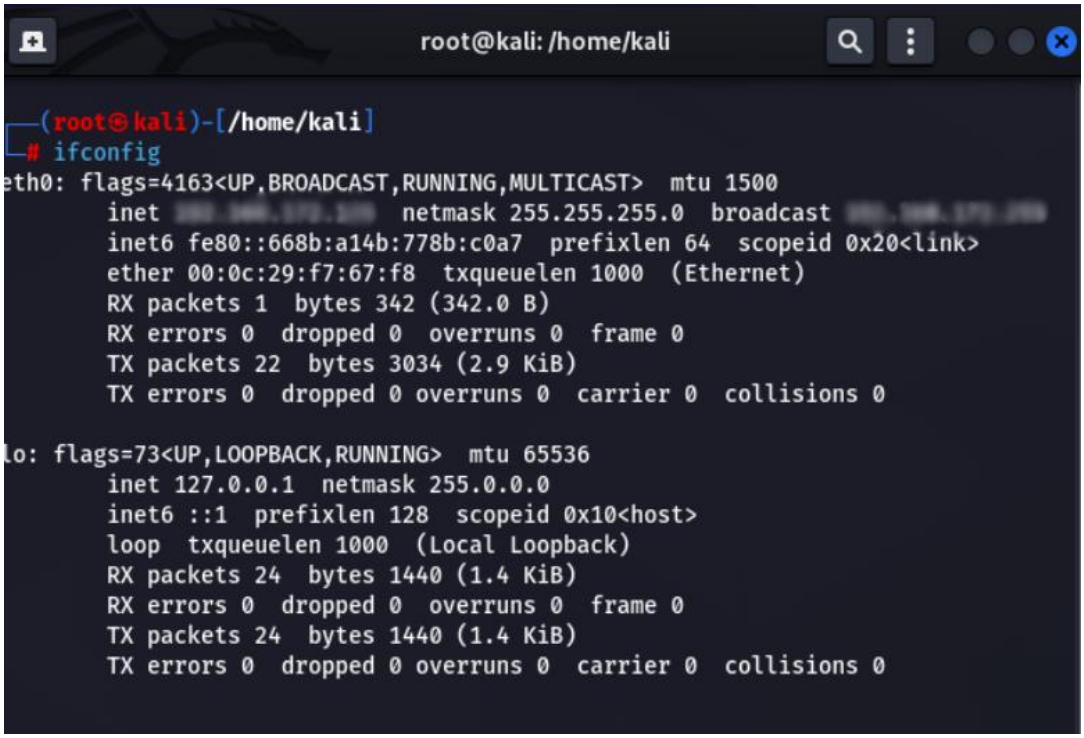
# IP Address Basic Commands

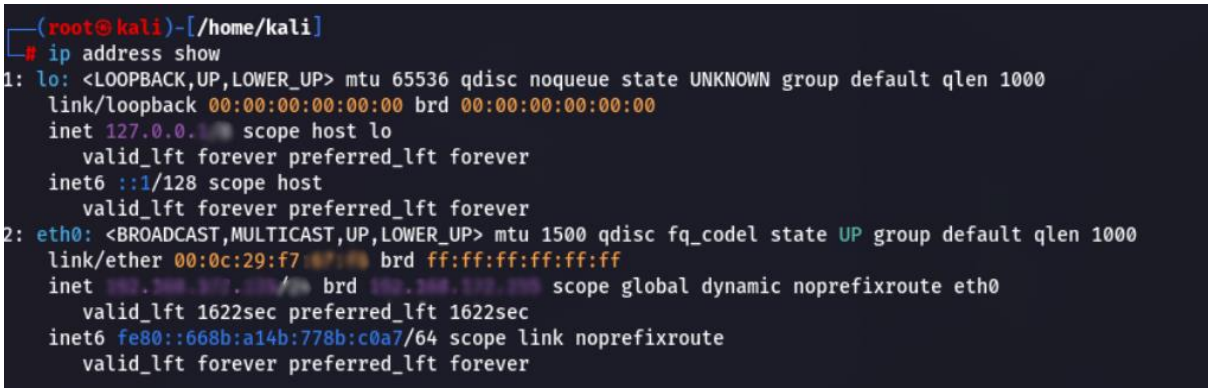
An Internet Protocol (IP) address is a unique numerical identifier for every device or network that connects to the internet. Typically assigned by an internet service provider (ISP), an IP address is an online device address used for communicating across the internet.

There are two versions of IP addresses that are commonly used on the internet: IPv4 and IPv6. An IPv4 address is expressed as a set of four dotted decimal numbers, where each octet is separated by a period, such as 192.168.35.4. The three digits in the first octet represent a particular network on the internet while the rest of the digits represent the actual host address within the local network, such as a workstation or a server. An IPv6 address represents eight groups of four hexadecimal digits separated by colons, such as 2620:cc:8000:1c82:544c:cc2e:f2fa:5a9b.

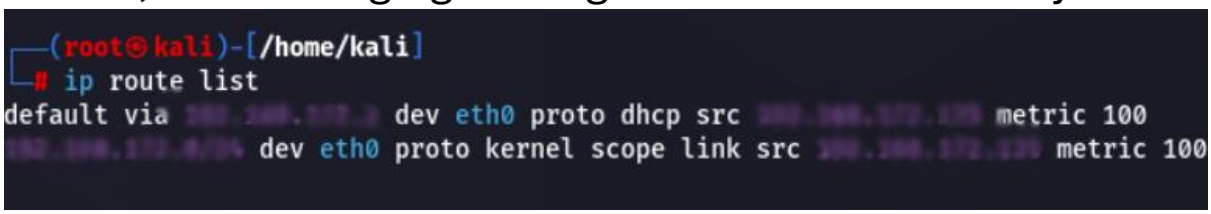
1. ifconfig (interface configuration) command is used to configure the kernel-resident network interfaces. It is used at the boot time to set up the interfaces as necessary. After that, it is usually used when needed during debugging or when you need system tuning. Also, this command is used to assign the IP address and netmask to an interface or to enable or disable a given interface.



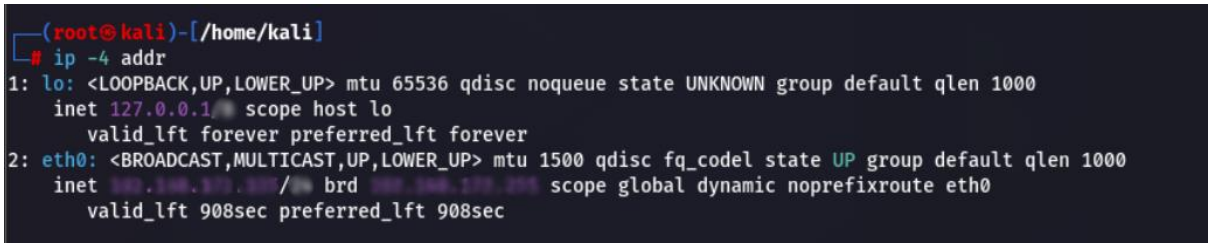

2. The ip address show command in Linux is used to display detailed information about network interfaces and their associated IP addresses on a system. It shows the IP addresses assigned to each interface, along with additional information such as the interface's MAC address and network-related settings. It's a versatile tool for examining network configurations and troubleshooting connectivity issues.



3. The ip route list command in Linux displays the system's routing table, showing how network packets are directed to their destinations. It's useful for understanding network routing configurations, diagnosing connectivity issues, and managing routing information efficiently.




4. The command ip -4 addr in Linux is used to display IPv4 addresses assigned to network interfaces on the system. It provides a concise list of IPv4 addresses along with associated interface names and additional information like the network prefix length. This command is useful for quickly retrieving IPv4 configuration details for networking purposes.




5. The command ip -6 addr in Linux is used to display IPv6 addresses assigned to network interfaces on the system. It provides a concise list of IPv6 addresses along with associated interface names and additional information such as the network prefix length. This command is useful for retrieving IPv6 configuration details for networking purposes.

```
┌──(root㉿kali)-[/home/kali]
└─# ip -6 addr
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 state UNKNOWN qlen 1000
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 state UP qlen 1000
    inet6 fe80::668b:a14b:778b:c0a7/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
```

6. The command ip link show in Linux is used to display information about network interfaces on the system. It provides a comprehensive list of network interfaces along with their corresponding MAC addresses, state (such as UP or DOWN), and any additional flags or settings. This command is useful for quickly examining the status and configuration of network interfaces.

```
┌──(root㉿kali)-[/home/kali]
└─# ip link show
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN mode DEFAULT group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP mode DEFAULT group default qlen 1000
    link/ether 00:0c:29:f7:67:f8 brd ff:ff:ff:ff:ff:ff
```

7. The command ip addr show dev eth0 in Linux displays detailed information about the network interface eth0, including its IP addresses, network prefix length, and associated settings such as the interface state (UP or DOWN). This command is useful for inspecting the specific configuration of a particular network interface, aiding in troubleshooting and network management tasks.

```
┌──(root㉿kali)-[/home/kali]
└─# ip addr show dev eth0
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc fq_codel state UP group default qlen 1000
    link/ether 00:0c:29:f7:67:f8 brd ff:ff:ff:ff:ff:ff
    inet 192.168.172.130/24 brd 192.168.172.255 scope global dynamic noprefixroute eth0
       valid_lft 1143sec preferred_lft 1143sec
    inet6 fe80::668b:a14b:778b:c0a7/64 scope link noprefixroute
       valid_lft forever preferred_lft forever
```