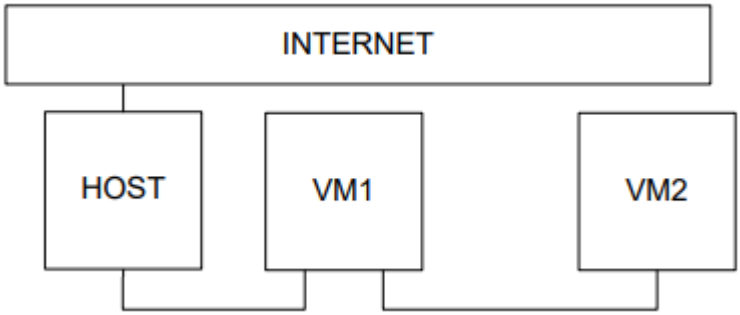
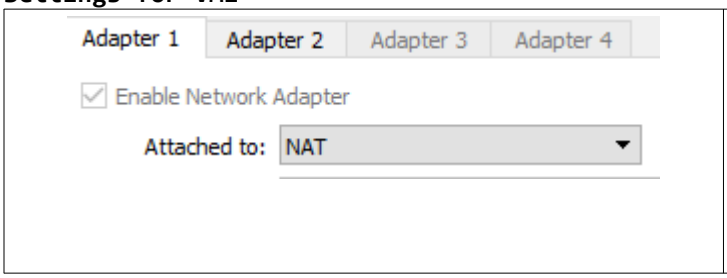
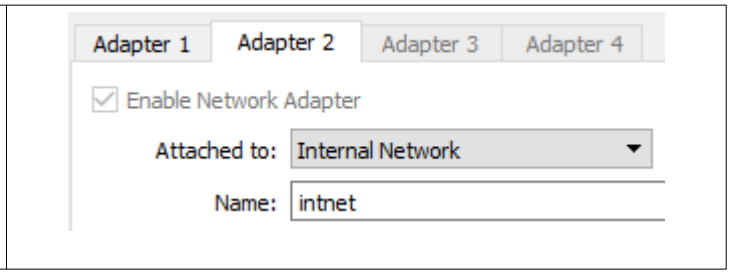
1) Create virtual machines connection according to figure 1. VM2 has one interface (internal), VM1 has 2 interfaces (NAT and internal). Configure all network interfaces in order to make VM2 has an access to the Internet (iptables, forward, masquerade).



Settings for VM1



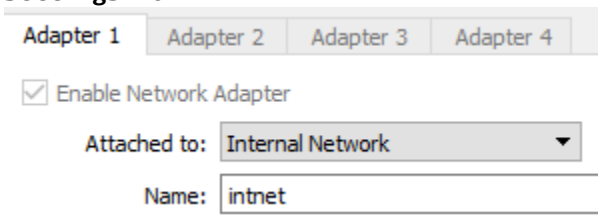



```
root@CsnKhai:~# cat /etc/network/interfaces

# The loopback network interface
auto lo
iface lo inet loopback

# 1-NAT
auto eth0
iface eth0 inet dhcp

#internal
auto eth1
iface eth1 inet static
address 10.10.10.1
netmask 255.255.255.0
broadcast 10.10.10.255

root@CsnKhai:~# mcedit /etc/sysctl.con
```

```
# Uncomment the next line to enable packet forwarding for IPv4
net.ipv4.ip_forward=1
```

```
iptables -t nat -A POSTROUTING -o eth0 -j MASQUERADE
iptables-save > /etc/iptables.rules
mcedit /etc/rc.local
iptables-restore < /etc/iptables.rules
```

Settings for VM2




```
# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet static
address 10.10.10.2
netmask 255.255.255.0
broadcast 10.10.10.255
gateway 10.10.10.1
```

3) Check the route from VM2 to Host.

```
traceroute to 192.168.56.1 (192.168.56.1), 30 hops max, 60 byte packets
 1  10.10.10.1 (10.10.10.1)  0.000 ms  0.000 ms  0.000 ms
 2  10.0.2.2 (10.0.2.2)  0.000 ms  0.000 ms  0.000 ms
 3  10.0.2.2 (10.0.2.2)  0.000 ms  0.000 ms  0.000 ms
```

4) Check the access to the Internet, (just ping, for example, 8.8.8.8).

```
root@CsnKhai:~# ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:c6:1d:1f brd ff:ff:ff:ff:ff:ff
    inet 10.10.10.2/24 brd 10.10.10.255 scope global eth0
       valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fec6:1d1f/64 scope link
       valid_lft forever preferred_lft forever
root@CsnKhai:~# ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=117 time=16.0 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=117 time=16.0 ms
^C
--- 8.8.8.8 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1004ms
rtt min/avg/max/mdev = 16.001/16.001/16.001/0.000 ms
```

5) Determine, which resource has an IP address 8.8.8.8.

```
root@CsnKhai:~# nslookup 8.8.8.8
Server:         127.0.0.1
Address:        127.0.0.1#53

Non-authoritative answer:
8.8.8.8.in-addr.arpa    name = dns.google.

Authoritative answers can be found from:
8.8.8.in-addr.arpa      nameserver = ns3.google.com.
8.8.8.in-addr.arpa      nameserver = ns2.google.com.
8.8.8.in-addr.arpa      nameserver = ns1.google.com.
8.8.8.in-addr.arpa      nameserver = ns4.google.com.
ns1.google.com  internet address = 216.239.32.10
ns1.google.com  has AAAA address 2001:4860:4802:32::a
```

```
ns2.google.com  internet address = 216.239.34.10
ns2.google.com  has AAAA address 2001:4860:4802:34::a
ns3.google.com  internet address = 216.239.36.10
ns3.google.com  has AAAA address 2001:4860:4802:36::a
ns4.google.com  internet address = 216.239.38.10
ns4.google.com  has AAAA address 2001:4860:4802:38::a
```

6) Determine, which IP address belongs to resource epam.com

```
root@CsnKhai:~# dig epam.com

; <<>> DiG 9.9.5-3ubuntu0.19-Ubuntu <<>> epam.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 64950
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 6, ADDITIONAL: 8

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1220
;; QUESTION SECTION:
;epam.com.                      IN      A

;; ANSWER SECTION:
epam.com.               2695    IN      A       3.214.134.159

;; AUTHORITY SECTION:
epam.com.               2118    IN      NS      a7-64.akam.net.
epam.com.               2118    IN      NS      a11-65.akam.net.
epam.com.               2118    IN      NS      a10-64.akam.net.
epam.com.               2118    IN      NS      a20-67.akam.net.
epam.com.               2118    IN      NS      a14-66.akam.net.
epam.com.               2118    IN      NS      a1-195.akam.net.

;; ADDITIONAL SECTION:
a7-64.akam.net.         260     IN      A       23.61.199.64
a1-195.akam.net.        2118    IN      A       193.108.91.195
a10-64.akam.net.        2224    IN      A       96.7.50.64
a11-65.akam.net.        1385    IN      A       84.53.139.65
a14-66.akam.net.        367     IN      A       184.26.161.66
a20-67.akam.net.        2118    IN      A       95.100.175.67
a20-67.akam.net.        360     IN      AAAA    2a02:26f0:67::43

;; Query time: 4 msec
;; SERVER: 127.0.0.1#53(127.0.0.1)
;; WHEN: Sat Dec 25 07:03:34 UTC 2021
;; MSG SIZE  rcvd: 310
```

7) Determine the default gateway for your HOST and display routing table.

```
root@CsnKhai:~# route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         10.0.2.2        0.0.0.0         UG    0      0        0 eth0
10.0.2.0        *               255.255.255.0   U     0      0        0 eth0
10.10.10.0      *               255.255.255.0   U     0      0        0 eth1вш
```

8) Trace the route to google.com

```
dig google.com
;; ANSWER SECTION:
google.com.             64      IN      A       216.58.215.78

root@CsnKhai:~# mtr 216.58.215.78
```

```
                                 My traceroute  [v0.85]
CsnKhai (0.0.0.0)                                        Sat Dec 25 07:49:22 2021
Keys:  Help   Display mode   Restart statistics   Order of fields   quit
                                                 Packets               Pings
 Host                                          Loss%   Snt   Last   Avg  Best  Wrst StDev
 1. 10.10.10.1                                  0.0%    17    0.0   0.0   0.0   0.0   0.0
 2. 10.0.2.2                                    0.0%    17    0.0   0.2   0.0   4.0   0.9
 3. 192.168.0.1                                 0.0%    17    0.0   1.2   0.0   4.0   1.8
 4. 94.158.88.1                                 0.0%    17    0.0   3.5   0.0  12.0   4.2
 5. 91.196.151.3                                0.0%    16    0.0   3.5   0.0  12.0   4.0
 6. 172.27.0.0                                  0.0%    16    4.0   3.7   0.0  12.0   3.7
 7. 209.85.148.56                               0.0%    16    4.0   5.0   0.0  20.0   5.5
 8. 108.170.248.155                             0.0%    16    4.0   5.7   0.0  24.0   6.1
 9. 216.239.46.121                              0.0%    16   16.0  17.0  12.0  24.0   3.0
10. 108.170.250.209                             0.0%    16   16.0  17.5  16.0  20.0   1.9
11. 108.170.234.103                             0.0%    16   16.0  19.2  16.0  44.0   7.5
12. 216.58.215.78                               0.0%    16   16.0  16.5  12.0  20.0   1.9
```