

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

### Configuring VM3:

```
GNU nano 2.2.6 File: /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

# internal
auto eth0
iface eth0 inet static
address 10.10.10.3
netmask 255.255.255.0
broadcast 10.10.10.255
gateway 10.10.10.1
```

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

apt-get update

apt-get install dnsmasq

nano /etc/dnsmasq.conf

setting interface eth1

```
VM1 [Работает] - Oracle VM VirtualBox
Файл Машина Вид Ввод Устройства Справка
GNU nano 2.2.6 File: /etc/dnsmasq.conf

# and this sets the source (ie local) address used to talk to
# 10.1.2.3 to 192.168.1.1 port 55 (there must be a interface with that
# IP on the machine, obviously).
# server=10.1.2.3@192.168.1.1#55

# If you want dnsmasq to change uid and gid to something other
# than the default, edit the following lines.
#user=
#group=

# If you want dnsmasq to listen for DHCP and DNS requests only on
# specified interfaces (and the loopback) give the name of the
# interface=eth1
# Repeat the line for more than one interface.
#interface=
# Or you can specify which interface _not_ to listen on
#except-interface=
# Or which to listen on by address (remember to include 127.0.0.1 if
# you use this.)
#listen-address=
# If you want dnsmasq to provide only DNS service on an interface,
# configure it as shown above, and then use the following line to
# disable DHCP and TFTP on it.
#no-dhcp-interface=

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```

And dhcp-range from 10.10.10.10 to 10.10.10.20 with 12h timeout

```
# Configuration on the machine running dnsmasq
# an explicit netmask instead.
dhcp-range=10.10.10.10,10.10.10.20,12h_
```

Setting up other machines:

nano /etc/network/interfaces

```

or# internal
w# auto eth0
# iface eth0 inet dhcp
# address 10.10.10.2

```

## Reboot

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

VM2 [Работает] - Oracle VM VirtualBox

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```

Ubuntu 14.04.3 LTS Csnkhai tty1
Csnkhai login: student
Password:
Last login: Sun Nov 21 14:47:19 UTC 2021 on tty1
Welcome to Ubuntu 14.04.3 LTS (GNU/Linux 3.13.0-63-generic i686)

 * Documentation:  https://help.ubuntu.com/
student@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 08:00:27:3a:35:bc brd ff:ff:ff:ff:ff:ff
    inet 10.10.10.11/24 brd 10.10.10.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe3a:35bc/64 scope link
        valid_lft forever preferred_lft forever
student@Csnkhai:~$ _

```

VM3 [Работает] - Oracle VM VirtualBox

Файл Машина Вид Ввод Устройства Справка

```

root@Csnkhai:/home/student# 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 08:00:27:25:3f:94 brd ff:ff:ff:ff:ff:ff
    inet 10.10.10.20/24 brd 10.10.10.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fe25:3f94/64 scope link
        valid_lft forever preferred_lft forever
root@Csnkhai:/home/student# _

```

### 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).

nano /etc/dhcp/dhclient.conf

VM1 [Работает] - Oracle VM VirtualBox

Файл Машина Вид Ввод Устройства Справка

GNU nano 2.2.6 File: /etc/dhcp/dhclient.conf Modified

```

# Configuration file for /sbin/dhclient, which is included in Debian's
#   dhcp3-client package.
#
# This is a sample configuration file for dhclient. See dhclient.conf's
#   man page for more information about the syntax of this file
#   and a more comprehensive list of the parameters understood by
#   dhclient.
#
# Normally, if the DHCP server provides reasonable information and does
#   not leave anything out (like the domain name, for example), then
#   few changes must be made to this file, if any.
#
option rfc3442-classless-static-routes code 121 = array of unsigned integer 8:

#send host-name "andare.fugue.com";
send host-name = gethostname();
#send dhcp-client-identifier 1:0:a0:24:ab:fb:9c;
#send dhcp-lease-time 3600;
#supersede domain-name "fugue.com home.vix.com";
prepend domain-name-servers 127.0.0.1;
request subnet-mask, broadcast-address, time-offset, routers,
       domain-name, domain-name-servers, domain-search, host-name,
       dhcp6.name-servers, dhcp6.domain-search,
       netbios-name-servers, netbios-scope, interface-mtu,

```

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sudo iptables -t nat -A POSTROUTING -o eth0 -j MASQUERADE

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

VM3 [Работает] - Oracle VM VirtualBox

Файл Машина Вид Ввод Устройства Справка

root@Csnkhal:/home/student# dig google.com

;; <<> DiG 9.9.5-3ubuntu0.5-Ubuntu <<> google.com

;; global options: +cmd

;; Got answer:

;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 63383

;; flags: qr rd ra ad; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:

google.com. IN A

;; ANSWER SECTION:

google.com. 53 IN A 142.250.201.206

;; Query time: 0 msec

;; SERVER: 10.10.10.1#53(10.10.10.1)

;; WHEN: Sun Nov 21 20:09:53 UTC 2021

;; MSG SIZE rcvd: 44

root@Csnkhal:/home/student# \_

VM2 [Работает] - Oracle VM VirtualBox

Файл Машина Вид Ввод Устройства Справка

student@Csnkhal:~\$ ping google.com

PING google.com (142.250.201.206) 56(84) bytes of data:

64 bytes from bud02s35-in-f14.1e100.net (142.250.201.206): icmp\_seq=1 ttl=113 time=30.5 ms

64 bytes from bud02s35-in-f14.1e100.net (142.250.201.206): icmp\_seq=2 ttl=113 time=27.7 ms

64 bytes from bud02s35-in-f14.1e100.net (142.250.201.206): icmp\_seq=3 ttl=113 time=28.0 ms

^C

--- google.com ping statistics ---

3 packets transmitted, 3 received, 0% packet loss, time 2003ms

rtt min/avg/max/mdev = 27.717/28.753/30.509/1.263 ms

student@Csnkhal:~\$ dig epam.com

;; <<> DiG 9.9.5-3ubuntu0.5-Ubuntu <<> epam.com

;; global options: +cmd

;; Got answer:

;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 51440

;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:

EDNS: version: 0, flags:: udp: 512

;; QUESTION SECTION:

epam.com. IN A

;; ANSWER SECTION:

epam.com. 3600 IN A 3.214.134.159

;; Query time: 46 msec

;; SERVER: 10.10.10.1#53(10.10.10.1)

;; WHEN: Sun Nov 21 20:09:40 UTC 2021

;; MSG SIZE rcvd: 53

student@Csnkhal:~\$