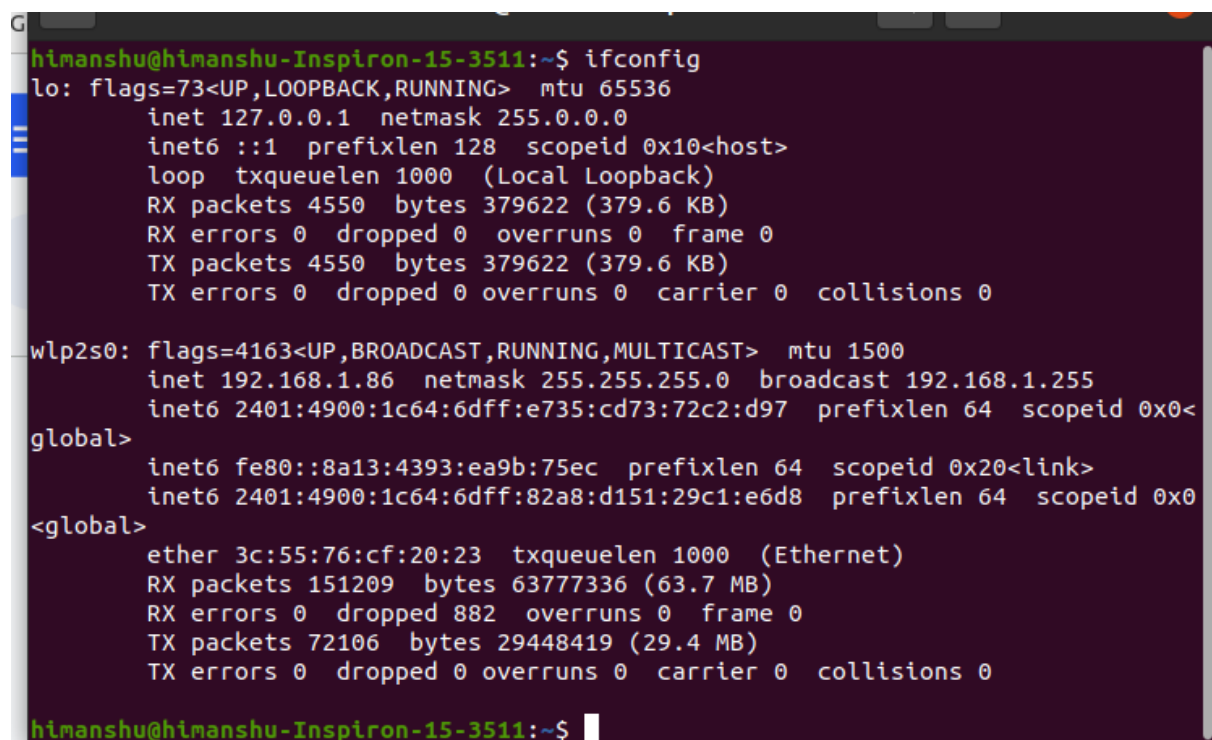# . LINUX NETWORKING

ubuntu में कई networking command उपलब्ध हैं जिनका use आप अपने network के management और problem solve के लिए कर सकते हैं। यहाँ कुछ common हैं:

- ifconfig - IP address, netmask, and MAC address include network interface configuration information include show करता है।

```
himanshu@himanshu-Inspiron-15-3511:~$ ifconfig
lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
        inet 127.0.0.1  netmask 255.0.0.0
        inet6 ::1  prefixlen 128  scopeid 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 4550  bytes 379622 (379.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 4550  bytes 379622 (379.6 KB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

wlp2s0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.86  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 2401:4900:1c64:6dff:e735:cd73:72c2:d97  prefixlen 64  scopeid 0x0<
global>
        inet6 fe80::8a13:4393:ea9b:75ec  prefixlen 64  scopeid 0x20<link>
        inet6 2401:4900:1c64:6dff:82a8:d151:29c1:e6d8  prefixlen 64  scopeid 0x0
<global>
        ether 3c:55:76:cf:20:23  txqueuelen 1000  (Ethernet)
        RX packets 151209  bytes 63777336 (63.7 MB)
        RX errors 0  dropped 882  overruns 0  frame 0
        TX packets 72106  bytes 29448419 (29.4 MB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

himanshu@himanshu-Inspiron-15-3511:~$
```

- IP - A interfaces and routing tables को configure करने के लिए एक more advanced tool होता है ।

```
himanshu@himanshu-Inspiron-15-3511:~$ ip -a
Usage: ip [ OPTIONS ] OBJECT { COMMAND | help }
       ip [ -force ] -batch filename
where  OBJECT := { link | address | addrlabel | route | rule | neigh | ntable |
                   tunnel | tuntap | maddress | mroute | mrule | monitor | xfrm |
                   netns | l2tp | fou | macsec | tcp_metrics | token | netconf | ila |
                   vrf | sr | nexthop }
       OPTIONS := { -V[ersion] | -s[tatistics] | -d[etails] | -r[esolve] |
                    -h[uman-readable] | -iec | -j[son] | -p[retty] |
                    -f[amily] { inet | inet6 | mpls | bridge | link } |
                    -4 | -6 | -I | -D | -M | -B | -0 |
                    -l[oops] { maximum-addr-flush-attempts } | -br[ief] |
                    -o[neline] | -t[imestamp] | -ts[hort] | -b[atch] [filename] |
                    -rc[vbuf] [size] | -n[etns] name | -N[umeric] | -a[ll] |
                    -c[olor]}
himanshu@himanshu-Inspiron-15-3511:~$ 
```

- Ping - Tests को ICMP (Internet Control Message Protocol) packets send करके networking connectivity का testing करता है।

```
himanshu@himanshu-Inspiron-15-3511:~$ ping linux.com
PING linux.com(2620:12a:8000::3 (2620:12a:8000::3)) 56 data bytes
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=1 ttl=59 time=322 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=2 ttl=59 time=218 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=3 ttl=59 time=71.5 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=4 ttl=59 time=188 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=5 ttl=59 time=776 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=6 ttl=59 time=1165 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=7 ttl=59 time=369 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=8 ttl=59 time=840 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=9 ttl=59 time=323 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=10 ttl=59 time=1925 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=11 ttl=59 time=925 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=12 ttl=59 time=686 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=13 ttl=59 time=139 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=14 ttl=59 time=135 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=15 ttl=59 time=148 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=16 ttl=59 time=55.4 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=17 ttl=59 time=323 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=18 ttl=59 time=934 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=19 ttl=59 time=259 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=20 ttl=59 time=116 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=21 ttl=59 time=67.8 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=22 ttl=59 time=89.3 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=23 ttl=59 time=135 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=24 ttl=59 time=57.6 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=25 ttl=59 time=67.7 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=26 ttl=59 time=93.8 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=27 ttl=59 time=110 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=28 ttl=59 time=119 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=29 ttl=59 time=828 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=30 ttl=59 time=189 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=31 ttl=59 time=671 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=32 ttl=59 time=487 ms
64 bytes from 2620:12a:8000::3 (2620:12a:8000::3): icmp_seq=33 ttl=59 time=107 ms
```

- Traceroute - वह path show करता है जो packet आपके computer से remote host तक ले जाता है, और each hop को travel करने में कितना time लगता है।

```
Try traceroute --help or traceroute --usage for more information.
himanshu@himanshu-Inspiron-15-3511:~$ traceroute linux.com
traceroute to linux.com (23.185.0.3), 64 hops max
 1   192.168.1.1  88.136ms  3.335ms  3.298ms
 2   223.177.143.255  99.140ms  202.412ms  107.369ms
 3   122.186.81.177  496.652ms  222.451ms  5.604ms
 4   116.119.109.250  497.919ms  629.543ms  421.015ms
 5   *   *   *
 6   *   *   *
 7   *   *   *
 8   *   *   *
 9   *   *   *
10   *   *   *
11   *   *   *
12   *   *   *
13   *   *   *
14   *   *   *
15   *   *   *
16   *   *   *
17   *   *   *
18   *   *   *
19   *   *   *
20   *   *   *
21   *   *   *
22   *   *   
```

- netstat - active connections and listening ports such as network statistics show करता है।

- nslookup - IP addresses पर hostnames को solve करने के लिए DNS queries करता है और इसके opposite I

- Digg - Another DNS tool जो आपको advanced DNS queries and get detailed information provide करने की permission देता है।

```
himanshu@himanshu-Inspiron-15-3511:~$ dig geeksforgeeks.org

; <<>> DiG 9.16.1-Ubuntu <<>> geeksforgeeks.org
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 32843
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 65494
;; QUESTION SECTION:
;geeksforgeeks.org.                  IN      A

;; ANSWER SECTION:
geeksforgeeks.org.         30        IN      A       34.218.62.116

;; Query time: 618 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Tue Mar 28 15:08:29 IST 2023
;; MSG SIZE  rcvd: 62

himanshu@himanshu-Inspiron-15-3511:~$ dig geeksforgeeks.org +short
34.218.62.116
himanshu@himanshu-Inspiron-15-3511:~$ dig geeksforgeeks.org +nocomments

; <<>> DiG 9.16.1-Ubuntu <<>> geeksforgeeks.org +nocomments
;; global options: +cmd
;geeksforgeeks.org.                  IN      A
geeksforgeeks.org.         18        IN      A       34.218.62.116
;; Query time: 239 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Tue Mar 28 15:09:03 IST 2023
;; MSG SIZE  rcvd: 62

himanshu@himanshu-Inspiron-15-3511:~$ dig geeksforgeeks.org +noall
himanshu@himanshu-Inspiron-15-3511:~$ dig geeksforgeeks.org +noall +answer
geeksforgeeks.org.         19        IN      A       34.218.62.116
himanshu@himanshu-Inspiron-15-3511:~$ dig geeksforgeeks.org ANY

; <<>> DiG 9.16.1-Ubuntu <<>> geeksforgeeks.org ANY
;; global options: +cmd
;; connection timed out; no servers could be reached

himanshu@himanshu-Inspiron-15-3511:~$ dig geeksforgeeks.org ANY

; <<>> DiG 9.16.1-Ubuntu <<>> geeksforgeeks.org ANY
;; global options: +cmd
;; connection timed out; no servers could be reached

himanshu@himanshu-Inspiron-15-3511:~$ dig geeksforgeeks.org MX

; <<>> DiG 9.16.1-Ubuntu <<>> geeksforgeeks.org MX
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 29447
;; flags: qr rd ra; QUERY: 1, ANSWER: 5, AUTHORITY: 0, ADDITIONAL: 1
```

```
himanshu@himanshu-Inspiron-15-3511:~$ dig geeksforgeeks.org @8.8.8.8

; <<>> DiG 9.16.1-Ubuntu <<>> geeksforgeeks.org @8.8.8.8
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 34590
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 512
;; QUESTION SECTION:
;geeksforgeeks.org.              IN      A

;; ANSWER SECTION:
geeksforgeeks.org.      30      IN      A       34.218.62.116

;; Query time: 20 msec
;; SERVER: 8.8.8.8#53(8.8.8.8)
;; WHEN: Tue Mar 28 15:11:59 IST 2023
;; MSG SIZE  rcvd: 62

himanshu@himanshu-Inspiron-15-3511:~$ dig geeksforgeeks.org +noall +answer +stats
geeksforgeeks.org.      30      IN      A       34.218.62.116
;; Query time: 592 msec
;; SERVER: 127.0.0.53#53(127.0.0.53)
;; WHEN: Tue Mar 28 15:12:17 IST 2023
;; MSG SIZE  rcvd: 62

himanshu@himanshu-Inspiron-15-3511:~$
```

- route - network routing table को Displays and manages करता है, जो उस path को determines करता है जो packet अपने target तक पहुंचने के लिए लेते हैं।

```
himanshu@himanshu-Inspiron-15-3511:~$ route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         dsldevice.lan   0.0.0.0         UG    600    0        0 wlp2s0
link-local      0.0.0.0         255.255.0.0     U     1000   0        0 wlp2s0
192.168.1.0     0.0.0.0         255.255.255.0   U     600    0        0 wlp2s0
himanshu@himanshu-Inspiron-15-3511:~$ route -n
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
0.0.0.0         192.168.1.1     0.0.0.0         UG    600    0        0 wlp2s0
169.254.0.0     0.0.0.0         255.255.0.0     U     1000   0        0 wlp2s0
192.168.1.0     0.0.0.0         255.255.255.0   U     600    0        0 wlp2s0
himanshu@himanshu-Inspiron-15-3511:~$ sudo route add default gw 169.254.0.0
[sudo] password for himanshu:
himanshu@himanshu-Inspiron-15-3511:~$ route -Cn
Kernel IP routing cache
Source          Destination     Gateway         Flags Metric Ref   Use Iface
himanshu@himanshu-Inspiron-15-3511:~$ sudo route add -host 192.168.1.51 reject
himanshu@himanshu-Inspiron-15-3511:~$ sudo route add -host 192.168.1.51 reject
SIOCADDRT: File exists
himanshu@himanshu-Inspiron-15-3511:~$ ip route
default via 169.254.0.0 dev wlp2s0
default via 192.168.1.1 dev wlp2s0 proto dhcp metric 600
169.254.0.0/16 dev wlp2s0 scope link metric 1000
192.168.1.0/24 dev wlp2s0 proto kernel scope link src 192.168.1.86 metric 600
unreachable 192.168.1.51 scope host
himanshu@himanshu-Inspiron-15-3511:~$ route del default
SIOCDELRT: Operation not permitted
himanshu@himanshu-Inspiron-15-3511:~$ route del default
SIOCDELRT: Operation not permitted
himanshu@himanshu-Inspiron-15-3511:~$ sudo route del default
himanshu@himanshu-Inspiron-15-3511:~$ ip route show table local
local 127.0.0.0/8 dev lo proto kernel scope host src 127.0.0.1
local 127.0.0.1 dev lo proto kernel scope host src 127.0.0.1
broadcast 127.255.255.255 dev lo proto kernel scope link src 127.0.0.1
local 192.168.1.86 dev wlp2s0 proto kernel scope host src 192.168.1.86
broadcast 192.168.1.255 dev wlp2s0 proto kernel scope link src 192.168.1.86
himanshu@himanshu-Inspiron-15-3511:~$ ip -4 route
default via 192.168.1.1 dev wlp2s0 proto dhcp metric 600
169.254.0.0/16 dev wlp2s0 scope link metric 1000
192.168.1.0/24 dev wlp2s0 proto kernel scope link src 192.168.1.86 metric 600
unreachable 192.168.1.51 scope host
himanshu@himanshu-Inspiron-15-3511:~$ ip -6 route
::1 dev lo proto kernel metric 256 pref medium
2401:4900:1c64:6dff::/64 via fe80::1 dev wlp2s0 proto ra metric 600 pref high
fe80::/64 dev wlp2s0 proto kernel metric 600 pref medium
default via fe80::1 dev wlp2s0 proto ra metric 600 pref low
himanshu@himanshu-Inspiron-15-3511:~$ █
```

. MANAGING LOCAL LINUX USERS AND GROUPS

ubuntu या किसी linux distribution में, local users और groups को
management करने के लिए कई order उपलब्ध हैं। यहाँ कुछ general रूप
से use किए जाने वाले order दिए गए हैं

- Creating a User :

एक new user create करने के लिए, आप adder command का use कर सकते हैं। examples के लिए, "jondo " name एक new users create करने के लिए, terminal में निम्नलिखित command run करे :

```
himanshu@himanshu-Inspiron-15-3511:~$ sudo adduser hj
[sudo] password for himanshu:
Adding user `hj' ...
Adding new group `hj' (1001) ...
Adding new user `hj' (1001) with group `hj' ...
Creating home directory `/home/hj' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for hj
Enter the new value, or press ENTER for the default
        Full Name []: himanshu
        Room Number []: himanshu
        Work Phone []: himanshu
        Home Phone []: himanshu
        Other []: na
Is the information correct? [Y/n] y
```

- Adding a user to a group :

users को किसी existing group में add करने के लिए, usermod command का use करें। example के लिए, users "jondo" को "sudo" group में add करने के लिए, निम्नलिखित command run करे :

```
himanshu@himanshu-Inspiron-15-3511:~$ sudo usermod -aG sudo johndoe
usermod: user 'johndoe' does not exist
himanshu@himanshu-Inspiron-15-3511:~$ sudo usermod -aG sudo hj
himanshu@himanshu-Inspiron-15-3511:~$
```

- Creating a Group :

एक new group create करने के लिए, addgroup command का use करें।
example के लिए, "webdevs" name एक new group create करने के
लिए, निम्नलिखित command run करे :

```
himanshu@himanshu-Inspiron-15-3511:~$ sudo usermod -aG sudo johndoe
usermod: user 'johndoe' does not exist
himanshu@himanshu-Inspiron-15-3511:~$ sudo usermod -aG sudo hj
himanshu@himanshu-Inspiron-15-3511:~$ sudo addgroup webdevs
Adding group `webdevs' (GID 1002) ...
Done.
himanshu@himanshu-Inspiron-15-3511:~$ sudo addgroup hc
Adding group `hc' (GID 1003) ...
Done.
himanshu@himanshu-Inspiron-15-3511:~$
```

● Deleting a User :

किसी users को delete करने के लिए, deluser command का use करें।
example के लिए, users "jondo" को delete करने के लिए, निम्नलिखित
command run करे :

```
/usr/sbin/deluser: The user `johndoe' does not exist.
himanshu@himanshu-Inspiron-15-3511:~$ sudo deluser hj
Removing user `hj' ...
Warning: group `hj' has no more members.
Done.
himanshu@himanshu-Inspiron-15-3511:~$
```

● Delete a group :

किसी group को delete करने के लिए, delete group command का use
करें। example के लिए, "webdevs" group को delete के लिए,
निम्नलिखित command run करे :

```
himanshu@himanshu-Inspiron-15-3511:~$ sudo usermod -aG sudo johndoe
usermod: user 'johndoe' does not exist
himanshu@himanshu-Inspiron-15-3511:~$ sudo usermod -aG sudo hj
himanshu@himanshu-Inspiron-15-3511:~$ sudo addgroup webdevs
Adding group `webdevs' (GID 1002) ...
Done.
himanshu@himanshu-Inspiron-15-3511:~$ sudo addgroup hc
Adding group `hc' (GID 1003) ...
Done.
himanshu@himanshu-Inspiron-15-3511:~$ sudo deluser johndoe
/usr/sbin/deluser: The user `johndoe' does not exist.
himanshu@himanshu-Inspiron-15-3511:~$ sudo deluser hj
Removing user `hj' ...
Warning: group `hj' has no more members.
Done.
himanshu@himanshu-Inspiron-15-3511:~$ sudo delgroup webdevs
Removing group `webdevs' ...
Done.
himanshu@himanshu-Inspiron-15-3511:~$ sudo delgroup hc
Removing group `hc' ...
Done.
himanshu@himanshu-Inspiron-15-3511:~$
```

ये उन command के कुछ example हैं जिनका use आप ubuntu या किसी other linux distribution में local users and groups को management करने के लिए कर सकते हैं। आप इन command और other more information ubuntu document में या terminal में man command का use करके find कर सकते हैं।