++Network Security Lab

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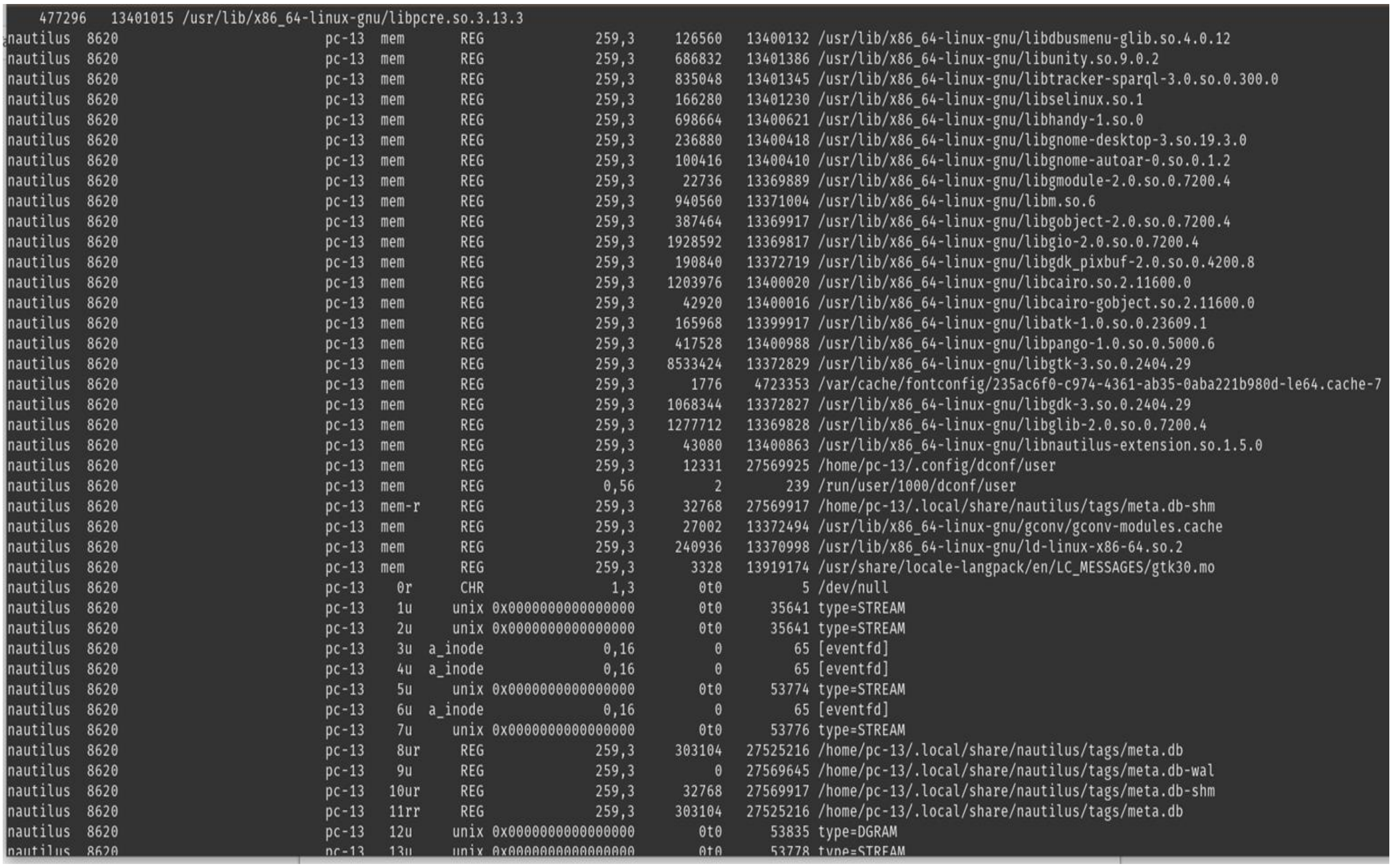
Lab-01:

Task-01

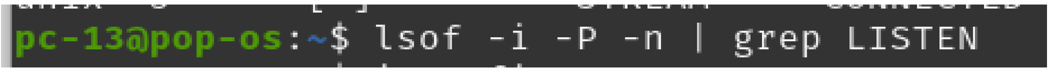
Listing open files using lsof

The lsof (List Open Files) command in Linux is used to display a list of all open files and the processes that have opened them.



```
    477296   13401015 /usr/lib/x86_64-linux-gnu/libpcre.so.3.13.3
nautilus  8620                        pc-13 mem       REG              259,3     126560   13400132 /usr/lib/x86_64-linux-gnu/libdbusmenu-glib.so.4.0.12
nautilus  8620                        pc-13 mem       REG              259,3     686832   13401386 /usr/lib/x86_64-linux-gnu/libunity.so.9.0.2
nautilus  8620                        pc-13 mem       REG              259,3     835048   13401345 /usr/lib/x86_64-linux-gnu/libtracker-sparql-3.0.so.0.300.0
nautilus  8620                        pc-13 mem       REG              259,3     166280   13401230 /usr/lib/x86_64-linux-gnu/libselinux.so.1
nautilus  8620                        pc-13 mem       REG              259,3     698664   13400621 /usr/lib/x86_64-linux-gnu/libhandy-1.so.0
nautilus  8620                        pc-13 mem       REG              259,3     236880   13400418 /usr/lib/x86_64-linux-gnu/libgnome-desktop-3.so.19.3.0
nautilus  8620                        pc-13 mem       REG              259,3     100416   13400410 /usr/lib/x86_64-linux-gnu/libgnome-autoar-0.so.0.1.2
nautilus  8620                        pc-13 mem       REG              259,3      22736   13369889 /usr/lib/x86_64-linux-gnu/libgmodule-2.0.so.0.7200.4
nautilus  8620                        pc-13 mem       REG              259,3     940560   13371004 /usr/lib/x86_64-linux-gnu/libm.so.6
nautilus  8620                        pc-13 mem       REG              259,3     387464   13369917 /usr/lib/x86_64-linux-gnu/libgobject-2.0.so.0.7200.4
nautilus  8620                        pc-13 mem       REG              259,3    1928592   13369817 /usr/lib/x86_64-linux-gnu/libgio-2.0.so.0.7200.4
nautilus  8620                        pc-13 mem       REG              259,3     190840   13372719 /usr/lib/x86_64-linux-gnu/libgdk_pixbuf-2.0.so.0.4200.8
nautilus  8620                        pc-13 mem       REG              259,3    1203976   13400020 /usr/lib/x86_64-linux-gnu/libcairo.so.2.11600.0
nautilus  8620                        pc-13 mem       REG              259,3      42920   13400016 /usr/lib/x86_64-linux-gnu/libcairo-gobject.so.2.11600.0
nautilus  8620                        pc-13 mem       REG              259,3     165968   13399917 /usr/lib/x86_64-linux-gnu/libatk-1.0.so.0.23609.1
nautilus  8620                        pc-13 mem       REG              259,3     417528   13400988 /usr/lib/x86_64-linux-gnu/libpango-1.0.so.0.5000.6
nautilus  8620                        pc-13 mem       REG              259,3    8533424   13372829 /usr/lib/x86_64-linux-gnu/libgtk-3.so.0.2404.29
nautilus  8620                        pc-13 mem       REG              259,3       1776    4723353 /var/cache/fontconfig/235ac6f0-c974-4361-ab35-0aba221b980d-le64.cache-7
nautilus  8620                        pc-13 mem       REG              259,3    1068344   13372827 /usr/lib/x86_64-linux-gnu/libgdk-3.so.0.2404.29
nautilus  8620                        pc-13 mem       REG              259,3    1277712   13369828 /usr/lib/x86_64-linux-gnu/libglib-2.0.so.0.7200.4
nautilus  8620                        pc-13 mem       REG              259,3      43080   13400863 /usr/lib/x86_64-linux-gnu/libnautilus-extension.so.1.5.0
nautilus  8620                        pc-13 mem       REG              259,3      12331   27569925 /home/pc-13/.config/dconf/user
nautilus  8620                        pc-13 mem       REG               0,56          2        239 /run/user/1000/dconf/user
nautilus  8620                        pc-13 mem-r     REG              259,3      32768   27569917 /home/pc-13/.local/share/nautilus/tags/meta.db-shm
nautilus  8620                        pc-13 mem       REG              259,3      27002   13372494 /usr/lib/x86_64-linux-gnu/gconv/gconv-modules.cache
nautilus  8620                        pc-13 mem       REG              259,3     240936   13370998 /usr/lib/x86_64-linux-gnu/ld-linux-x86-64.so.2
nautilus  8620                        pc-13 mem       REG              259,3       3328   13919174 /usr/share/locale-langpack/en/LC_MESSAGES/gtk30.mo
nautilus  8620                        pc-13   0r      CHR                1,3        0t0          5 /dev/null
nautilus  8620                        pc-13   1u     unix 0x0000000000000000        0t0      35641 type=STREAM
nautilus  8620                        pc-13   2u     unix 0x0000000000000000        0t0      35641 type=STREAM
nautilus  8620                        pc-13   3u  a_inode               0,16          0         65 [eventfd]
nautilus  8620                        pc-13   4u  a_inode               0,16          0         65 [eventfd]
nautilus  8620                        pc-13   5u     unix 0x0000000000000000        0t0      53774 type=STREAM
nautilus  8620                        pc-13   6u  a_inode               0,16          0         65 [eventfd]
nautilus  8620                        pc-13   7u     unix 0x0000000000000000        0t0      53776 type=STREAM
nautilus  8620                        pc-13   8ur     REG              259,3     303104   27525216 /home/pc-13/.local/share/nautilus/tags/meta.db
nautilus  8620                        pc-13   9u      REG              259,3          0   27569645 /home/pc-13/.local/share/nautilus/tags/meta.db-wal
nautilus  8620                        pc-13  10ur     REG              259,3      32768   27569917 /home/pc-13/.local/share/nautilus/tags/meta.db-shm
nautilus  8620                        pc-13  11rr     REG              259,3     303104   27525216 /home/pc-13/.local/share/nautilus/tags/meta.db
nautilus  8620                        pc-13  12u     unix 0x0000000000000000        0t0      53835 type=DGRAM
nautilus  8620                        pc-13  13u     unix 0x0000000000000000        0t0      53778 type=STREAM
```

Running command to check which services are listening to machine



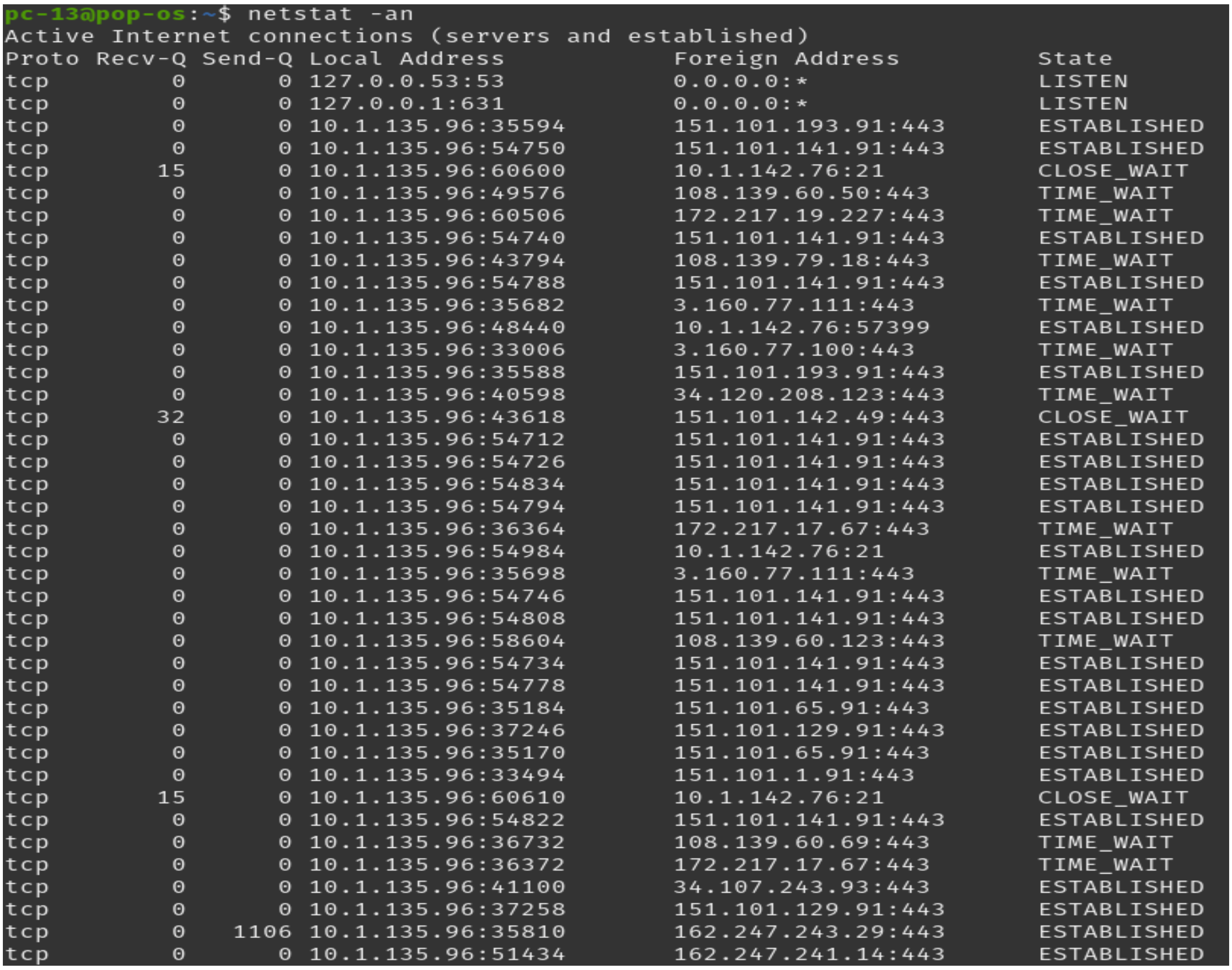
```
pc-13@pop-os:~$ lsof -i -P -n | grep LISTEN
```

The command lists all the network services (processes) currently listening for incoming connections on the system.

Components:

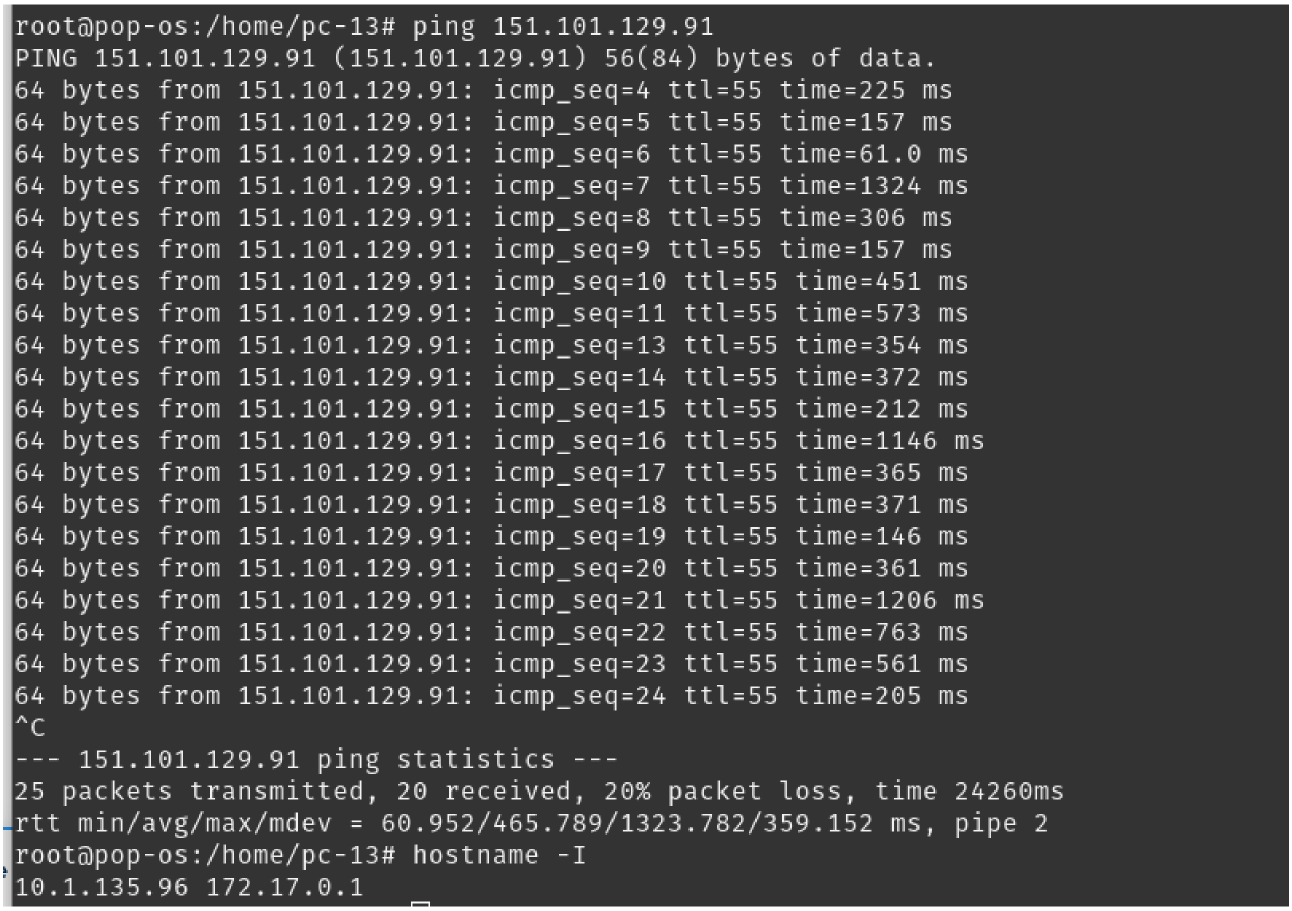
- **lsof -i**: Lists all the open network files (network connections such as TCP/UDP).
- **-P**: Prevents lsof from converting port numbers to their service names (e.g., 80 would remain 80, instead of being converted to http).
- **-n**: Prevents lsof from resolving IP addresses to hostnames, speeding up the command.
- **grep LISTEN**: Filters the output to show only the lines where the process is in a LISTEN state, meaning it's actively listening for incoming connections.

Using Netstat to listen to open ports



```
pc-13@pop-os:~$ netstat -an
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 127.0.0.53:53           0.0.0.0:*               LISTEN
tcp        0      0 127.0.0.1:631           0.0.0.0:*               LISTEN
tcp        0      0 10.1.135.96:35594       151.101.193.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:54750       151.101.141.91:443      ESTABLISHED
tcp       15      0 10.1.135.96:60600       10.1.142.76:21          CLOSE_WAIT
tcp        0      0 10.1.135.96:49576       108.139.60.50:443       TIME_WAIT
tcp        0      0 10.1.135.96:60506       172.217.19.227:443      TIME_WAIT
tcp        0      0 10.1.135.96:54740       151.101.141.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:43794       108.139.79.18:443       TIME_WAIT
tcp        0      0 10.1.135.96:54788       151.101.141.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:35682       3.160.77.111:443        TIME_WAIT
tcp        0      0 10.1.135.96:48440       10.1.142.76:57399       ESTABLISHED
tcp        0      0 10.1.135.96:33006       3.160.77.100:443        TIME_WAIT
tcp        0      0 10.1.135.96:35588       151.101.193.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:40598       34.120.208.123:443      TIME_WAIT
tcp       32      0 10.1.135.96:43618       151.101.142.49:443      CLOSE_WAIT
tcp        0      0 10.1.135.96:54712       151.101.141.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:54726       151.101.141.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:54834       151.101.141.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:54794       151.101.141.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:36364       172.217.17.67:443       TIME_WAIT
tcp        0      0 10.1.135.96:54984       10.1.142.76:21          ESTABLISHED
tcp        0      0 10.1.135.96:35698       3.160.77.111:443        TIME_WAIT
tcp        0      0 10.1.135.96:54746       151.101.141.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:54808       151.101.141.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:58604       108.139.60.123:443      TIME_WAIT
tcp        0      0 10.1.135.96:54734       151.101.141.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:54778       151.101.141.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:35184       151.101.65.91:443       ESTABLISHED
tcp        0      0 10.1.135.96:37246       151.101.129.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:35170       151.101.65.91:443       ESTABLISHED
tcp        0      0 10.1.135.96:33494       151.101.1.91:443        ESTABLISHED
tcp       15      0 10.1.135.96:60610       10.1.142.76:21          CLOSE_WAIT
tcp        0      0 10.1.135.96:54822       151.101.141.91:443      ESTABLISHED
tcp        0      0 10.1.135.96:36732       108.139.60.69:443       TIME_WAIT
tcp        0      0 10.1.135.96:36372       172.217.17.67:443       TIME_WAIT
tcp        0      0 10.1.135.96:41100       34.107.243.93:443       ESTABLISHED
tcp        0      0 10.1.135.96:37258       151.101.129.91:443      ESTABLISHED
tcp        0   1106 10.1.135.96:35810       162.247.243.29:443      ESTABLISHED
tcp        0      0 10.1.135.96:51434       162.247.241.14:443      ESTABLISHED
```

Using ping to check network connectivity



```
root@pop-os:/home/pc-13# ping 151.101.129.91
PING 151.101.129.91 (151.101.129.91) 56(84) bytes of data.
64 bytes from 151.101.129.91: icmp_seq=4 ttl=55 time=225 ms
64 bytes from 151.101.129.91: icmp_seq=5 ttl=55 time=157 ms
64 bytes from 151.101.129.91: icmp_seq=6 ttl=55 time=61.0 ms
64 bytes from 151.101.129.91: icmp_seq=7 ttl=55 time=1324 ms
64 bytes from 151.101.129.91: icmp_seq=8 ttl=55 time=306 ms
64 bytes from 151.101.129.91: icmp_seq=9 ttl=55 time=157 ms
64 bytes from 151.101.129.91: icmp_seq=10 ttl=55 time=451 ms
64 bytes from 151.101.129.91: icmp_seq=11 ttl=55 time=573 ms
64 bytes from 151.101.129.91: icmp_seq=13 ttl=55 time=354 ms
64 bytes from 151.101.129.91: icmp_seq=14 ttl=55 time=372 ms
64 bytes from 151.101.129.91: icmp_seq=15 ttl=55 time=212 ms
64 bytes from 151.101.129.91: icmp_seq=16 ttl=55 time=1146 ms
64 bytes from 151.101.129.91: icmp_seq=17 ttl=55 time=365 ms
64 bytes from 151.101.129.91: icmp_seq=18 ttl=55 time=371 ms
64 bytes from 151.101.129.91: icmp_seq=19 ttl=55 time=146 ms
64 bytes from 151.101.129.91: icmp_seq=20 ttl=55 time=361 ms
64 bytes from 151.101.129.91: icmp_seq=21 ttl=55 time=1206 ms
64 bytes from 151.101.129.91: icmp_seq=22 ttl=55 time=763 ms
64 bytes from 151.101.129.91: icmp_seq=23 ttl=55 time=561 ms
64 bytes from 151.101.129.91: icmp_seq=24 ttl=55 time=205 ms
^C
--- 151.101.129.91 ping statistics ---
25 packets transmitted, 20 received, 20% packet loss, time 24260ms
rtt min/avg/max/mdev = 60.952/465.789/1323.782/359.152 ms, pipe 2
root@pop-os:/home/pc-13# hostname -I
10.1.135.96 172.17.0.1
```