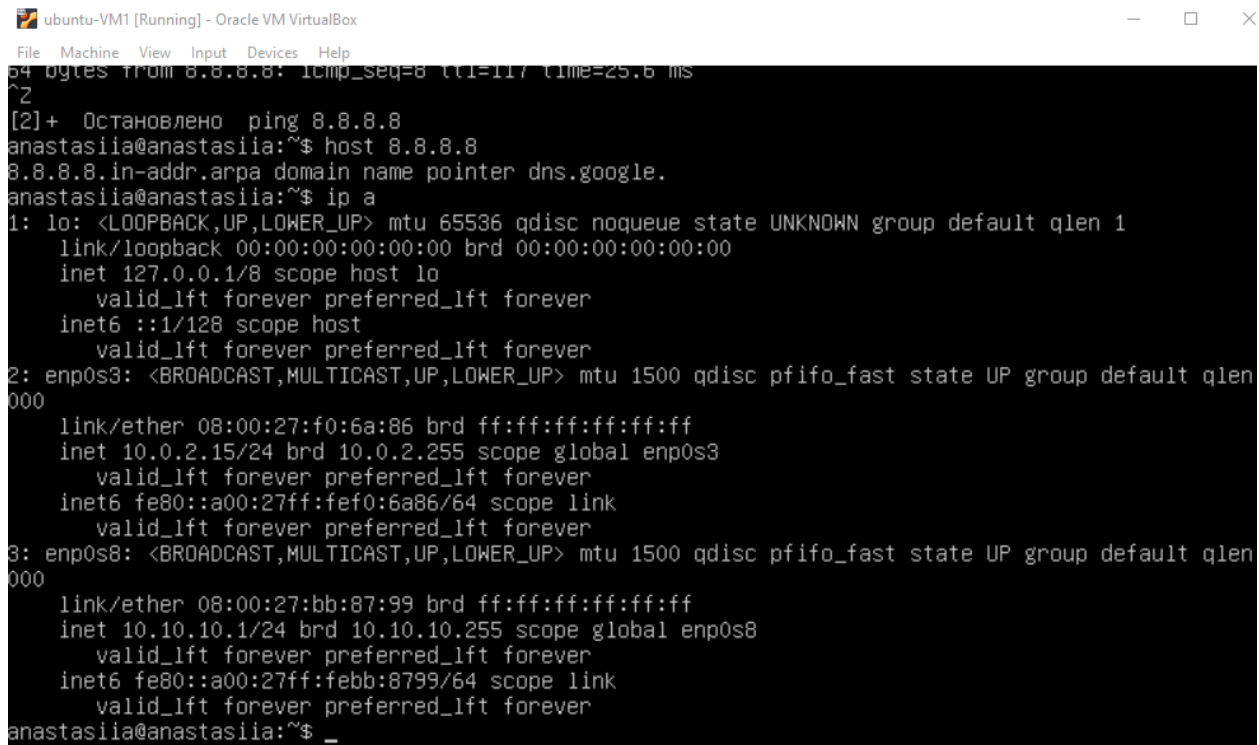
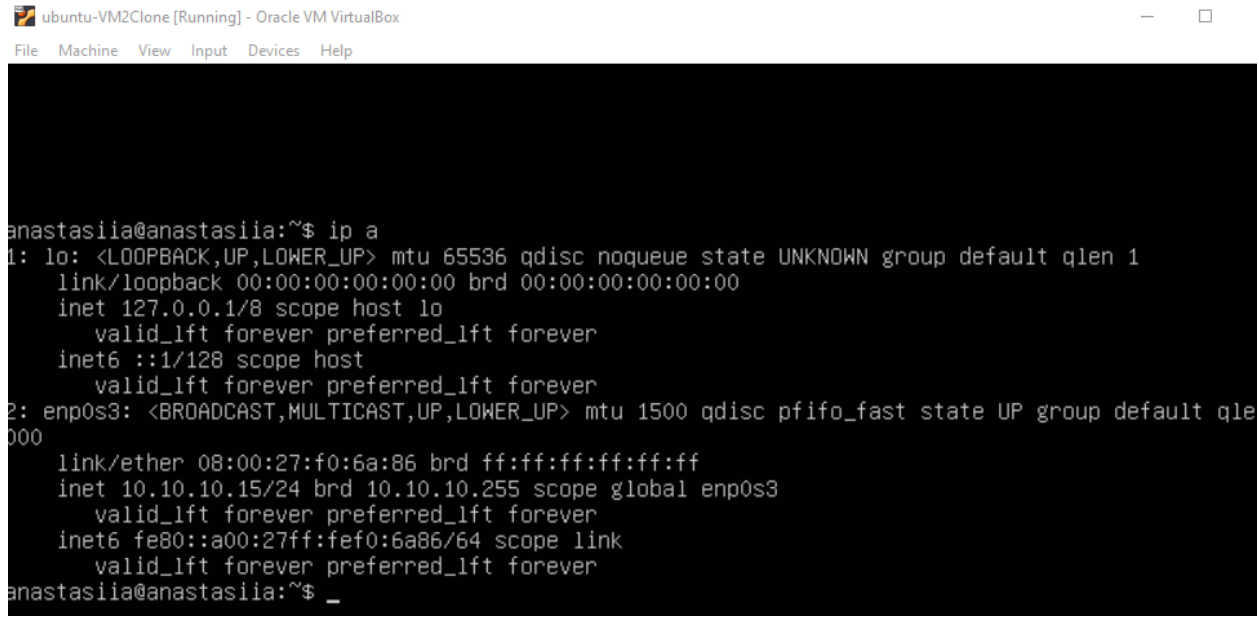


Configuring DHCP, DNS servers and dynamic routing using OSPF protocol

1. Use already created internal-network for three VMs (VM1-VM3). VM1 has NAT and internal, VM2, VM3 – internal only interfaces.



```
ubuntu-VM1 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
64 bytes from 8.8.8.8: icmp_seq=8 ttl=117 time=25.6 ms
^C
[2]+  Остановлено ping 8.8.8.8
anastasiia@anastasiia:~$ host 8.8.8.8
8.8.8.8.in-addr.arpa domain name pointer dns.google.
anastasiia@anastasiia:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1
    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: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:f0:6a:86 brd ff:ff:ff:ff:ff:ff
    inet 10.0.2.15/24 brd 10.0.2.255 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fef0:6a86/64 scope link
        valid_lft forever preferred_lft forever
3: enp0s8: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:bb:87:99 brd ff:ff:ff:ff:ff:ff
    inet 10.10.10.1/24 brd 10.10.10.255 scope global enp0s8
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:febb:8799/64 scope link
        valid_lft forever preferred_lft forever
anastasiia@anastasiia:~$ _
```

2. 
- 3.

```
VM3--- [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
64 bytes from 8.8.8.8: icmp_seq=2 ttl=116 time=20.9 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=116 time=21.2 ms
^Z
[1]+  Остановлено ping 8.8.8.8
anastasiia@anastasiia:~$ host 8.8.8.8
8.8.8.8.in-addr.arpa domain name pointer dns.google.
anastasiia@anastasiia:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1
    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: enp0s3: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 08:00:27:b2:b2:e5 brd ff:ff:ff:ff:ff:ff
    inet 10.10.10.13/24 brd 10.10.10.255 scope global enp0s3
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:feb2:b2e5/64 scope link
        valid_lft forever preferred_lft forever
anastasiia@anastasiia:~$
```

4.

2. Install and configure DHCP server on VM1. (3 ways: using VBoxManage, DNSMASQ and ISC-DHSPSERVER). You should use at least 2 of them.

3. Check VM2 and VM3 for obtaining network addresses from DHCP server.

4. Using existed network for three VMs (from p.1) install and configure DNS server on VM1. (You can use DNSMASQ, BIND9 or something else).

```
root@anastasiia:/home/anastasiia# sudo iptables -S
-P INPUT ACCEPT
-P FORWARD ACCEPT
-P OUTPUT ACCEPT
-A FORWARD -i enp0s8 -o enp0s3 -m state --state RELATED,ESTABLISHED -j ACCEPT
-A FORWARD -i enp0s8 -o enp0s3 -j ACCEPT
root@anastasiia:/home/anastasiia#
```

```
ubuntu-VM2Clone [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
valid_lft forever preferred_lft forever
anastasiia@anastasiia:~$ dig g.co
; <<>> DiG 9.10.3-P4-Ubuntu <<>> g.co
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 8930
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;g.co.                IN      A
;; ANSWER SECTION:
g.co.                 300     IN      A      142.250.203.142

;; Query time: 180 msec
;; SERVER: 10.10.10.1#53(10.10.10.1)
;; WHEN: Sat Nov 20 20:07:26 EET 2021
;; MSG SIZE rcvd: 49

anastasiia@anastasiia:~$ _
```

```
VM3--- [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

; <<>> DiG 9.10.3-P4-Ubuntu <<>> g.co
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 63087
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1280
;; QUESTION SECTION:
;g.co.                IN      A

;; ANSWER SECTION:
g.co.                216     IN      A      142.250.203.142

;; Query time: 0 msec
;; SERVER: 10.10.10.1#53(10.10.10.1)
;; WHEN: Sat Nov 20 20:08:50 EET 2021
;; MSG SIZE rcvd: 49

anastasiia@anastasiia:~$
```

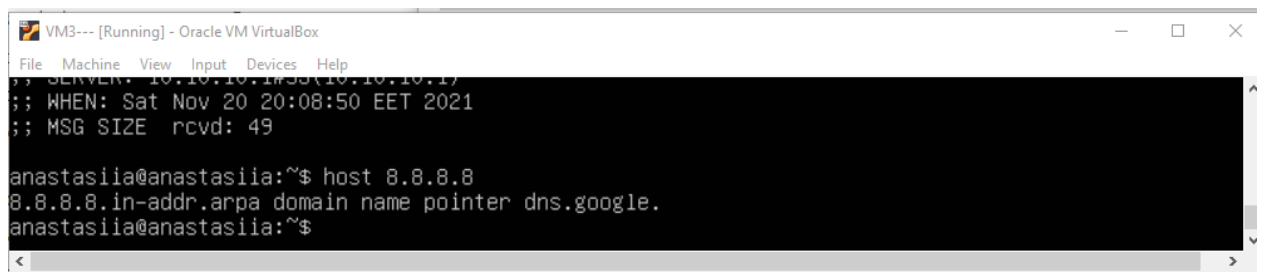
5. Check VM2 and VM3 for gaining access to DNS server (naming services).

```
ubuntu-VM2Clone [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

anastasiia@anastasiia:~$ 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=116 time=21.4 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=116 time=20.6 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=116 time=21.6 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=116 time=20.6 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=116 time=20.5 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=116 time=20.6 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=116 time=20.9 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=116 time=20.8 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=116 time=21.1 ms
64 bytes from 8.8.8.8: icmp_seq=10 ttl=116 time=22.9 ms
64 bytes from 8.8.8.8: icmp_seq=11 ttl=116 time=20.9 ms
64 bytes from 8.8.8.8: icmp_seq=12 ttl=116 time=20.9 ms
64 bytes from 8.8.8.8: icmp_seq=13 ttl=116 time=20.8 ms
64 bytes from 8.8.8.8: icmp_seq=14 ttl=116 time=21.0 ms
64 bytes from 8.8.8.8: icmp_seq=15 ttl=116 time=20.9 ms
64 bytes from 8.8.8.8: icmp_seq=16 ttl=116 time=22.4 ms
64 bytes from 8.8.8.8: icmp_seq=17 ttl=116 time=20.9 ms
64 bytes from 8.8.8.8: icmp_seq=18 ttl=116 time=22.4 ms
^C
[4]+  Остановлено ping 8.8.8.8
anastasiia@anastasiia:~$
```

```
ubuntu-VM2Clone [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help

Обрабатываются триггеры для man-db (2:7.5-1) ...
настраивается пакет bind9utils (1:9.10.3.dfsg.P4-8ubuntu1.19) ...
anastasiia@anastasiia:~$ named-checkzone example.com /etc/bind/db.example.com
zone example.com/IN: loading from master file /etc/bind/db.example.com failed: file not found
zone example.com/IN: not loaded due to errors.
anastasiia@anastasiia:~$ host 8.8.8.8
8.8.8.8.in-addr.arpa domain name pointer dns.google.
anastasiia@anastasiia:~$ _
```



VM3--- [Running] - Oracle VM VirtualBox

File Machine View Input Devices Help

```
;; SERVER: 10.10.10.1#53(10.10.10.1)
;; WHEN: Sat Nov 20 20:08:50 EET 2021
;; MSG SIZE rcvd: 49

anastasiia@anastasiia:~$ host 8.8.8.8
8.8.8.8.in-addr.arpa domain name pointer dns.google.
anastasiia@anastasiia:~$
```