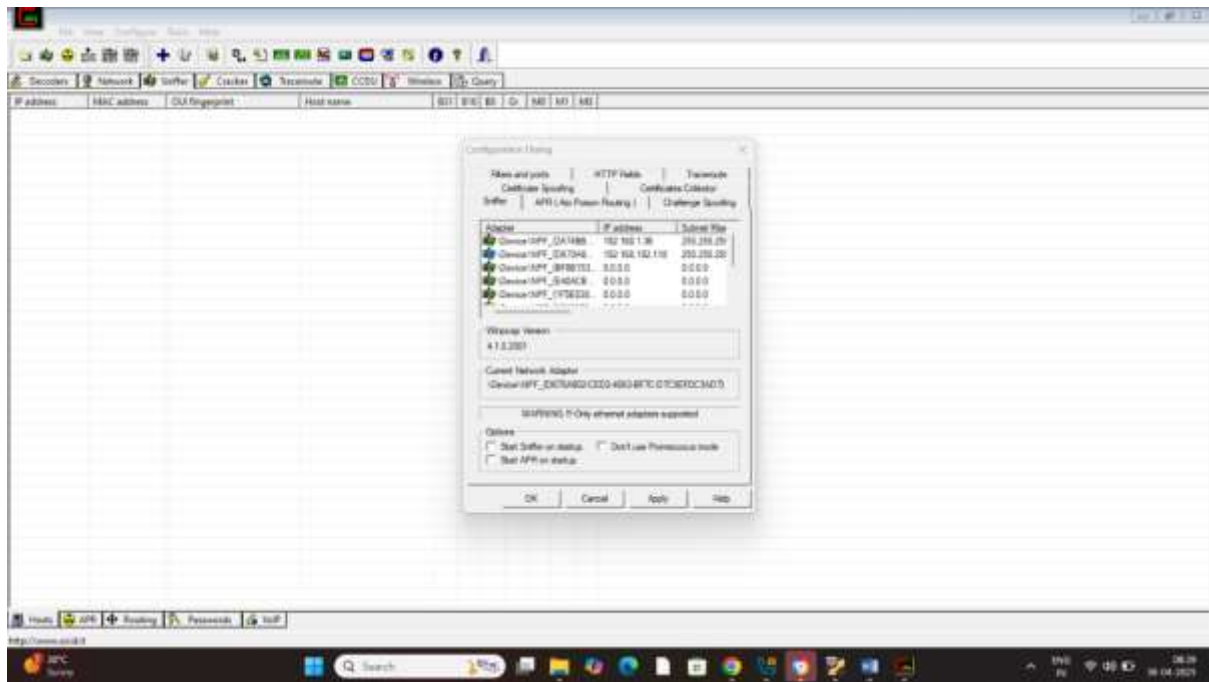
Perform network sniffing convert various sniffing tools

There is attack arp poisoning attack that is man in the middle attack by using Cain

Step1: open the Cain

Step2: click on sniffer go to host

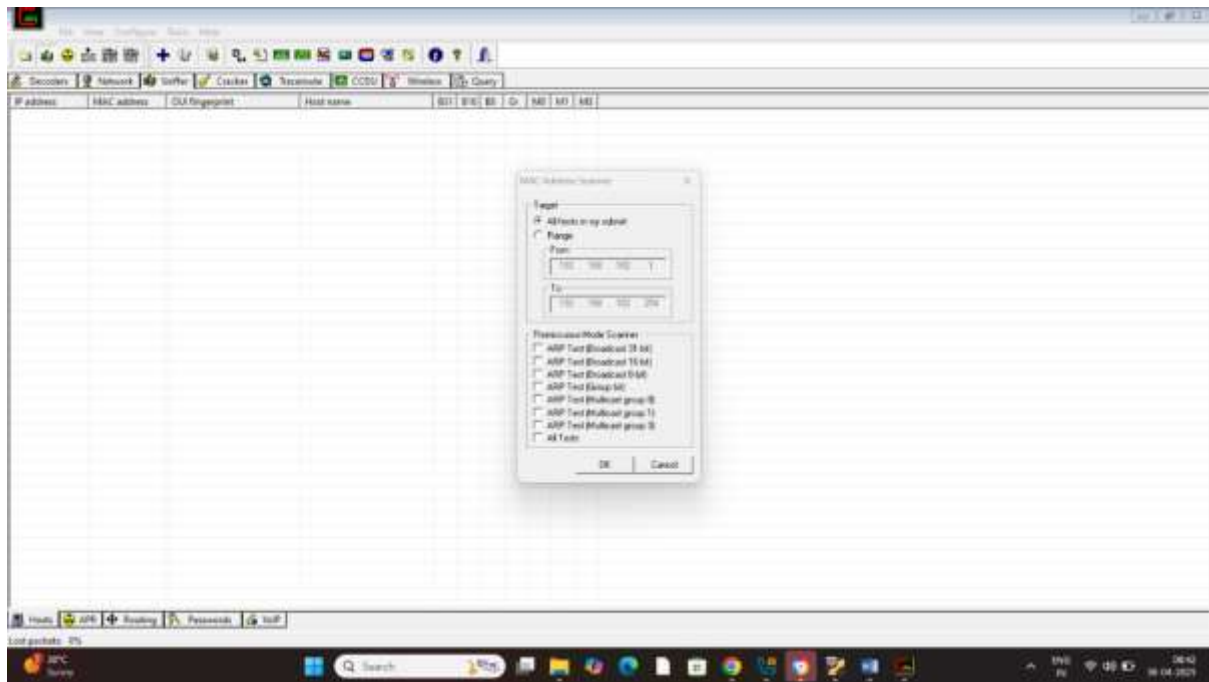
Step3: click on configuration select the IP



Step4: click on apply and ok

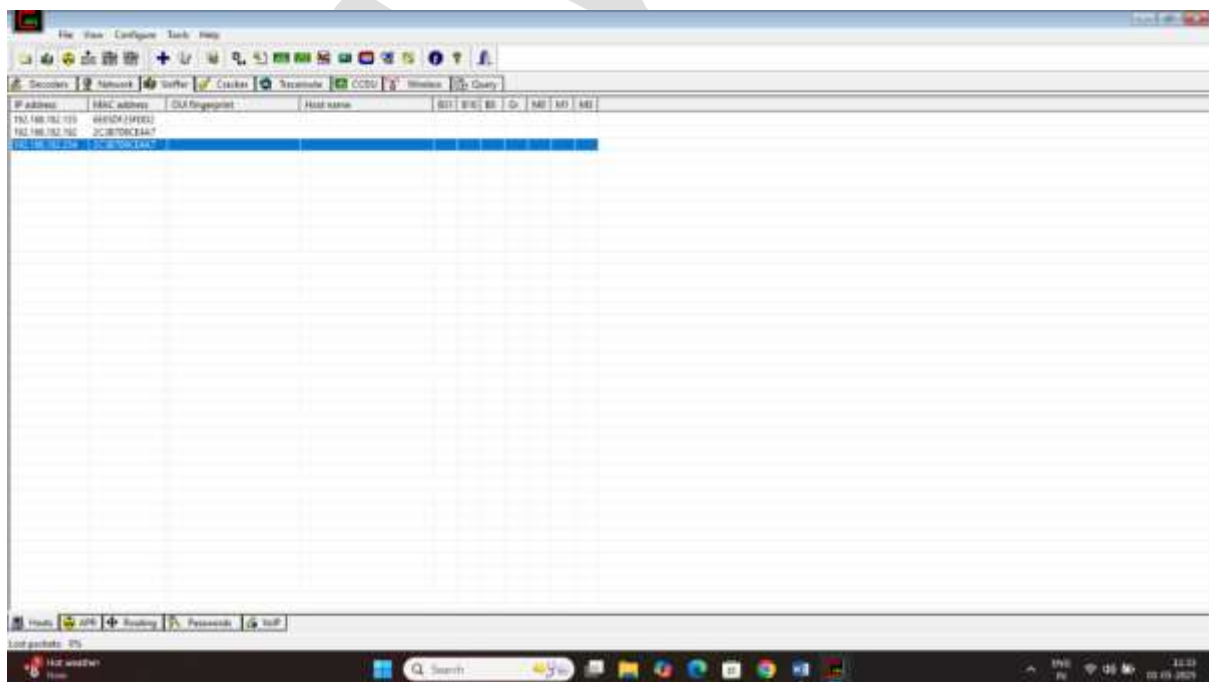
Step5: click on sniffer button

Step6: click on + button /multiple ip range



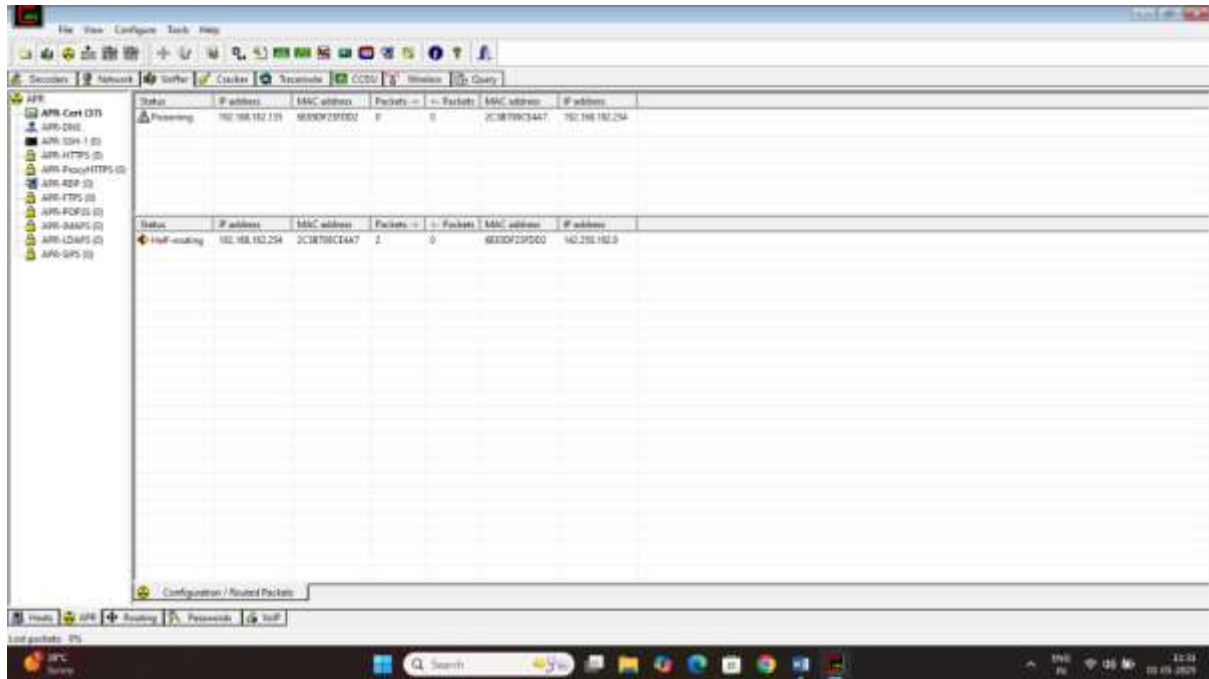
Step7: click on ok

Step8: Select the ip and gateway

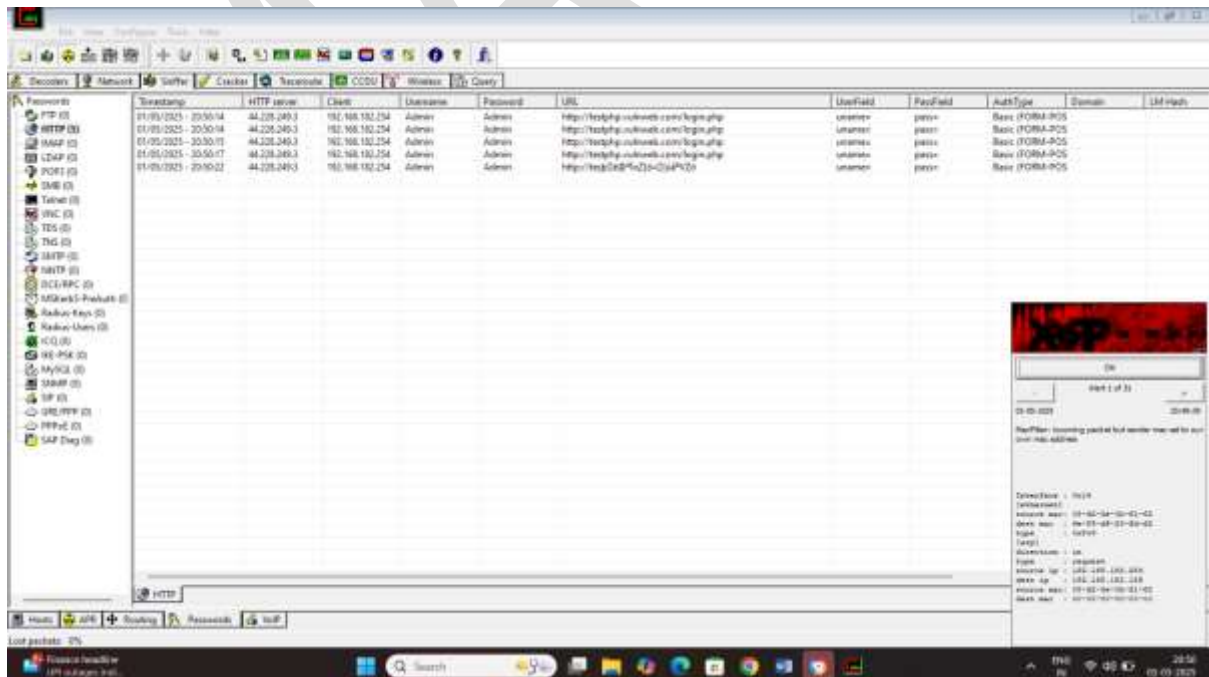


Step9:click on arp yellow button and click on 1 row

Step10: Start the positioning



Result:

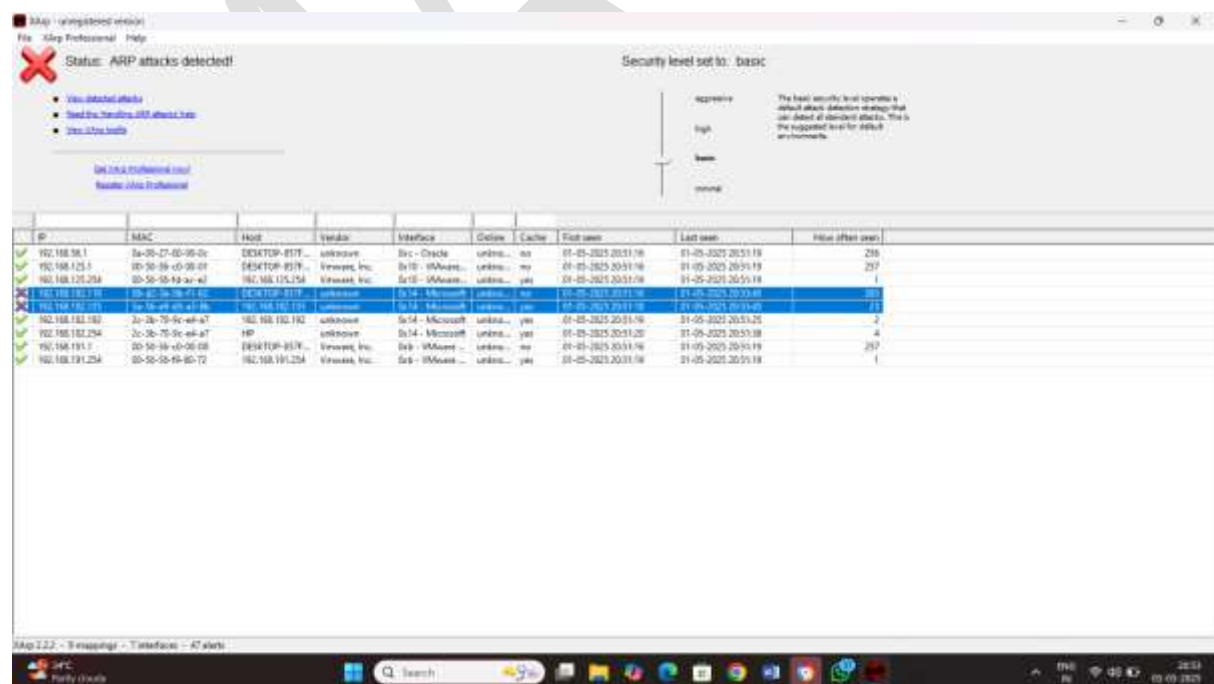
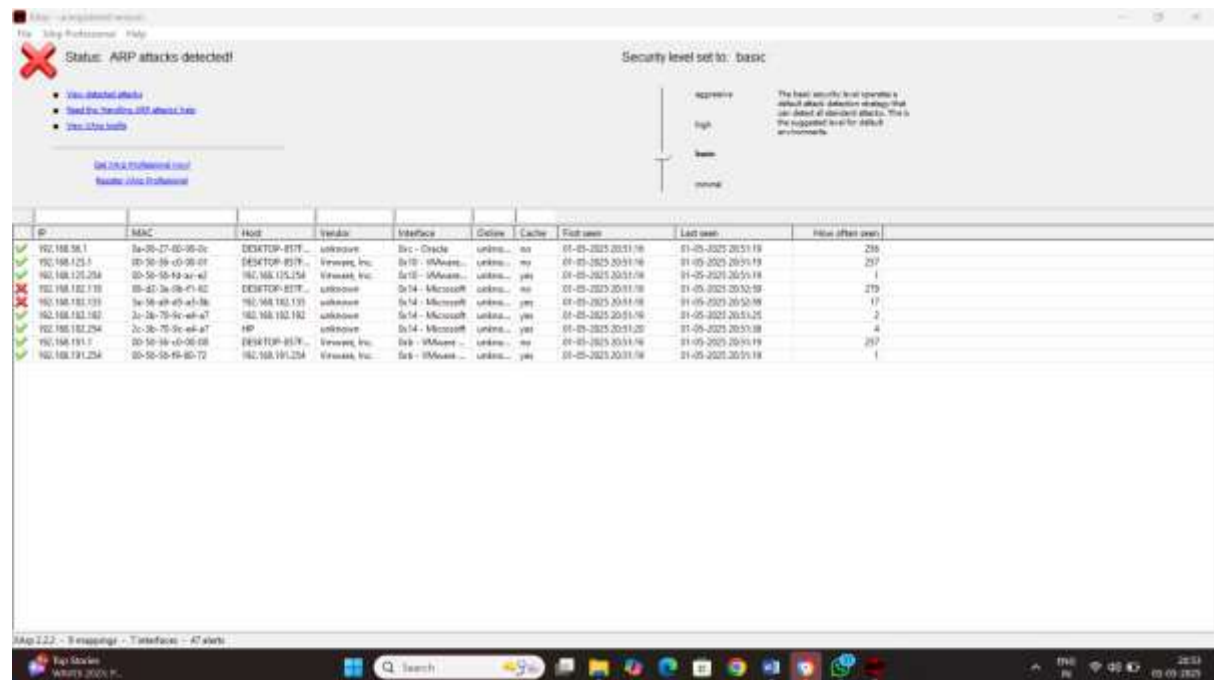


How to detect arp positioning attack using arp x tool

Step1 : open the x arp tool

Step2: start the x arp tool and detect the attack

Result:



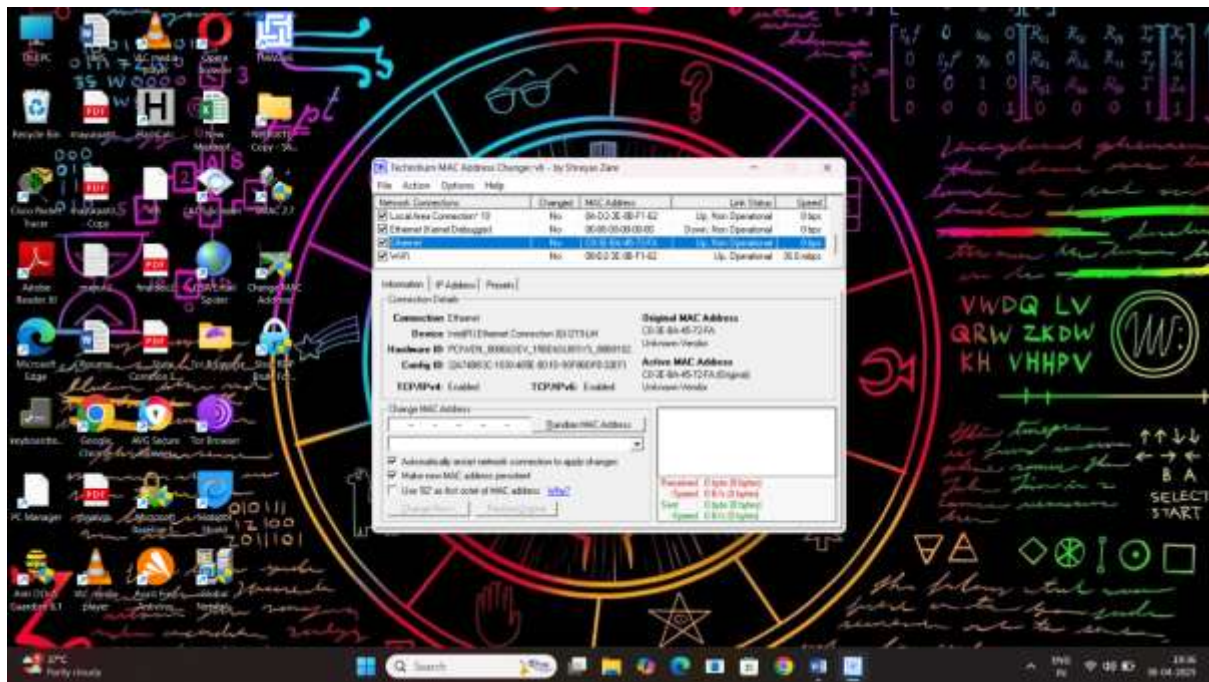
1 Extra activity for windows Mac Spoofing

How to mac spoofing using TMac V6 windows

MAC spoofing is the practice of changing the Media Access Control (MAC) address of a network interface on your device. While MAC spoofing has legitimate uses (like testing, privacy, or bypassing device-based network restrictions), it can also be misused, so always ensure you're complying with local laws and network policies.

Step1: open the TMac v6/for use mac spoof

Step2: select the ethernet



Step3:click on the Random Mac Access button



Step4: click on the change now I

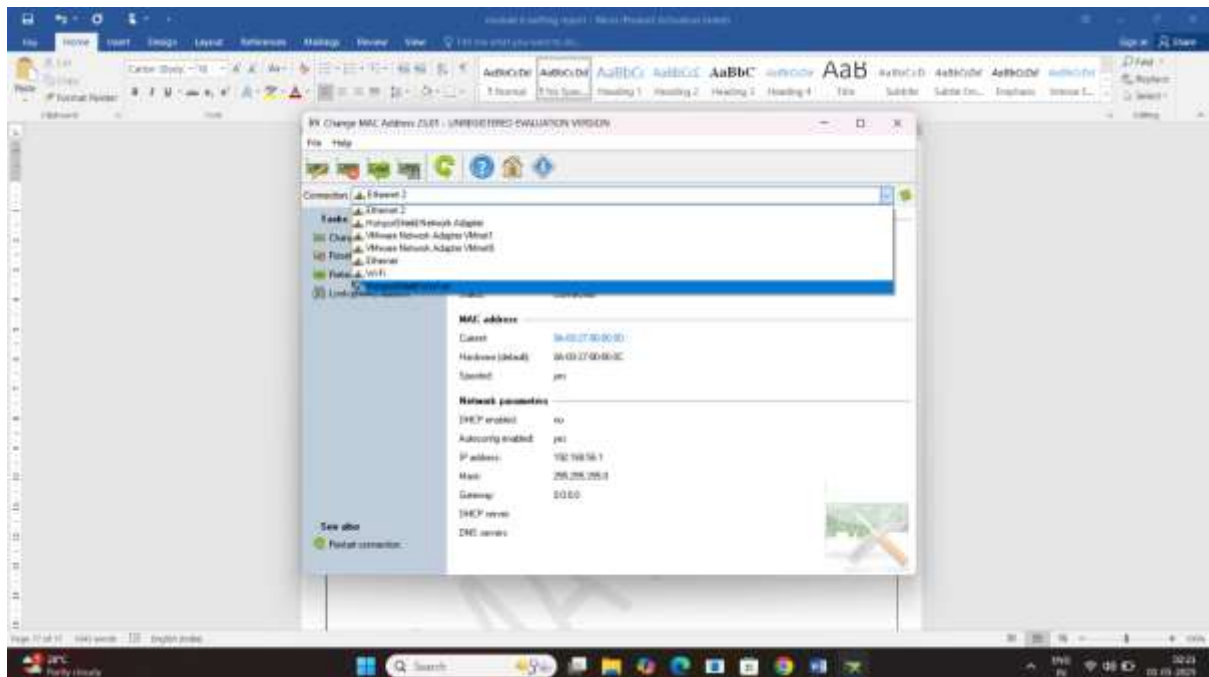
Result:



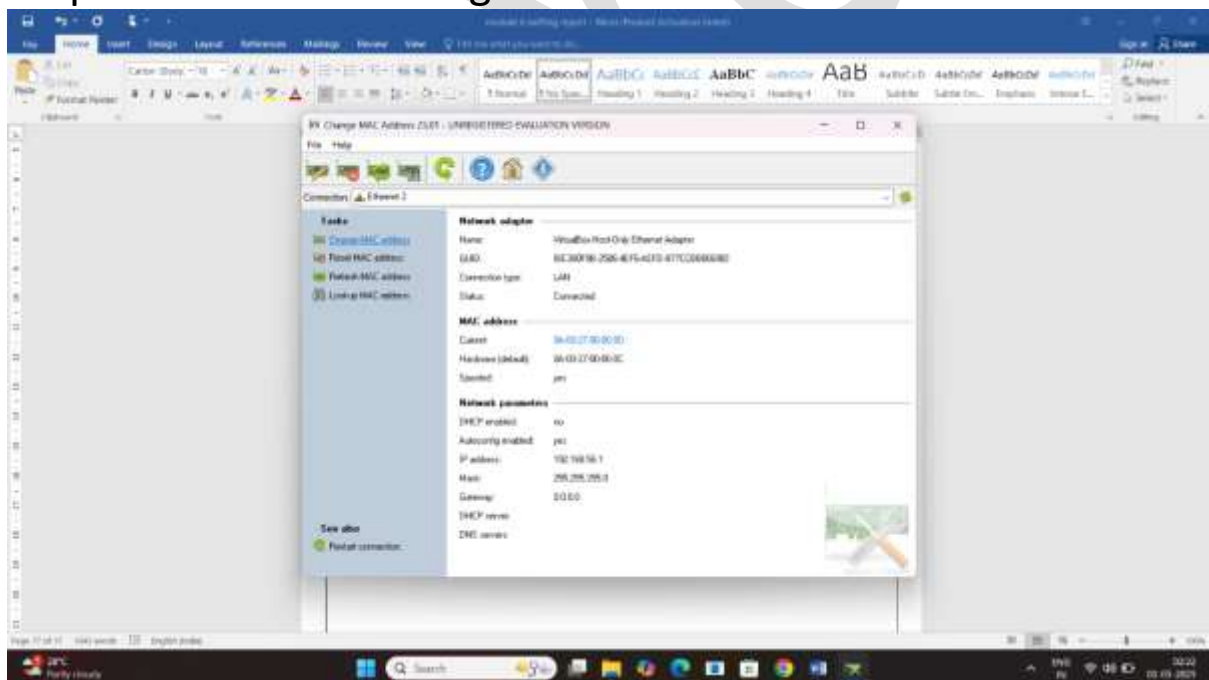
2 Extra activity for windows Mac Spoofing using there is tool called change mac address

Step1: open the change mac address tool

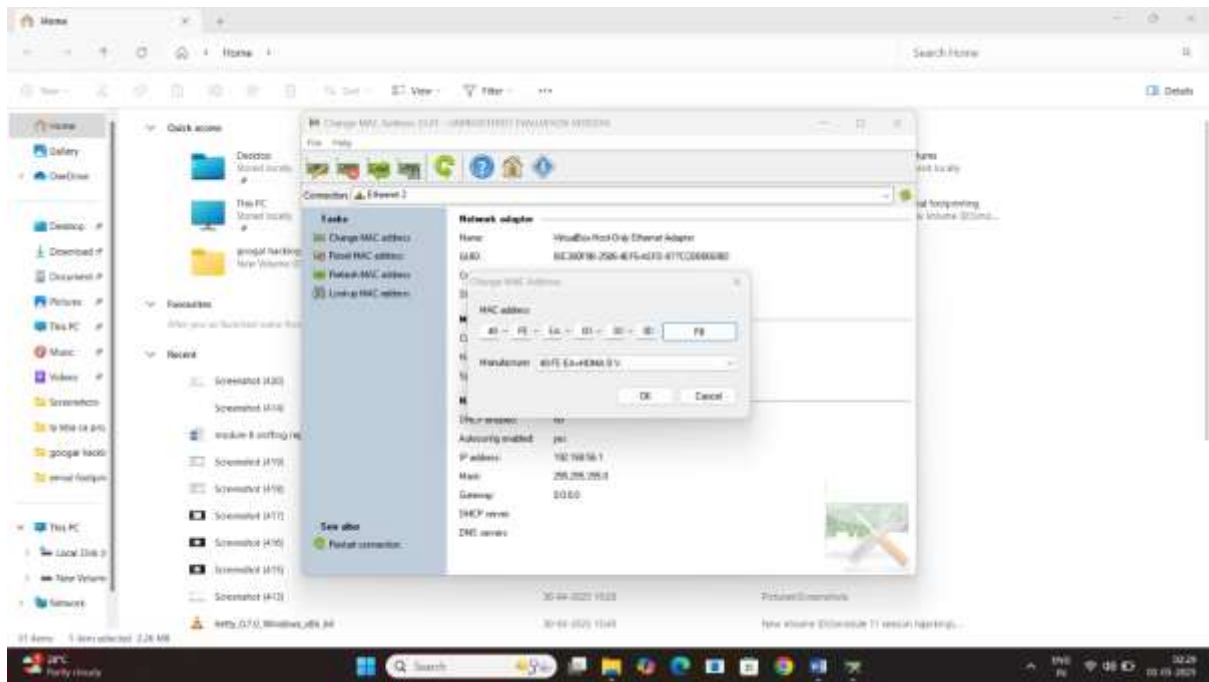
Step2: select the Ethernet type



Step3: click on the change mac

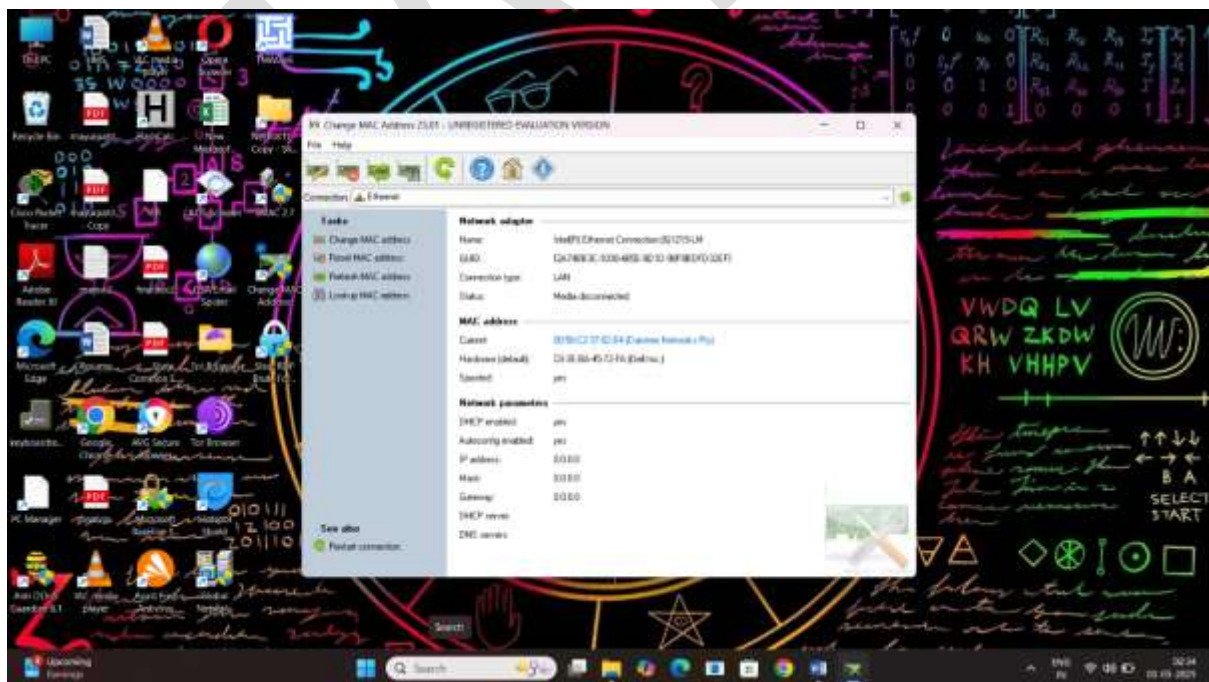


Step4: select the random mac option and click the ok



Step5: final step is change the mac address and spoof the mac

Result:

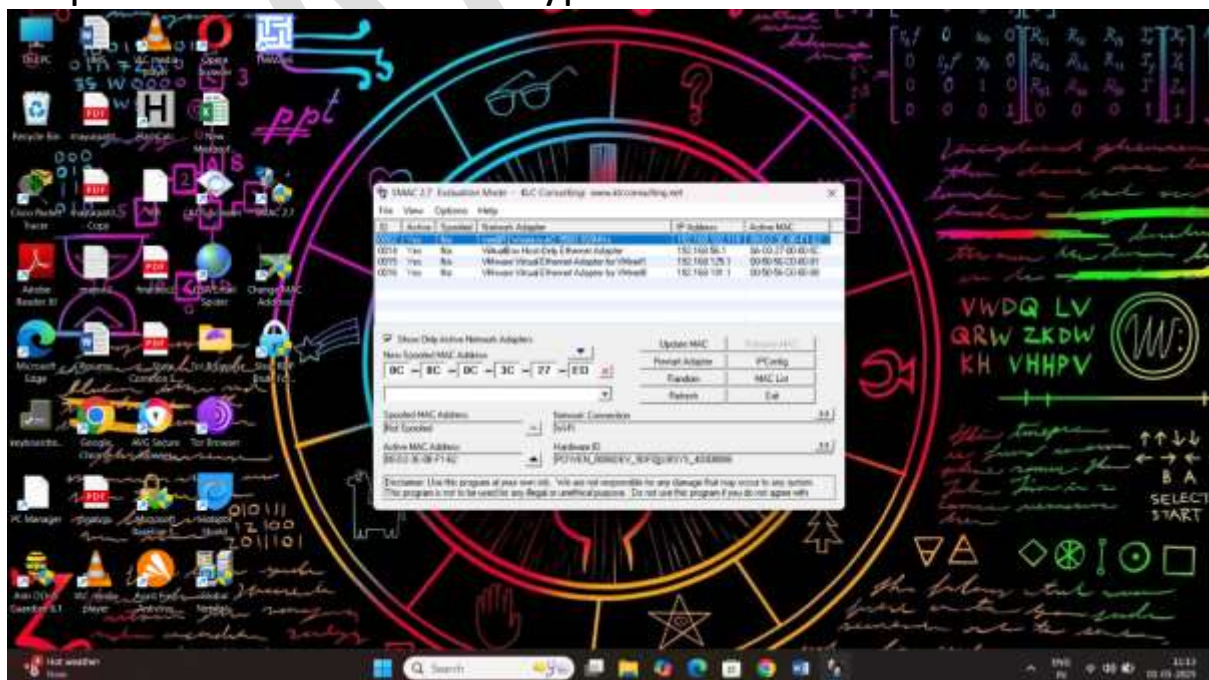


2 Extra activity for windows Mac Spoofing using there is tool called change SAMC 2.7

Step1: open the tool click on proceed button



Step2: select the Ethernet type



Step 3: click on random

Step4: click on mac update

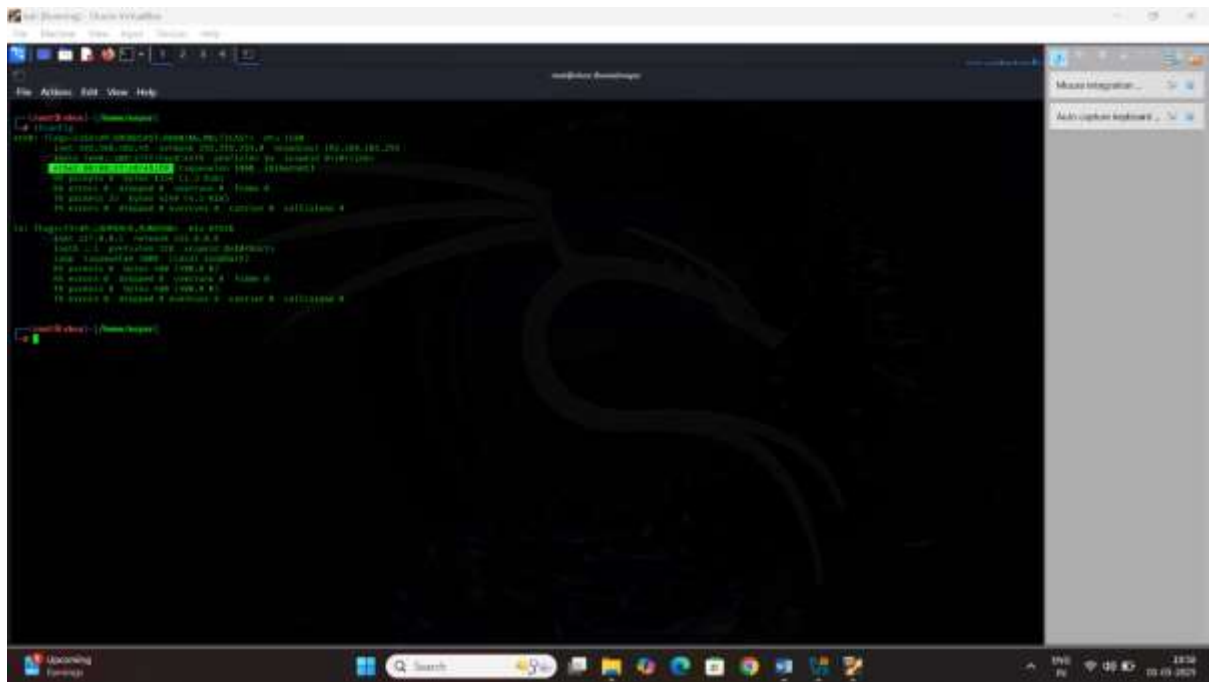
Result:



MAC Spoofing in kali linux these is tool called macchanger

Step1: open the kali linux terminal type the command

Original macc address for kali



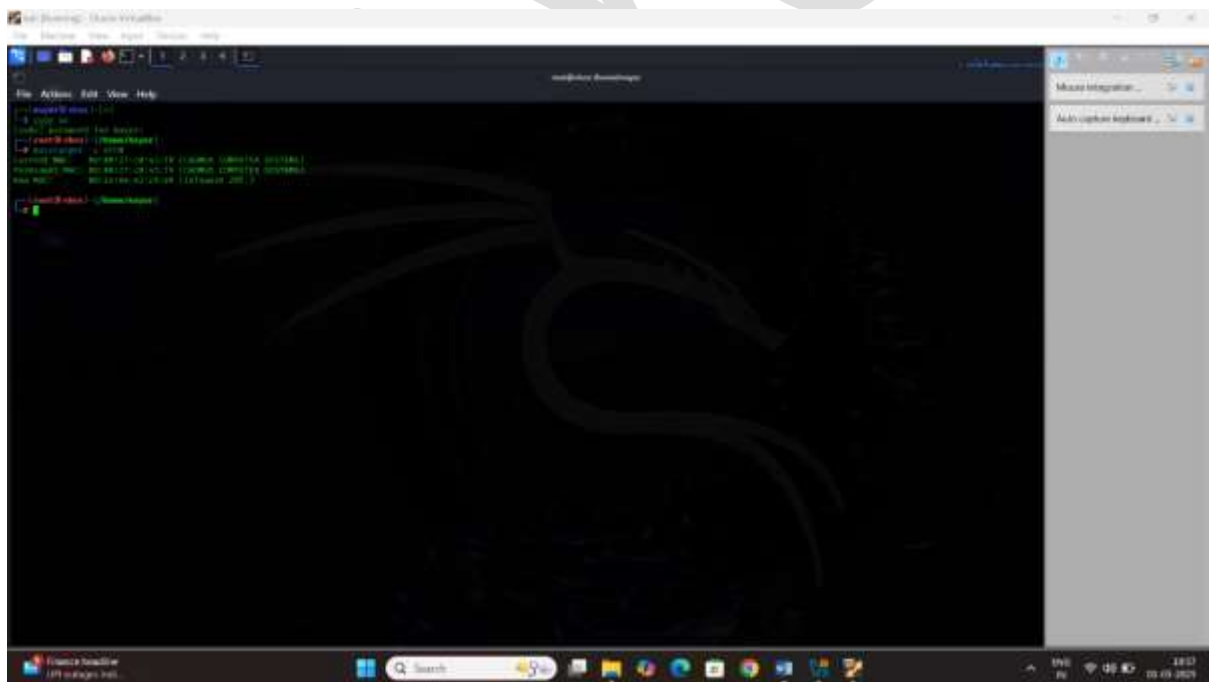
```
root@kali:~# ifconfig
eth0: flags=4163<UP,BROADCAST,MULTICAST> mtu 1500
    inet 192.168.1.10 netmask 255.255.255.0 broadcast 192.168.1.255
    ether 08:00:27:00:00:00 txqueuelen 1000 (10.0 Mb)
    RX packets 0 bytes 0 (0.0 B)
    TX packets 0 bytes 0 (0.0 B)
    RX errors 0 TX errors 0 overruns 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 01<host>
    ether 00:00:00:00:00:00 txqueuelen 1000 (10.0 Mb)
    RX packets 0 bytes 0 (0.0 B)
    TX packets 0 bytes 0 (0.0 B)
    RX errors 0 TX errors 0 overruns 0 carrier 0 collisions 0

root@kali:~# macchanger -r eth0
macchanger: eth0: random MAC address: 08:00:27:00:00:00
```

Command: macchanger -r eth0

This command are use for random macaddres genreat



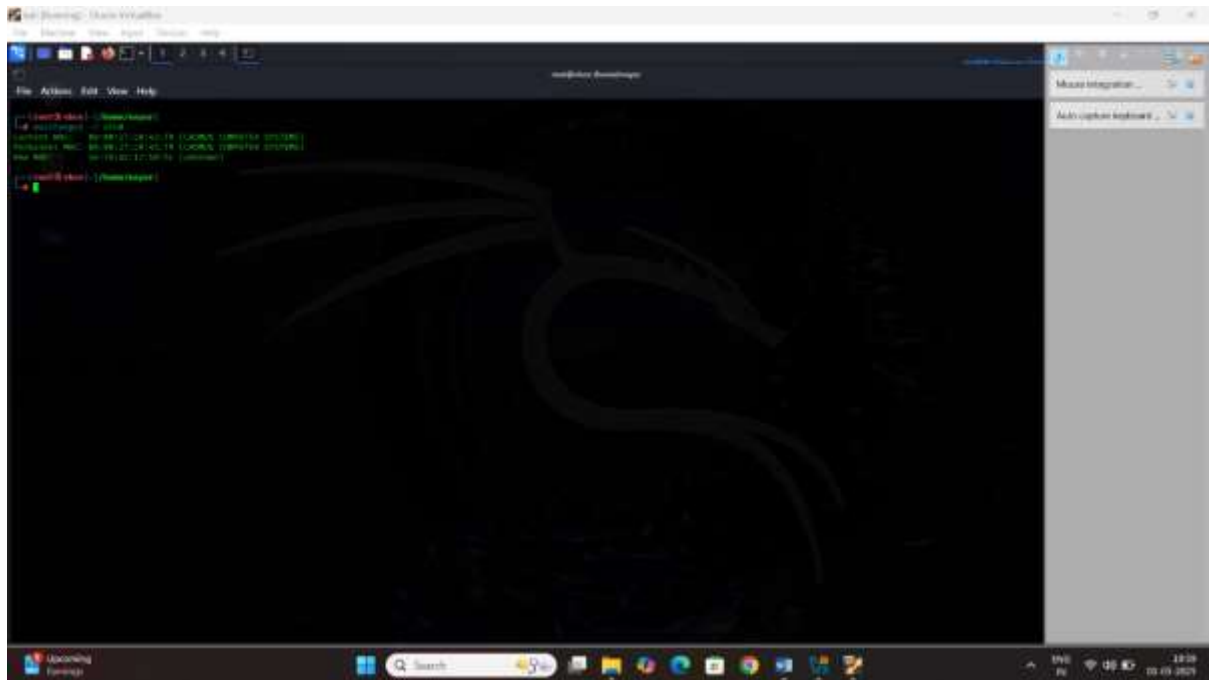
```
root@kali:~# ifconfig
eth0: flags=4163<UP,BROADCAST,MULTICAST> mtu 1500
    inet 192.168.1.10 netmask 255.255.255.0 broadcast 192.168.1.255
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    RX errors 0 TX errors 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 01<host>
    ether 00:00:00:00:00:00 txqueuelen 1000 (10.0 Mb)
    RX packets 0 bytes 0 (0.0 B)
    TX packets 0 bytes 0 (0.0 B)
    RX errors 0 TX errors 0 overruns 0 carrier 0 collisions 0

root@kali:~#
```

Step2: back to original macaddress

Command: `macchanger -p eth0`



SSL Stripping attacks/protocol down attack

To convert to the HTTPS TO HTTP

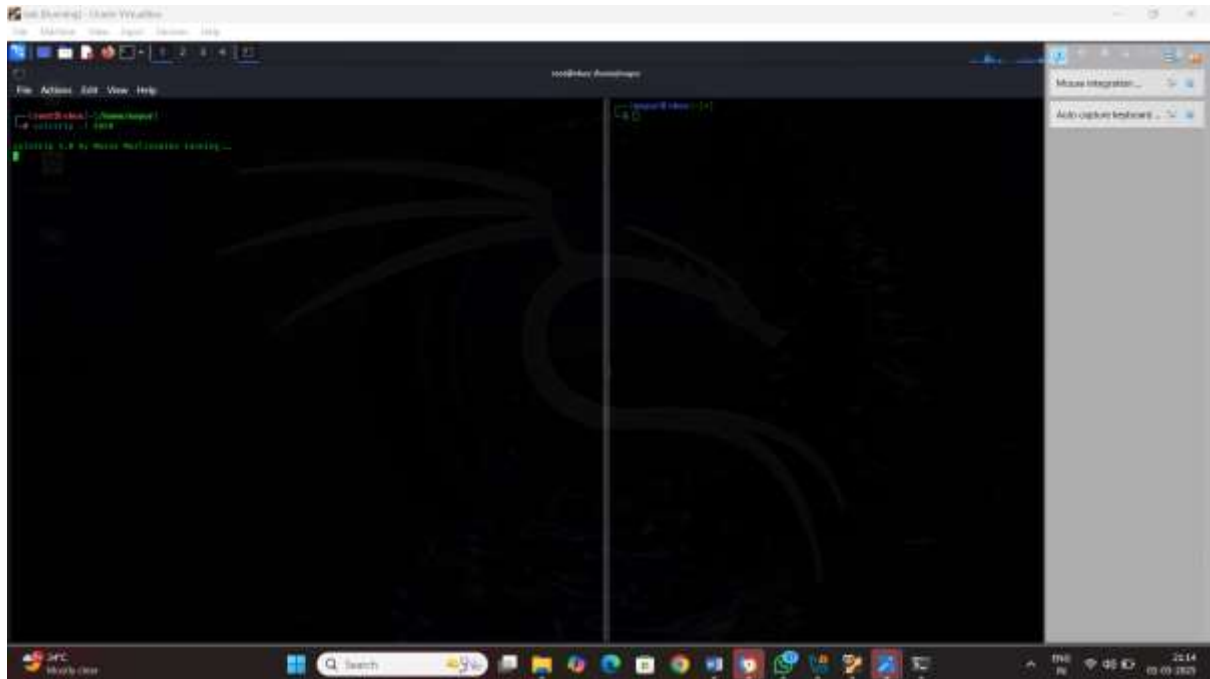
Step1: open kali linux terminal type the command

Step2: `echo 1 >/proc/sys/net/ipv4/ip_forward`

This command are use ip forward

Step3: `iptables -t nat -A PREROUTING -p tcp --dport 80 -j REDIRECT --to-port 8080`

Sslstrip -l 8080



Open the browser and disable hsts / any website
Search the web site and you can monitoring the activity