Networking Basics for DevOps

```
Setting up net-tools (2.10-0.1ubuntu4.4) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
ubuntu@ip-172-31-6-33:~$ ifconfig
ens5: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 9001
        inet 172.31.6.33  netmask 255.255.240.0  broadcast 172.31.15.255
        inet6 fe80::85e:12ff:fe4f:282d  prefixlen 64  scopeid 0x20<link>
        ether 0a:5e:12:4f:28:2d  txqueuelen 1000  (Ethernet)
        RX packets 799  bytes 342610 (342.6 KB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 659  bytes 110447 (110.4 KB)
```

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Ping to Google DNS

```
ubuntu@ip-172-31-6-33:~$ ping google.com
PING google.com (142.251.220.78) 56(84) bytes of data.
64 bytes from hkg07s51-in-f14.1e100.net (142.251.220.78): icmp_seq=1 ttl=114 time=0.873 ms
64 bytes from hkg07s51-in-f14.1e100.net (142.251.220.78): icmp_seq=2 ttl=114 time=0.899 ms
64 bytes from hkg07s51-in-f14.1e100.net (142.251.220.78): icmp_seq=3 ttl=114 time=0.894 ms
64 bytes from hkg07s51-in-f14.1e100.net (142.251.220.78): icmp_seq=4 ttl=114 time=0.918 ms
64 bytes from hkg07s51-in-f14.1e100.net (142.251.220.78): icmp_seq=5 ttl=114 time=0.911 ms
64 bytes from hkg07s51-in-f14.1e100.net (142.251.220.78): icmp_seq=6 ttl=114 time=0.888 ms
64 bytes from hkg07s51-in-f14.1e100.net (142.251.220.78): icmp_seq=7 ttl=114 time=0.927 ms
64 bytes from hkg07s51-in-f14.1e100.net (142.251.220.78): icmp_seq=8 ttl=114 time=0.913 ms
^Z
[1]+  Stopped                 ping google.com
ubuntu@ip-172-31-6-33:~$
```

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Nslookup

```
ubuntu@ip-172-31-6-33:~$ nslookup google.com
Server:         127.0.0.53
Address:        127.0.0.53#53

Non-authoritative answer:
Name:   google.com
Address: 142.251.220.14
Name:   google.com
Address: 2404:6800:4009:80c::200e

ubuntu@ip-172-31-6-33:~$ █
```

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Netstat Commands

```
ubuntu@ip-172-31-6-33:~$ netstat
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address          Foreign Address         State
tcp        0      0 ip-172-31-6-33.ap-s:ssh ec2-13-233-177-5.:54022 ESTABLISHED
Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type       State         I-Node   Path
unix  3      [ ]         DGRAM      CONNECTED     5607
unix  3      [ ]         STREAM     CONNECTED     6733
unix  3      [ ]         STREAM     CONNECTED     7400     /run/systemd/journal/stdout
unix  2      [ ]         DGRAM      CONNECTED     3380
unix  3      [ ]         STREAM     CONNECTED     1692
unix  3      [ ]         STREAM     CONNECTED     6632
unix  3      [ ]         STREAM     CONNECTED     5795
unix  3      [ ]         STREAM     CONNECTED     6334     /run/dbus/system_bus_socket
unix  3      [ ]         STREAM     CONNECTED     6636     /run/dbus/system_bus_socket
unix  3      [ ]         STREAM     CONNECTED     6892     /run/dbus/system_bus_socket
unix  3      [ ]         STREAM     CONNECTED     6505
unix  2      [ ]         DGRAM                    9222     /run/user/1000/systemd/notify
```

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```
ubuntu@ip-172-31-6-33:~$ ss
Netid  State  Recv-Q  Send-Q                          Local Address:Port              Peer Address:Port  Process
u_dgr  ESTAB  0       0                                            * 5607                          * 5606
u_str  ESTAB  0       0                                            * 6733                          * 6734
u_str  ESTAB  0       0             /run/systemd/journal/stdout 7400                          * 7399
u_dgr  ESTAB  0       0                                            * 3380                          * 852
u_str  ESTAB  0       0                                            * 1692                          * 1693
u_str  ESTAB  0       0                                            * 6632                          * 6636
u_str  ESTAB  0       0                                            * 5795                          * 6286
u_str  ESTAB  0       0             /run/dbus/system_bus_socket 6334                          * 5731
u_str  ESTAB  0       0             /run/dbus/system_bus_socket 6636                          * 6632
u_str  ESTAB  0       0             /run/dbus/system_bus_socket 6892                          * 6891
u_str  ESTAB  0       0                                            * 6505                          * 6506
u_dgr  ESTAB  0       0                                            * 5606                          * 5607
u_str  ESTAB  0       0                                            * 6891                          * 6892
```

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Traceroute Pkg installation

```
ubuntu@ip-172-31-6-33:~$ sudo apt install traceroute
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  traceroute
0 upgraded, 1 newly installed, 0 to remove and 86 not upgraded.
Need to get 60.5 kB of archives.
After this operation, 162 kB of additional disk space will be used.
Get:1 http://ap-south-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 traceroute amd64 1:2.1.5-1 [60.5 kB]
Fetched 60.5 kB in 0s (4548 kB/s)
Selecting previously unselected package traceroute.
(Reading database ... 71783 files and directories currently installed.)
Preparing to unpack .../traceroute_1%3a2.1.5-1_amd64.deb ...
```

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Run traceroute command

```
ubuntu@ip-172-31-6-33:~$ traceroute 8.8.8.8
traceroute to 8.8.8.8 (8.8.8.8), 30 hops max, 60 byte packets
 1  240.2.196.13 (240.2.196.13)  2.272 ms 240.2.196.12 (240.2.196.12)  1.391 ms 240.2.196.15 (240.2.196.15)  1.402 ms
 2  242.6.252.7 (242.6.252.7)  1.362 ms 242.6.252.1 (242.6.252.1)  1.556 ms 242.6.252.131 (242.6.252.131)  1.262 ms
 3  * * *
 4  * * 99.82.178.53 (99.82.178.53)  1.664 ms
 5  * * *
 6  dns.google (8.8.8.8)  1.176 ms  1.257 ms  1.237 ms
ubuntu@ip-172-31-6-33:~$
```

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Network Report

```
ubuntu@ip-172-31-6-33:~$ nmcli device show
GENERAL.DEVICE:                         ens5
GENERAL.TYPE:                           ethernet
GENERAL.HWADDR:                         0A:5E:12:4F:28:2D
GENERAL.MTU:                            9001
GENERAL.STATE:                          10 (unmanaged)
GENERAL.CONNECTION:                     --
GENERAL.CON-PATH:                       --
WIRED-PROPERTIES.CARRIER:               on
IP4.ADDRESS[1]:                         172.31.6.33/20
IP4.GATEWAY:                            172.31.0.1
IP4.ROUTE[1]:                           dst = 0.0.0.0/0, nh = 172.31.0.1, mt = 100
IP4.ROUTE[2]:                           dst = 172.31.0.0/20, nh = 0.0.0.0, mt = 100
IP4.ROUTE[3]:                           dst = 172.31.0.1/32, nh = 0.0.0.0, mt = 100
IP4.ROUTE[4]:                           dst = 172.31.0.2/32, nh = 0.0.0.0, mt = 100
IP6.ADDRESS[1]:                         fe80::85e:12ff:fe4f:282d/64
IP6.GATEWAY:                            --
IP6.ROUTE[1]:                           dst = fe80::/64, nh = ::, mt = 256
```

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```
ip-172-31-6-33 (127.0.0.1) -> localhost (127.0.0.1)                                              2026-01-19T15:59:37+0000
Keys:  Help   Display mode   Restart statistics   Order of fields   quit
                                                                              Packets                Pings
Host                                                                       Loss%   Snt   Last   Avg  Best  Wrst StDev
1. localhost                                                                0.0%    15    0.0   0.0   0.0   0.1   0.0
```

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