
CSE1004-LAB

TASK 1

INTERFACE NAME	eth0
FLAGS	UP, BROADCAST, RUNNING, MULTICAST
MTU	1500
INET	192.168.64.128
INET6	fe80::20c:29ff:fe38:4ade
txqueuelen	1000
MAC-ADDRESS	00:0c:29:38:4a:de
RX,TX	0,0

INTERFACE NAME	lo
FLAGS	UP,LOOPBACK,RUNNING
MTU	65536
INET	127.0.0.1
INET6	::1
MAC-ADDRESS	-
Txqueuelen	1000
RX,TX	0,0

TASK -2

ifconfig

ghost - VMware Workstation 16 Player (Non-commercial use only)

Player | Kazam | ghost@Ghost: ~

```
File Actions Edit View Help
(ghost@Ghost)-[~]
$ sudo ifconfig
[sudo] password for ghost:
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.64.128 netmask 255.255.255.0 broadcast 192.168.64.255
        inet6 fe80::20c:29ff:fe38:4ade prefixlen 64 scopeid 0x20<link>
            ether 00:0c:29:38:4a:de txqueuelen 1000 (Ethernet)
            RX packets 49 bytes 3222 (3.1 KiB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 11 bytes 1143 (1.1 KiB)
            TX errors 0 dropped 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 0x10<host>
            loop txqueuelen 1000 (Local Loopback)
            RX packets 8 bytes 400 (400.0 B)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 8 bytes 400 (400.0 B)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

(ghost@Ghost)-[~]
$
```

Ifconfig -a

ghost - VMware Workstation 16 Player (Non-commercial use only)

Player | Kazam | ghost@Ghost: ~

```
File Actions Edit View Help
(ghost@Ghost)-[~]
$ sudo ifconfig -a
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.64.128 netmask 255.255.255.0 broadcast 192.168.64.255
        inet6 fe80::20c:29ff:fe38:4ade prefixlen 64 scopeid 0x20<link>
            ether 00:0c:29:38:4a:de txqueuelen 1000 (Ethernet)
            RX packets 49 bytes 3222 (3.1 KiB)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 11 bytes 1143 (1.1 KiB)
            TX errors 0 dropped 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 0x10<host>
            loop txqueuelen 1000 (Local Loopback)
            RX packets 8 bytes 400 (400.0 B)
            RX errors 0 dropped 0 overruns 0 frame 0
            TX packets 8 bytes 400 (400.0 B)
            TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Ifconfig -s, ifconfig -v

ghost - VMware Workstation 16 Player (Non-commercial use only)

Player | Kazam | ghost@Ghost: ~

```
(ghost@Ghost)-[~]
$ sudo ifconfig -s
Iface      MTU     RX-OK RX-ERR RX-DRP RX-OVR     TX-OK TX-ERR TX-DRP TX-OVR Flg
eth0       1500      49     0      0 0        11      0      0      0 BMRU
lo         65536      8      0      0 0        8       0      0      0 LRU

(ghost@Ghost)-[~]
$ sudo ifconfig -v
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
      inet 192.168.64.128  netmask 255.255.255.0  broadcast 192.168.64.255
      inet6 fe80::20c:29ff:fe38:4ade  prefixlen 64  scopeid 0x20<link>
        ether 00:0c:29:38:4a:de  txqueuelen 1000  (Ethernet)
        RX packets 49  bytes 3222 (3.1 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 11  bytes 1143 (1.1 KiB)
        TX errors 0  dropped 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 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 8  bytes 400 (400.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 8  bytes 400 (400.0 B)
        TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0
```

ifconfig eth0 down

ghost - VMware Workstation 16 Player (Non-commercial use only)

Player | Kazam | ghost@Ghost: ~

```
(ghost@Ghost)-[~]
$ sudo ifconfig eth0 down

(ghost@Ghost)-[~]
$ ifconfig -a
eth0: flags=4098<BROADCAST,MULTICAST>  mtu 1500
      inet 192.168.64.128  netmask 255.255.255.0  broadcast 192.168.64.255
        ether 00:0c:29:38:4a:de  txqueuelen 1000  (Ethernet)
        RX packets 66  bytes 4524 (4.4 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 22  bytes 2286 (2.2 KiB)
        TX errors 0  dropped 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 0x10<host>
        loop  txqueuelen 1000  (Local Loopback)
        RX packets 8  bytes 400 (400.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 8  bytes 400 (400.0 B)
        TX errors 0  dropped 0  overruns 0  carrier 0  collisions 0
```

Ifconfig eth0 up

```
(ghost㉿Ghost)~$ sudo ifconfig eth0 up
(ghost㉿Ghost)~$ ifconfig -a
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.64.128 netmask 255.255.255.0 broadcast 192.168.64.255
        inet6 fe80::20c:29ff:fe38:4ade prefixlen 64 scopeid 0x20<link>
            ether 00:0c:29:38:4a:de txqueuelen 1000 (Ethernet)
                RX packets 67 bytes 4866 (4.7 KiB)
                RX errors 0 dropped 0 overruns 0 frame 0
                TX packets 31 bytes 3305 (3.2 KiB)
                TX errors 0 dropped 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 0x10<host>
            loop txqueuelen 1000 (Local Loopback)
                RX packets 8 bytes 400 (400.0 B)
                RX errors 0 dropped 0 overruns 0 frame 0
                TX packets 8 bytes 400 (400.0 B)
                TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Ifconfig eth0 mtu 2000

```
ghost - VMware Workstation 16 Player (Non-commercial use only)
Player | || | Kazam ghost@Ghost: ~ ghost@Ghost: ~
File Actions Edit View Help

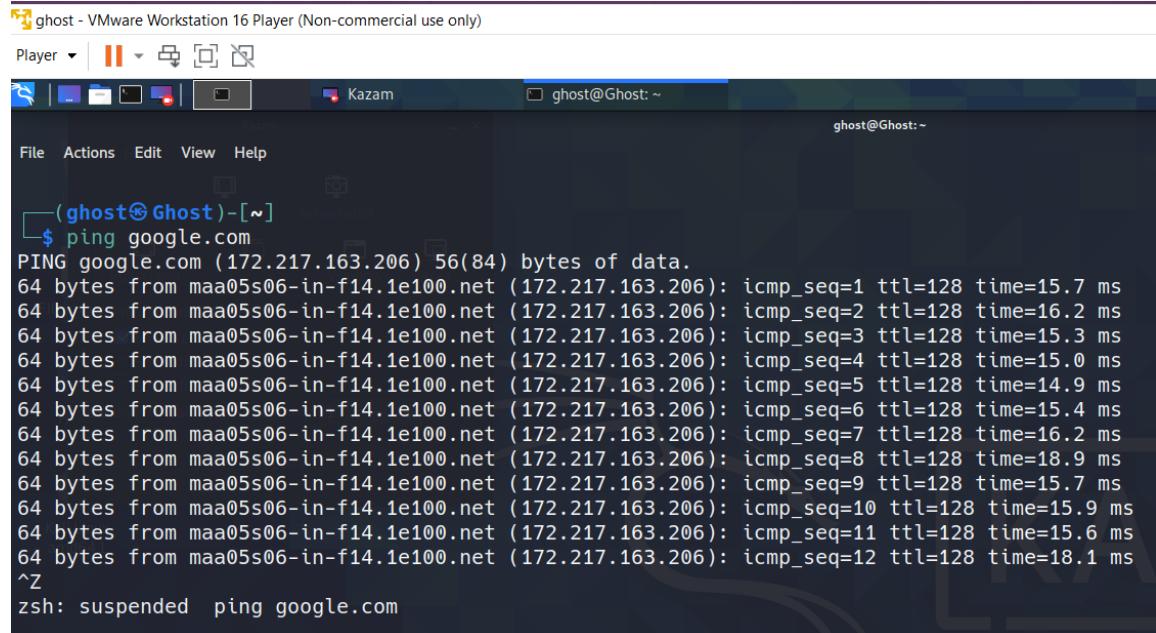
(ghost㉿Ghost)~$ ifconfig -s
Iface      MTU     RX-OK RX-ERR RX-DRP RX-OVR     TX-OK TX-ERR TX-DRP TX-OVR Flg
eth0       1500     99     0     0 0          33     0     0     0 BMRU
lo         65536     8     0     0 0          8     0     0     0 LRU

(ghost㉿Ghost)~$ sudo ifconfig eth0 mtu 2000
(ghost㉿Ghost)~$ ifconfig -s
Iface      MTU     RX-OK RX-ERR RX-DRP RX-OVR     TX-OK TX-ERR TX-DRP TX-OVR Flg
eth0       2000    111     0     0 0          38     0     0     0 BMRU
lo         65536     8     0     0 0          8     0     0     0 LRU

(ghost㉿Ghost)~$
```

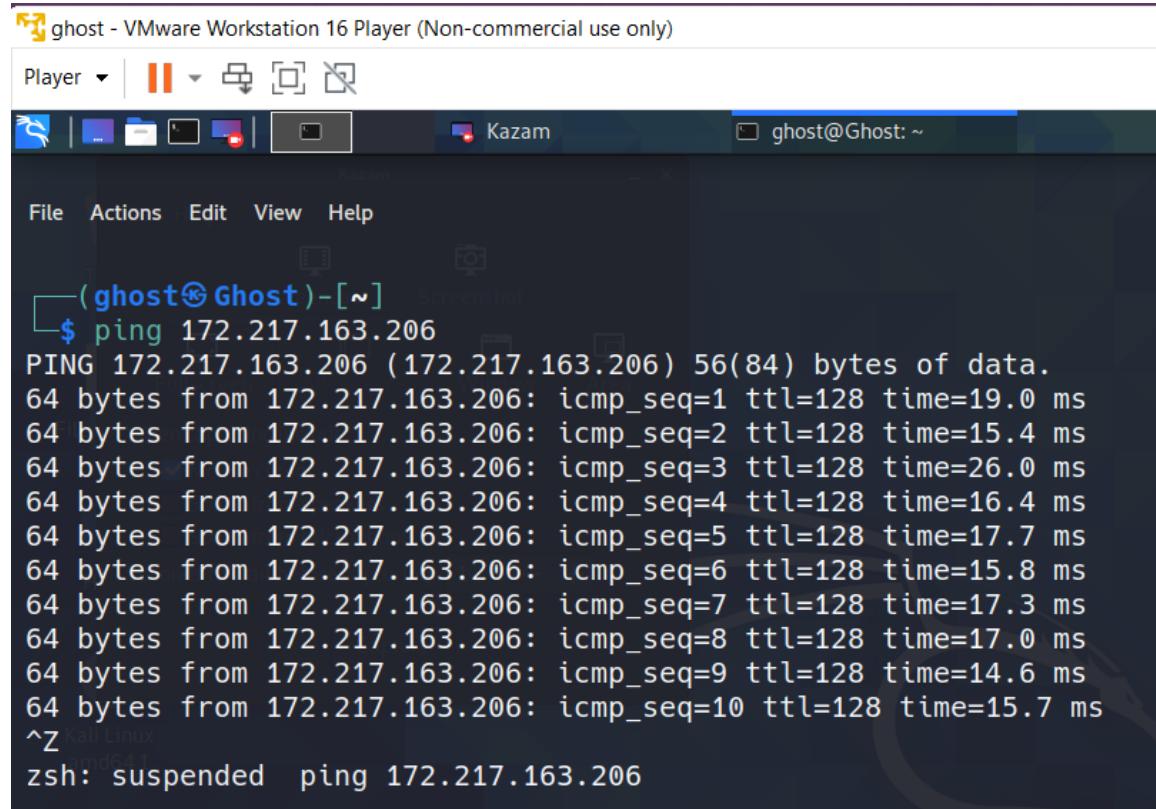
Task -3

Ping domainname



```
ghost - VMware Workstation 16 Player (Non-commercial use only)
Player | ||| | Kazam ghost@Ghost: ~
File Actions Edit View Help
(ghost@Ghost)-[~] $ ping google.com
PING google.com (172.217.163.206) 56(84) bytes of data.
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=1 ttl=128 time=15.7 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=2 ttl=128 time=16.2 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=3 ttl=128 time=15.3 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=4 ttl=128 time=15.0 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=5 ttl=128 time=14.9 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=6 ttl=128 time=15.4 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=7 ttl=128 time=16.2 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=8 ttl=128 time=18.9 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=9 ttl=128 time=15.7 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=10 ttl=128 time=15.9 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=11 ttl=128 time=15.6 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=12 ttl=128 time=18.1 ms
^Z
zsh: suspended ping google.com
```

Ping ip address



```
ghost - VMware Workstation 16 Player (Non-commercial use only)
Player | ||| | Kazam ghost@Ghost: ~
File Actions Edit View Help
(ghost@Ghost)-[~] $ ping 172.217.163.206
PING 172.217.163.206 (172.217.163.206) 56(84) bytes of data.
64 bytes from 172.217.163.206: icmp_seq=1 ttl=128 time=19.0 ms
64 bytes from 172.217.163.206: icmp_seq=2 ttl=128 time=15.4 ms
64 bytes from 172.217.163.206: icmp_seq=3 ttl=128 time=26.0 ms
64 bytes from 172.217.163.206: icmp_seq=4 ttl=128 time=16.4 ms
64 bytes from 172.217.163.206: icmp_seq=5 ttl=128 time=17.7 ms
64 bytes from 172.217.163.206: icmp_seq=6 ttl=128 time=15.8 ms
64 bytes from 172.217.163.206: icmp_seq=7 ttl=128 time=17.3 ms
64 bytes from 172.217.163.206: icmp_seq=8 ttl=128 time=17.0 ms
64 bytes from 172.217.163.206: icmp_seq=9 ttl=128 time=14.6 ms
64 bytes from 172.217.163.206: icmp_seq=10 ttl=128 time=15.7 ms
^Z
zsh: suspended ping 172.217.163.206
```

Ping -c count destination (a specific number of packets is sent)

```
ghost - VMware Workstation 16 Player (Non-commercial use only)
Player | ||| Kazam ghost@Ghost: ~
File Actions Edit View Help
(ghost@Ghost)-[~]
$ ping -c 5 google.com
PING google.com (172.217.163.206) 56(84) bytes of data.
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=1 ttl=128 time=16.3 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=2 ttl=128 time=26.0 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=3 ttl=128 time=14.8 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=4 ttl=128 time=14.8 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=5 ttl=128 time=18.2 ms
--- google.com ping statistics ---
5 packets transmitted, 5 received, 0% packet loss, time 4010ms
rtt min/avg/max/mdev = 14.822/18.027/25.985/4.171 ms
```

Ping -i interval destination (packet is after fixed time intervals)

```
ghost - VMware Workstation 16 Player (Non-commercial use only)
Player | ||| Kazam ghost@Ghost: ~
File Actions Edit View Help
(ghost@Ghost)-[~]
$ ping -i 2 google.com
PING google.com (172.217.163.206) 56(84) bytes of data.
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=1 ttl=128 time=20.5 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=2 ttl=128 time=17.1 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=3 ttl=128 time=15.9 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=4 ttl=128 time=16.0 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=5 ttl=128 time=17.2 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=6 ttl=128 time=15.0 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=7 ttl=128 time=15.5 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=8 ttl=128 time=15.4 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=9 ttl=128 time=16.9 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=10 ttl=128 time=15.2 ms
^Z
zsh: suspended ping -i 2 google.com
```

Ping -s [packet_size] destination (a packet of certain size is sent to the server)

```
ghost - VMware Workstation 16 Player (Non-commercial use only)
Player | ||| Kazam ghost@Ghost: ~
File Actions Edit View Help
(ghost@Ghost)-[~]
$ ping -s 12 facebook.com
PING facebook.com (157.240.199.35) 12(40) bytes of data.
20 bytes from edge-star-mini-shv-01-hkg4.facebook.com (157.240.199.35): icmp_seq=1 ttl=128
20 bytes from edge-star-mini-shv-01-hkg4.facebook.com (157.240.199.35): icmp_seq=2 ttl=128
20 bytes from edge-star-mini-shv-01-hkg4.facebook.com (157.240.199.35): icmp_seq=3 ttl=128
20 bytes from edge-star-mini-shv-01-hkg4.facebook.com (157.240.199.35): icmp_seq=4 ttl=128
20 bytes from edge-star-mini-shv-01-hkg4.facebook.com (157.240.199.35): icmp_seq=5 ttl=128
20 bytes from edge-star-mini-shv-01-hkg4.facebook.com (157.240.199.35): icmp_seq=6 ttl=128
20 bytes from edge-star-mini-shv-01-hkg4.facebook.com (157.240.199.35): icmp_seq=7 ttl=128
20 bytes from edge-star-mini-shv-01-hkg4.facebook.com (157.240.199.35): icmp_seq=8 ttl=128
20 bytes from edge-star-mini-shv-01-hkg4.facebook.com (157.240.199.35): icmp_seq=9 ttl=128
20 bytes from edge-star-mini-shv-01-hkg4.facebook.com (157.240.199.35): icmp_seq=10 ttl=128
20 bytes from edge-star-mini-shv-01-hkg4.facebook.com (157.240.199.35): icmp_seq=11 ttl=128
20 bytes from edge-star-mini-shv-01-hkg4.facebook.com (157.240.199.35): icmp_seq=12 ttl=128
^Z
zsh: suspended ping -s 12 facebook.com
```

Ping -w deadline destination

```
ghost - VMware Workstation 16 Player (Non-commercial use only)
Player | || | Kazam ghost@Ghost: ~
File Actions Edit View Help
(ghost@Ghost)-[~]
$ ping -w 10 google.com
PING google.com (172.217.163.206) 56(84) bytes of data.
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=1 ttl=128 time=15.1 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=2 ttl=128 time=16.3 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=3 ttl=128 time=15.3 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=4 ttl=128 time=16.5 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=5 ttl=128 time=17.6 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=6 ttl=128 time=16.5 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=7 ttl=128 time=14.7 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=8 ttl=128 time=15.2 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=9 ttl=128 time=16.3 ms
64 bytes from maa05s06-in-f14.1e100.net (172.217.163.206): icmp_seq=10 ttl=128 time=23.7 ms
--- google.com ping statistics ---
10 packets transmitted, 10 received, 0% packet loss, time 9035ms
rtt min/avg/max/mdev = 14.713/16.715/23.673/2.460 ms
```

Task -4

Traceroute -4 destination, traceroute -6 destination,

traceroute -f first_ttl_option destination

```
ghost - VMware Workstation 16 Player (Non-commercial use only)
Player | || | Kazam ghost@Ghost: ~
File Actions Edit View Help
(ghost@Ghost)-[~]
$ traceroute -4 google.com
traceroute to google.com (172.217.163.206), 30 hops max, 60 byte packets
 1  192.168.64.2 (192.168.64.2)  0.235 ms  0.105 ms  0.149 ms
 2  * * *
 3  * * *
 4  * * *
 5  * * *
 6  * * *
 7  *^Z
zsh: suspended  traceroute -4 google.com

(ghost@Ghost)-[~]
$ traceroute -6 google.com
traceroute to google.com (2404:6800:4007:810::200e), 30 hops max, 80 byte packets
connect: Network is unreachable

(ghost@Ghost)-[~]
$ traceroute -f 10 google.com
traceroute to google.com (172.217.163.206), 30 hops max, 60 byte packets
10  * * *
11  * * *
12  * * *
13  * * *
14  * * *
15  * * *
16  * * *
17  * * *
18  * * *
19  * * *
20  *^Z
zsh: suspended  traceroute -f 10 google.com
```

Traceroute -m max_hop destination, traceroute destination packet length

```
ghost - VMware Workstation 16 Player (Non-commercial use only)
Player | ||| | ghost@Ghost: ~
File Actions Edit View Help

(ghost@Ghost)-[~]
$ traceroute -m 200 google.com
traceroute to google.com (172.217.163.206), 200 hops max, 60 byte packets
1 192.168.64.2 (192.168.64.2) 0.249 ms 0.229 ms 0.147 ms
2 * *
3 * *
4 * *
5 * *
6 * *
7 * *
8 * *
9 * *
10 * *
11 * *
12 * *^Z
zsh: suspended traceroute -m 200 google.com

(ghost@Ghost)-[~]
$ traceroute google.com 12
traceroute to google.com (172.217.163.206), 30 hops max, 28 byte packets
1 192.168.64.2 (192.168.64.2) 0.228 ms 0.114 ms 0.162 ms
2 * *
3 * *
4 * *
5 * *
6 * *
7 *^Z
zsh: suspended traceroute google.com 12
```

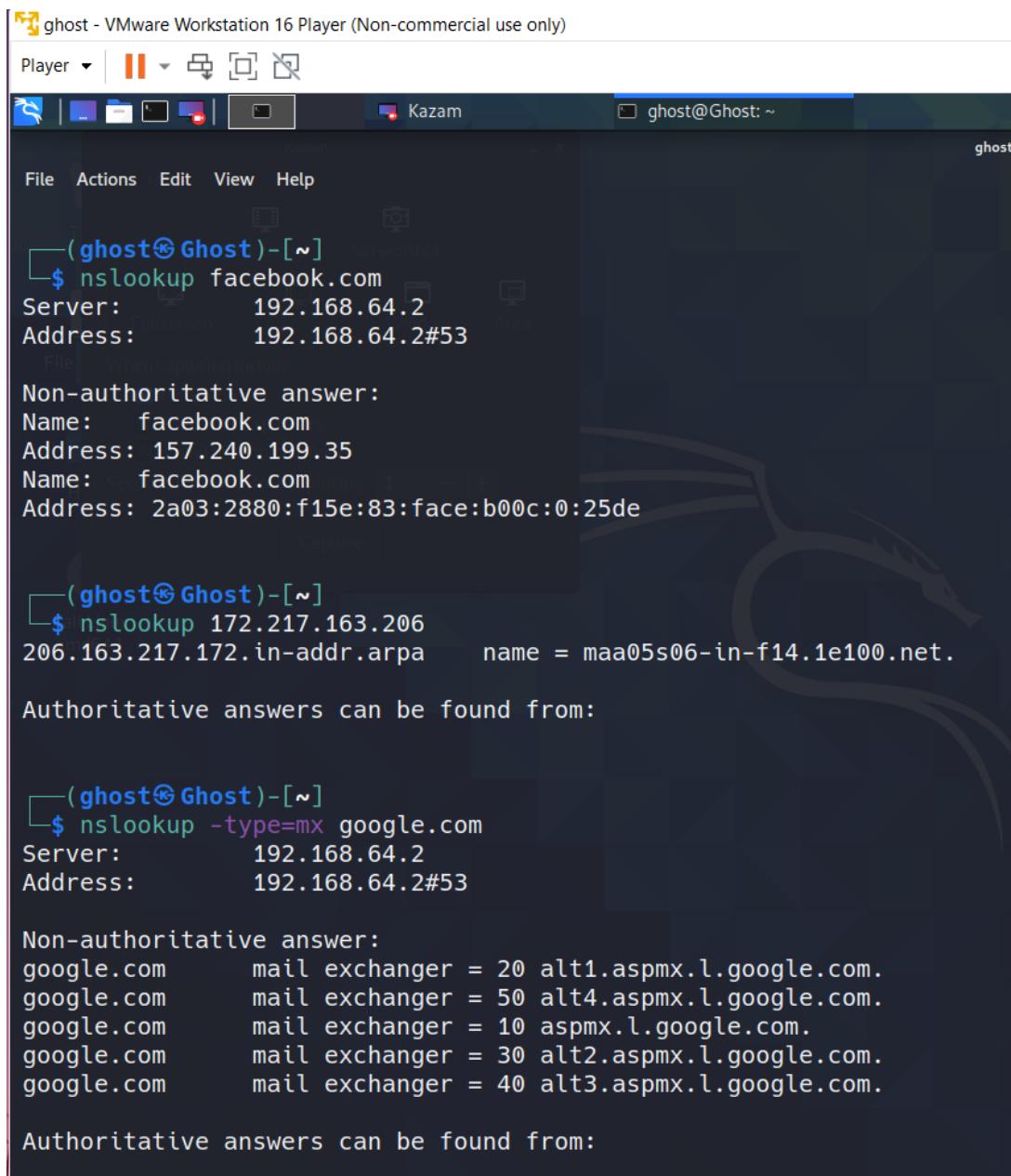
Traceroute -q nqueries destination (number of probes you send to the server per hop)

```
ghost - VMware Workstation 16 Player (Non-commercial use only)
Player | ||| | Kazam | ghost@Ghost: ~
File Actions Edit View Help

(ghost@Ghost)-[~]
$ traceroute -q 1 google.com
traceroute to google.com (172.217.163.206), 30 hops max, 60 byte packets
1 192.168.64.2 (192.168.64.2) 0.195 ms
2 *
3 *
4 *
5 *
6 *
7 *
8 *
9 *
10 *
11 *
12 *
13 *
14 *
15 *
16 *
17 *
18 *
19 *
20 *
21 *
```

Task -5

Nslookup domain name, nslookup ip address, nslookup -type=mx domain name(Lookup for a mx record)

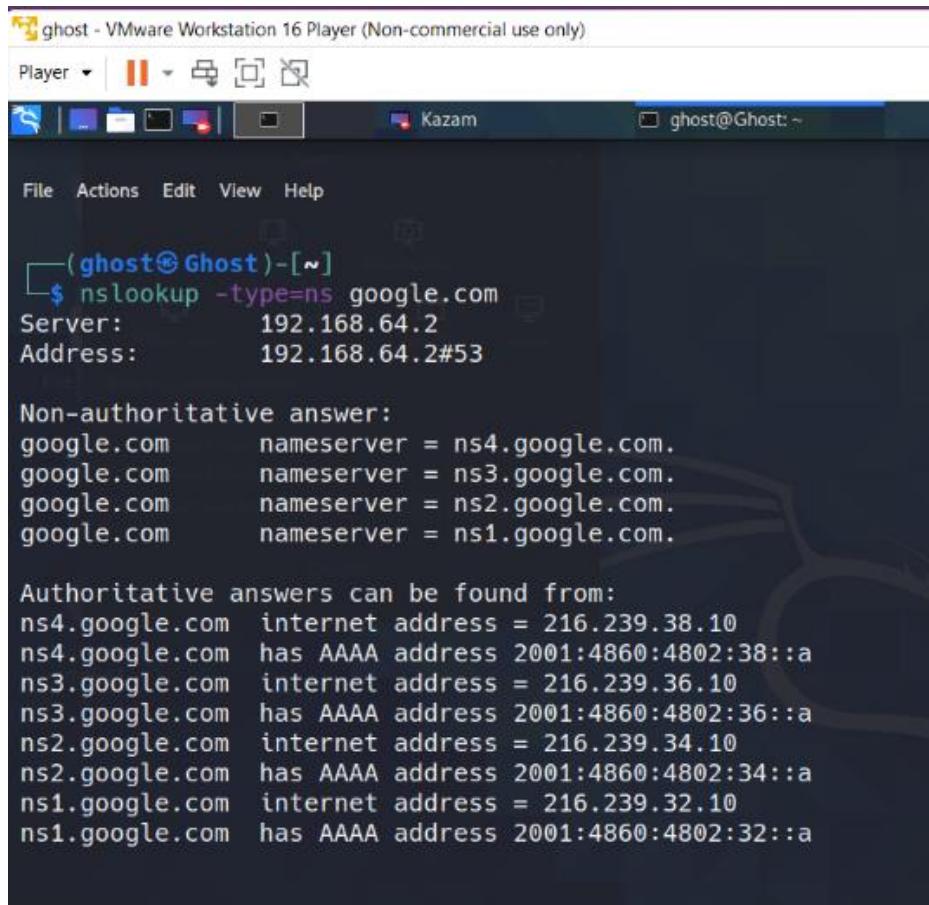


The screenshot shows a terminal window titled "ghost - VMware Workstation 16 Player (Non-commercial use only)". The terminal is running on a Linux system with a dark blue background. It displays several nslookup commands:

- First, it runs nslookup on the domain "facebook.com". The output shows a non-authoritative answer with the IP address 157.240.199.35.
- Then, it runs nslookup on the IP address 172.217.163.206, which is the IP for the "in-addr.arpa" domain. The output shows an authoritative answer with the name "maa05s06-in-f14.1e100.net".
- Finally, it runs nslookup with the "-type=mx" option on the domain "google.com". The output shows multiple mail exchanger records (MX records) for google.com, with exchange servers at 20, 50, 10, 30, and 40, all pointing to "aspmx.l.google.com".



Nslookup -type=ns domain name (Lookup for a ns record)



```
ghost - VMware Workstation 16 Player (Non-commercial use only)
Player | || | Kazam ghost@Ghost: ~

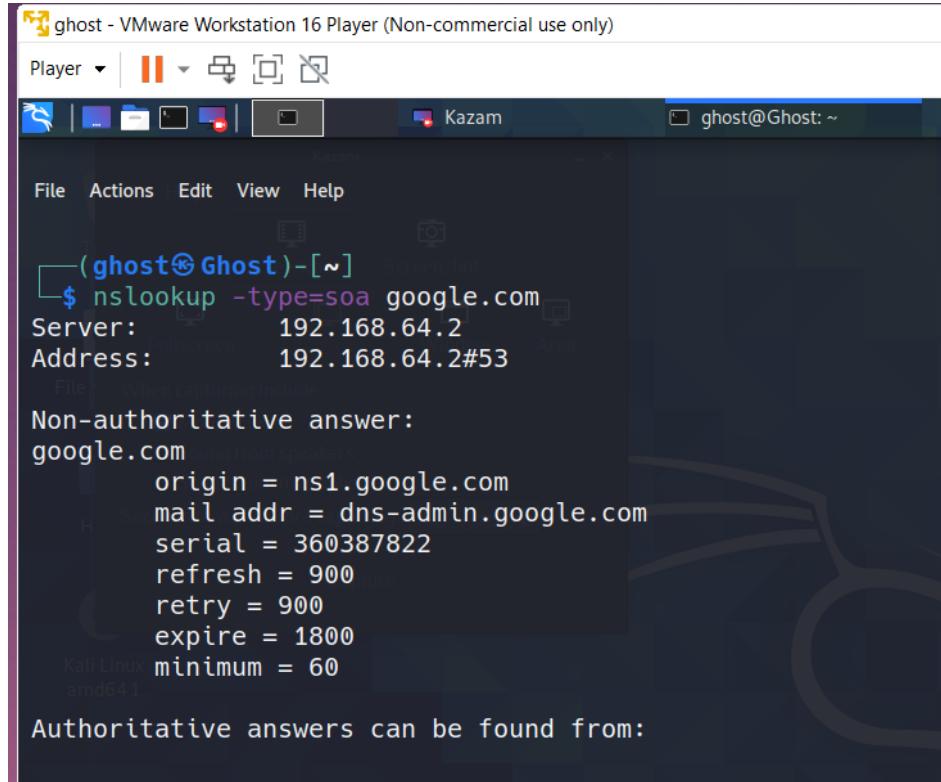
File Actions Edit View Help

(ghost@Ghost)-[~]
$ nslookup -type=ns google.com
Server:          192.168.64.2
Address:        192.168.64.2#53

Non-authoritative answer:
google.com      nameserver = ns4.google.com.
google.com      nameserver = ns3.google.com.
google.com      nameserver = ns2.google.com.
google.com      nameserver = ns1.google.com.

Authoritative answers can be found from:
ns4.google.com  internet address = 216.239.38.10
ns4.google.com  has AAAA address 2001:4860:4802:38::a
ns3.google.com  internet address = 216.239.36.10
ns3.google.com  has AAAA address 2001:4860:4802:36::a
ns2.google.com  internet address = 216.239.34.10
ns2.google.com  has AAAA address 2001:4860:4802:34::a
ns1.google.com  internet address = 216.239.32.10
ns1.google.com  has AAAA address 2001:4860:4802:32::a
```

Nslookup -type=soa domain name (Lookup for a soa record)



```
ghost - VMware Workstation 16 Player (Non-commercial use only)
Player | || | Kazam ghost@Ghost: ~

File Actions Edit View Help

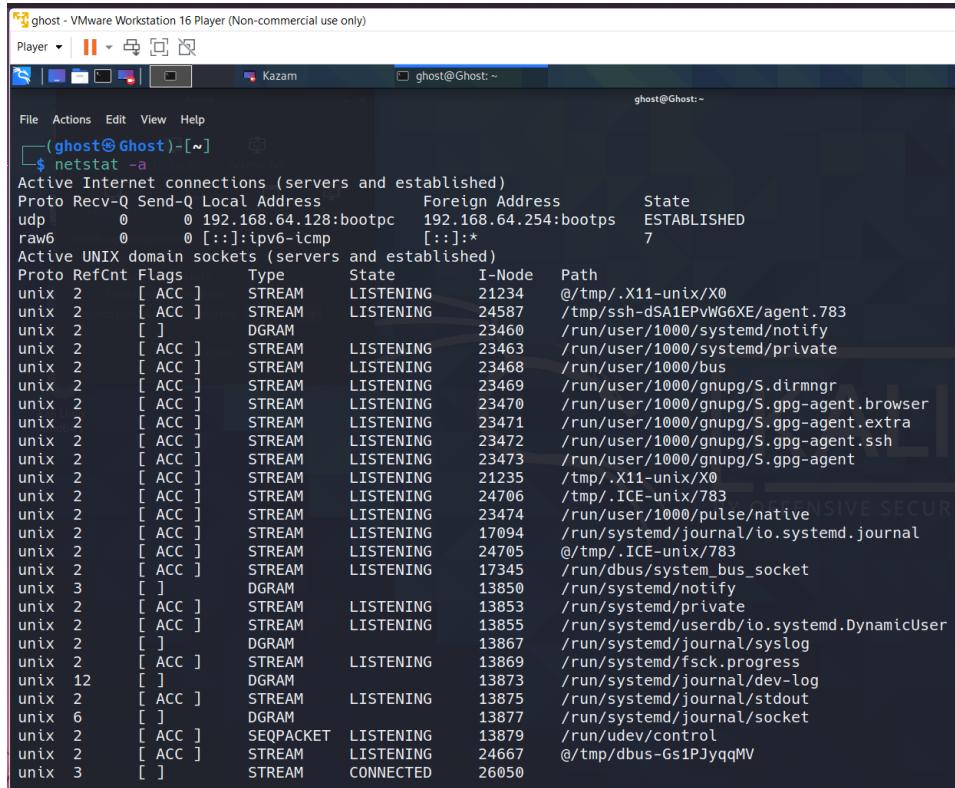
(ghost@Ghost)-[~]
$ nslookup -type=soa google.com
Server:          192.168.64.2
Address:        192.168.64.2#53

Non-authoritative answer:
google.com      origin = ns1.google.com
                mail addr = dns-admin.google.com
                serial = 360387822
                refresh = 900
                retry = 900
                expire = 1800
                minimum = 60

Authoritative answers can be found from:
```

Task-6

netstat -a (list all listening ports)



```
ghost - VMware Workstation 16 Player (Non-commercial use only)
ghost@Ghost: ~

File Actions Edit View Help
(ghost@Ghost)-[~] $ netstat -a
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp      0      0 192.168.64.128:bootpc    192.168.64.254:bootps ESTABLISHED
raw6     0      0 [::]:ipv6-icmp          [::]:*                7
Active UNIX domain sockets (servers and established)
Proto RefCnt Flags       Type      State      I-Node Path
unix  2      [ ACC ]     STREAM   LISTENING  21234  @/tmp/.X11-unix/X0
unix  2      [ ACC ]     STREAM   LISTENING  24587  /tmp/ssh-dSA1EPW6GXE/agent.783
unix  2      [ ]          DGRAM    LISTENING  23460  /run/user/1000/systemd/notify
unix  2      [ ACC ]     STREAM   LISTENING  23463  /run/user/1000/systemd/private
unix  2      [ ACC ]     STREAM   LISTENING  23468  /run/user/1000/bus
unix  2      [ ACC ]     STREAM   LISTENING  23469  /run/user/1000/gnupg/S.dirmngr
unix  2      [ ACC ]     STREAM   LISTENING  23470  /run/user/1000/gnupg/S.gpg-agent.browser
unix  2      [ ACC ]     STREAM   LISTENING  23471  /run/user/1000/gnupg/S.gpg-agent.extra
unix  2      [ ACC ]     STREAM   LISTENING  23472  /run/user/1000/gnupg/S.gpg-agent.ssh
unix  2      [ ACC ]     STREAM   LISTENING  23473  /run/user/1000/gnupg/S.gpg-agent
unix  2      [ ACC ]     STREAM   LISTENING  21235  /tmp/.X11-unix/X0
unix  2      [ ACC ]     STREAM   LISTENING  24706  /tmp/.ICE-unix/783
unix  2      [ ACC ]     STREAM   LISTENING  23474  /run/user/1000/pulse/native
unix  2      [ ACC ]     STREAM   LISTENING  17094  /run/systemd/journal/io.systemd.journal
unix  2      [ ACC ]     STREAM   LISTENING  24705  @/tmp/.ICE-unix/783
unix  2      [ ACC ]     STREAM   LISTENING  17345  /run/dbus/system_bus_socket
unix  3      [ ]          DGRAM    LISTENING  13850  /run/systemd/notify
unix  2      [ ACC ]     STREAM   LISTENING  13853  /run/systemd/private
unix  2      [ ACC ]     STREAM   LISTENING  13855  /run/systemd/userdb/io.systemd.DynamicUser
unix  2      [ ]          DGRAM    LISTENING  13867  /run/systemd/journal/syslog
unix  2      [ ACC ]     STREAM   LISTENING  13869  /run/systemd/fsck.progress
unix 12     [ ]          DGRAM    LISTENING  13873  /run/systemd/journal/dev-log
unix  2      [ ACC ]     STREAM   LISTENING  13875  /run/systemd/journal/stdout
unix  6      [ ]          DGRAM    LISTENING  13877  /run/systemd/journal/socket
unix  2      [ ACC ]     SEQPACKET LISTENING  13879  /run/udev/control
unix  2      [ ACC ]     STREAM   LISTENING  24667  @/tmp/dbus-Gs1PjyqqMV
unix  3      [ ]          STREAM   CONNECTED 26050  
```

netstat -at (list TCP port connections),

netstat -au (list UDP port connections),

netstat -l (list all active listening ports)



```

ghost - VMware Workstation 16 Player (Non-commercial use only)
ghost@Ghost: ~

File Actions Edit View Help

(ghost@Ghost)-[~]
$ netstat -at
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
(ghost@Ghost)-[~]
$ netstat -au
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
udp      0      0 192.168.64.128:bootpc    192.168.64.254:bootps  ESTABLISHED
(ghost@Ghost)-[~]
$ netstat -l
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
raw6     0      0 [::]:ipv6-icmp          [::]:*                7
Active UNIX domain sockets (only servers)
Proto RefCnt Flags       Type      State      I-Node  Path
unix    2 [ACC] STREAM    LISTENING  21234   @/tmp/.X11-unix/X0
unix    2 [ACC] STREAM    LISTENING  24587   /tmp/ssh-dSA1EPvwG6XE/agent.783
unix    2 [ACC] STREAM    LISTENING  23463   /run/user/1000/systemd/private
unix    2 [ACC] STREAM    LISTENING  23468   /run/user/1000/bus
unix    2 [ACC] STREAM    LISTENING  23469   /run/user/1000/gnupg/S.dirmngr
unix    2 [ACC] STREAM    LISTENING  23470   /run/user/1000/gnupg/S.gpg-agent.browser
unix    2 [ACC] STREAM    LISTENING  23471   /run/user/1000/gnupg/S.gpg-agent.extra
unix    2 [ACC] STREAM    LISTENING  23472   /run/user/1000/gnupg/S.gpg-agent.ssh
unix    2 [ACC] STREAM    LISTENING  23473   /run/user/1000/gnupg/S.gpg-agent
unix    2 [ACC] STREAM    LISTENING  21235   /tmp/.X11-unix/X0
unix    2 [ACC] STREAM    LISTENING  24706   /tmp/.ICE-unix/783
unix    2 [ACC] STREAM    LISTENING  23474   /run/user/1000/pulse/native
unix    2 [ACC] STREAM    LISTENING  17094   /run/systemd/journal/io.systemd.journal
unix    2 [ACC] STREAM    LISTENING  24705   @/tmp/.ICE-unix/783
unix    2 [ACC] STREAM    LISTENING  17345   /run/dbus/system_bus_socket
unix    2 [ACC] STREAM    LISTENING  13853   /run/systemd/private

```

netstat -lt (list active TCP listening ports),

netstat -lu (list active UDP listening ports)

```

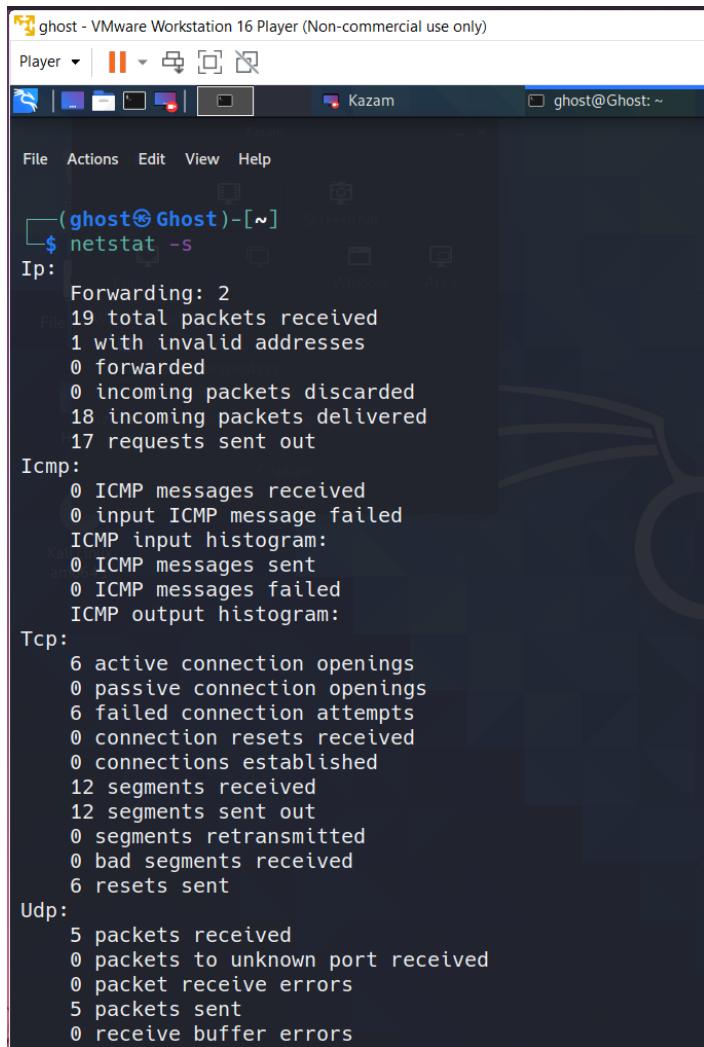
ghost - VMware Workstation 16 Player (Non-commercial use only)
ghost@Ghost: ~

File Actions Edit View Help

(ghost@Ghost)-[~]
$ netstat -lt
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN
(ghost@Ghost)-[~]
$ netstat -lu
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State

```

netstat -s (Protocol Statistics)



A screenshot of a terminal window titled "ghost - VMware Workstation 16 Player (Non-commercial use only)". The window shows the command \$ netstat -s being run. The output is as follows:

```
(ghost@Ghost)-[~] $ netstat -s
Ip:
  Forwarding: 2
  19 total packets received
  1 with invalid addresses
  0 forwarded
  0 incoming packets discarded
  18 incoming packets delivered
  17 requests sent out
Icmp:
  0 ICMP messages received
  0 input ICMP message failed
  ICMP input histogram:
  0 ICMP messages sent
  0 ICMP messages failed
  ICMP output histogram:
Tcp:
  6 active connection openings
  0 passive connection openings
  6 failed connection attempts
  0 connection resets received
  0 connections established
  12 segments received
  12 segments sent out
  0 segments retransmitted
  0 bad segments received
  6 resets sent
Udp:
  5 packets received
  0 packets to unknown port received
  0 packet receive errors
  5 packets sent
  0 receive buffer errors
```

netstat -st (TCP Protocol Statistics), netstat -su (UDP Protocol Statistics)



ghost - VMware Workstation 16 Player (Non-commercial use only)

Player ▾ | || | ⌂ | ☰ | ✎

File Actions Edit View Help

(ghost㉿Ghost)-[~] \$ netstat -st

Tcp:

```
6 active connection openings
0 passive connection openings
6 failed connection attempts
0 connection resets received
0 connections established
12 segments received
12 segments sent out
0 segments retransmitted
0 bad segments received
6 resets sent
```

UdpLite:

TcpExt:

```
0 packet headers predicted
```

IpExt:

```
InBcastPkts: 1
InOctets: 2085
OutOctets: 1203
InBcastOctets: 229
InNoECTPkts: 19
```

(ghost㉿Ghost)-[~] \$ netstat -su

Udp:

```
5 packets received
0 packets to unknown port received
0 packet receive errors
5 packets sent
0 receive buffer errors
0 send buffer errors
IgnoredMulti: 1
```

UdpLite:

netstat -i (Interface statistics), netstat -r (routing table info)

```
ghost - VMware Workstation 16 Player (Non-commercial use only)
ghost@Ghost: ~

File Actions Edit View Help

(ghost@Ghost)-[~]
$ netstat -r
Kernel IP routing table
Destination     Gateway      Genmask      Flags MSS Window irtt Iface
default         192.168.64.2  0.0.0.0      UG        0 0          0 eth0
192.168.64.0   0.0.0.0      255.255.255.0 U          0 0          0 eth0

(ghost@Ghost)-[~]
$ netstat -i
Kernel Interface table
Iface      MTU     RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
eth0      1500      168     0      0 0       24      0      0      0 BMRU
lo       65536      12      0      0 0       12      0      0      0 LRU
```

Netstat -p

```
ghost - VMware Workstation 16 Player (Non-commercial use only)
ghost@Ghost: ~

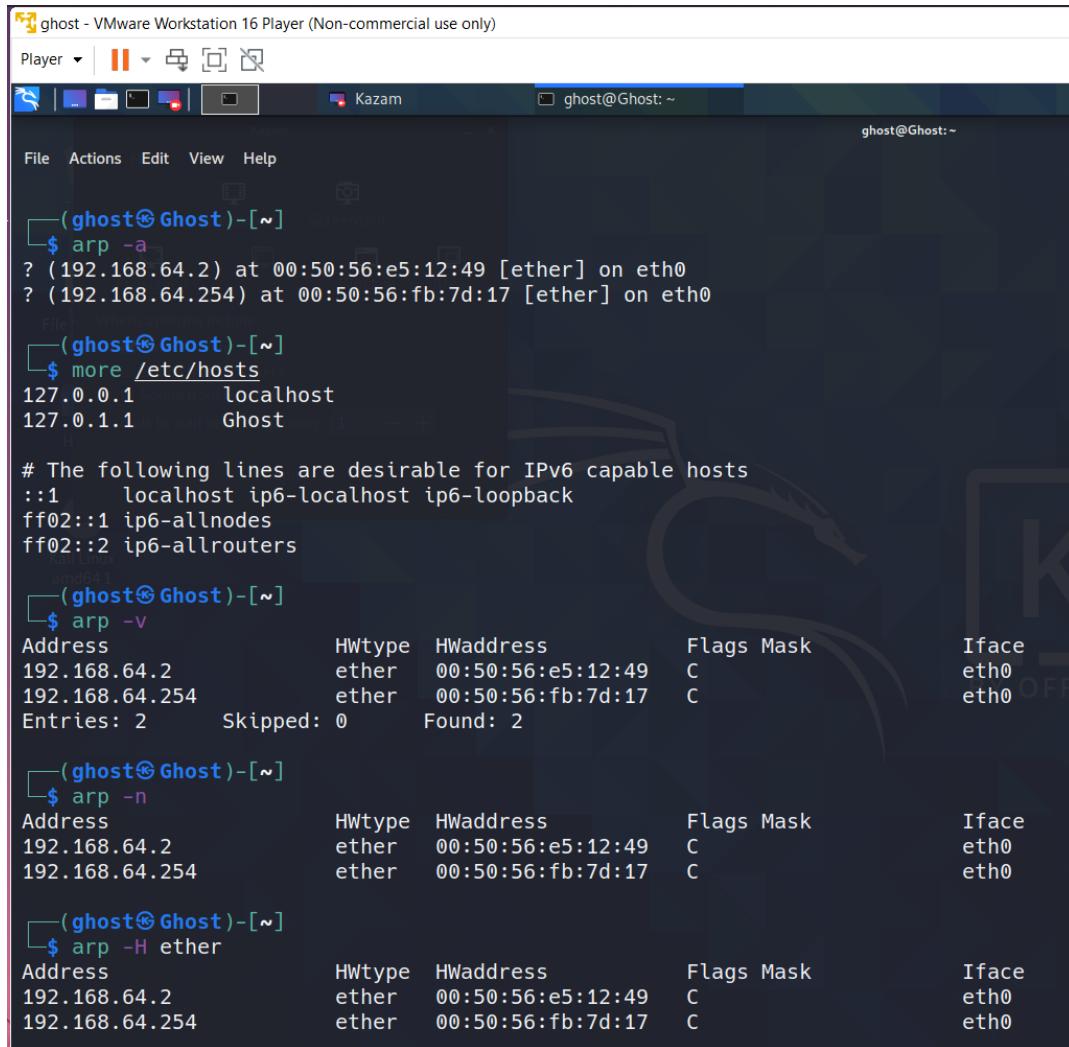
File Actions Edit View Help

(ghost@Ghost)-[~]
$ sudo netstat -p
Active Internet connections (w/o servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State      PID/Program name
udp        0      0 192.168.64.128:bootpc  192.168.64.254:bootps ESTABLISHED 482/NetworkManager

Active UNIX domain sockets (w/o servers)
Proto RefCnt Flags       Type      State          I-Node PID/Program name   Path
unix     2      [ ]      DGRAM     CONNECTED    23460  757/systemd      /run/user/1000/systemd/notify
unix     3      [ ]      DGRAM     CONNECTED    13850  1/init          /run/systemd/notify
unix     2      [ ]      DGRAM     CONNECTED    13867  1/init          /run/systemd/journal/syslog
unix    13      [ ]      DGRAM     CONNECTED    13873  1/init          /run/systemd/journal/dev-log
unix     6      [ ]      DGRAM     CONNECTED    13877  1/init          /run/systemd/journal/socket
unix     3      [ ]      STREAM    CONNECTED   26050  1046/python3     /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   24309  793/dbus-daemon  /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   24270  952/agent        /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   24134  793/dbus-daemon  /run/user/1000/bus
unix     2      [ ]      DGRAM     CONNECTED   21229  519/lightdm      /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   19858  480/dbus-daemon  /run/systemd/journal/stdout
unix     3      [ ]      STREAM    CONNECTED   25666  1/init          /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   23915  880/xfsettingsd  /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   23710  793/dbus-daemon  /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   25766  793/dbus-daemon  /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   24972  901/Thunar        /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   23674  1/init          /run/systemd/journal/stdout
unix     3      [ ]      STREAM    CONNECTED   24145  793/dbus-daemon  /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   24750  841/dbus-daemon  @/tmp/dbus-Gs1PJyqqMV
unix     3      [ ]      DGRAM     CONNECTED   16802  337/systemd-udevd  /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   25508  939/python3      /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   24027  880/xfsettingsd  /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   25988  1069/gvfs-goa-volum /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   25843  1046/python3     /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   24980  783/xfce4-session  @/tmp/.ICE-unix/783
unix     3      [ ]      STREAM    CONNECTED   24135  908(wrapper-2.0)  /run/user/1000/bus
unix     3      [ ]      STREAM    CONNECTED   26978  939/python3      /run/user/1000/bus
```

Task -7

More /etc/hosts (number of hosts present), arp -a (Addition of host), arp -v
arp -n, arp -H ether



The screenshot shows a terminal window titled "ghost - VMware Workstation 16 Player (Non-commercial use only)". The terminal session is running on a Kali Linux system, with the prompt "ghost@Ghost: ~". The user has run several commands to demonstrate network configuration and ARP tables:

- \$ arp -a
- ? (192.168.64.2) at 00:50:56:e5:12:49 [ether] on eth0
- ? (192.168.64.254) at 00:50:56:fb:7d:17 [ether] on eth0
- \$ more /etc/hosts
- 127.0.0.1 localhost
- 127.0.1.1 Ghost
- # The following lines are desirable for IPv6 capable hosts
- ::1 localhost ip6-localhost ip6-loopback
- ff02::1 ip6-allnodes
- ff02::2 ip6-allrouters
- \$ arp -v

Address	HWtype	HWaddress	Flags	Mask	Iface
192.168.64.2	ether	00:50:56:e5:12:49	C		eth0
192.168.64.254	ether	00:50:56:fb:7d:17	C		eth0

- Entries: 2 Skipped: 0 Found: 2
- \$ arp -n

Address	HWtype	HWaddress	Flags	Mask	Iface
192.168.64.2	ether	00:50:56:e5:12:49	C		eth0
192.168.64.254	ether	00:50:56:fb:7d:17	C		eth0

- \$ arp -H ether

Address	HWtype	HWaddress	Flags	Mask	Iface
192.168.64.2	ether	00:50:56:e5:12:49	C		eth0
192.168.64.254	ether	00:50:56:fb:7d:17	C		eth0

Task -8



Host domain name, host ip address, host -a domain name

```
ghost@Enola: ~
ghost@Enola:~$ host google.com
google.com has address 172.217.163.142
google.com has IPv6 address 2404:6800:4007:801::200e
google.com mail is handled by 10 aspmx.l.google.com.
google.com mail is handled by 30 alt2.aspmx.l.google.com.
google.com mail is handled by 20 alt1.aspmx.l.google.com.
google.com mail is handled by 40 alt3.aspmx.l.google.com.
google.com mail is handled by 50 alt4.aspmx.l.google.com.
ghost@Enola:~$ host 172.217.163.206
206.163.217.172.in-addr.arpa domain name pointer maa05s06-in-f14.1e100.net.
ghost@Enola:~$ host -a google.com
Trying "google.com"
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 16268
;; flags: qr rd ra; QUERY: 1, ANSWER: 12, AUTHORITY: 0, ADDITIONAL: 8

;; QUESTION SECTION:
;google.com.           IN      ANY

;; ANSWER SECTION:
google.com.        102     IN      AAAA    2404:6800:4007:80e::200e
google.com.        600     IN      NS      ns3.google.com.
google.com.        600     IN      NS      ns2.google.com.
google.com.        600     IN      NS      ns1.google.com.
google.com.        600     IN      NS      ns4.google.com.
google.com.        45      IN      SOA     ns1.google.com. dns-admin.google.com. 360387822 900 900 1800 60
google.com.        63      IN      A       172.217.163.142
google.com.        537     IN      MX      20 alt1.aspmx.l.google.com.
google.com.        537     IN      MX      40 alt3.aspmx.l.google.com.
google.com.        537     IN      MX      50 alt4.aspmx.l.google.com.
google.com.        537     IN      MX      10 aspmx.l.google.com.
google.com.        537     IN      MX      30 alt2.aspmx.l.google.com.

;; ADDITIONAL SECTION:
ns4.google.com.    600     IN      A       216.239.38.10
ns4.google.com.    600     IN      AAAA   2001:4860:4802:38::a
ns3.google.com.    600     IN      A       216.239.36.10
ns3.google.com.    600     IN      AAAA   2001:4860:4802:36::a
ns2.google.com.    600     IN      A       216.239.34.10
ns2.google.com.    600     IN      AAAA   2001:4860:4802:34::a
ns1.google.com.    600     IN      A       216.239.32.10
ns1.google.com.    600     IN      AAAA   2001:4860:4802:32::a

Received 474 bytes from 106.51.113.29#53 in 16 ms
ghost@Enola:~$
```

Host -v domain name



```

ghost@Enola:~$ host -v google.com
Trying "google.com"
;; ->HEADER<<- opcode: QUERY, status: NOERROR, id: 18653
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;google.com.           IN      A

;; ANSWER SECTION:
google.com.        46      IN      A      172.217.163.142

Received 44 bytes from 106.51.113.29#53 in 33 ms
Trying "google.com"
;; ->HEADER<<- opcode: QUERY, status: NOERROR, id: 42341
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;google.com.           IN      AAAA

;; ANSWER SECTION:
google.com.        285     IN      AAAA    2404:6800:4007:800::200e

Received 56 bytes from 106.51.255.135#53 in 78 ms
Trying "google.com"
;; ->HEADER<<- opcode: QUERY, status: NOERROR, id: 21207
;; flags: qr rd ra; QUERY: 1, ANSWER: 5, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;google.com.           IN      MX

;; ANSWER SECTION:
google.com.        600     IN      MX      20 alt1.aspmx.l.google.com.
google.com.        600     IN      MX      30 alt2.aspmx.l.google.com.
google.com.        600     IN      MX      40 alt3.aspmx.l.google.com.
google.com.        600     IN      MX      10 aspmx.l.google.com.
google.com.        600     IN      MX      50 alt4.aspmx.l.google.com.

Received 136 bytes from 106.51.255.135#53 in 93 ms
ghost@Enola:~$ 

```

Host -t ns domain name, host -t SOA domain name,

host -t txt domain name (various domain records)

host -r number of retries domain name (In order to specify the number of retries you can do in case one try fails. If anyone try succeeds then the command stops.)



```
ghost@Enola: ~
ghost@Enola:~$ sudo host -t ns google.com
[sudo] password for ghost:
google.com name server ns3.google.com.
google.com name server ns2.google.com.
google.com name server ns1.google.com.
google.com name server ns4.google.com.
ghost@Enola:~$ host -t SOA google.com
google.com has SOA record ns1.google.com. dns-admin.google.com. 360387822 900 900 1800 60
ghost@Enola:~$ host -t txt google.com
google.com descriptive text "v=spf1 include:_spf.google.com ~all"
google.com descriptive text "facebook-domain-verification=22rm551cu4k0ab0bxsw536tlds4h95"
google.com descriptive text "docsign=1b0a6754-49b1-4db5-8540-d2c12664b289"
google.com descriptive text "apple-domain-verification=30afIBcvSuDV2PLX"
google.com descriptive text "docsign=05958488-4752-4ef2-95eb-aa7ba8a3bd0e"
google.com descriptive text "globalsign-smime-dv=CDYX+XFHUw2wm16/Gb8+59BsH31KzUr6c1l2BPvqKX8="
ghost@Enola:~$ host -R 3 google.com
google.com has address 172.217.163.142
google.com has IPv6 address 2404:6800:4007:80e::200e
google.com mail is handled by 20 alt1.aspmx.l.google.com.
google.com mail is handled by 40 alt3.aspmx.l.google.com.
google.com mail is handled by 50 alt4.aspmx.l.google.com.
google.com mail is handled by 10 aspmx.l.google.com.
google.com mail is handled by 30 alt2.aspmx.l.google.com.
```