

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

vm 1 /etc/network/interfaces

```
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

# NAT
auto eth0
iface eth0 inet dhcp

# Internal
auto eth1
iface eth1 inet static
address 10.10.10.1
netmask 255.255.255.0

[ Read 16 lines ]
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```

vm 1 /etc/dhcp/dhclient.conf (dns)

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

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,
       rfc3442-classless-static-routes, ntp-servers,
       dhcp6.fqdn, dhcp6.sntp-servers;
#require subnet-mask, domain-name-servers;
#timeout 60;
#retry 60;
#reboot 10;
#select-timeout 5;
#initial-interval 2;
#script "/etc/dhcp3/dhclient-script";
#media "-link0 -link1 -link2", "link0 link1";
#reject 192.33.137.209;

#alias {

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```

vm 1 /etc/dnsmasq.conf

```
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 (eg eth0) here.
# Repeat the line for more than one interface.
interface=eth1
# 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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```

vm 1 /etc/dnsmasq.conf

```
GNU nano 2.2.6      File: /etc/dnsmasq.conf

# 3) Provides the domain part for "expand-hosts"
#domain=thekelleys.org.uk

# Set a different domain for a particular subnet
#domain=wireless.thekelleys.org.uk,192.168.2.0/24

# Same idea, but range rather than subnet
#domain=reserved.thekelleys.org.uk,192.68.3.100,192.168.3.200

# Uncomment this to enable the integrated DHCP server, you need
# to supply the range of addresses available for lease and optionally
# a lease time. If you have more than one network, you will need to
# repeat this for each network on which you want to supply DHCP
# service.
dhcp-range=10.10.10.30,10.10.10.40,12h

# This is an example of a DHCP range where the netmask is given. This
# is needed for networks we reach the dnsmasq DHCP server via a relay
# agent. If you don't know what a DHCP relay agent is, you probably
# don't need to worry about this.
#dhcp-range=192.168.0.50,192.168.0.150,255.255.255.0,12h

# This is an example of a DHCP range which sets a tag, so that
# some DHCP options may be set only for this network.
#dhcp-range=set:red,192.168.0.50,192.168.0.150

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

```
student@vm3:~$ 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:a5:3b:b5 brd ff:ff:ff:ff:ff:ff
    inet 10.10.10.31/24 brd 10.10.10.255 scope global eth0
        valid_lft forever preferred_lft forever
    inet6 fe80::a00:27ff:fea5:3bb5/64 scope link
        valid_lft forever preferred_lft forever
student@vm3:~$
```

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).

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

vm 2

```
student@vm2:~$ host epam.com
epam.com has address 3.214.134.159
epam.com mail is handled by 10 mxa-0039f301.gslb.pphosted.com.
epam.com mail is handled by 10 mxb-0039f301.gslb.pphosted.com.
student@vm2:~$ traceroute google.com
traceroute to google.com (142.250.201.206), 30 hops max, 60 byte packets
 1  10.10.10.1 (10.10.10.1)  0.650 ms  0.592 ms  0.569 ms
 2  10.0.2.2 (10.0.2.2)  1.153 ms  1.133 ms  0.936 ms
 3  * * *
 4  as01.m-x.net.ua (95.214.12.1)  10.027 ms  9.755 ms  9.720 ms
 5  10.50.10.3 (10.50.10.3)  11.727 ms  12.936 ms  13.447 ms
 6  rt-as00.kh.m-x.net.ua (95.214.15.250)  13.233 ms  4.063 ms  4.003 ms
 7  google2-ix.giganet.ua (185.1.63.152)  11.358 ms  11.293 ms  11.310 ms
 8  108.170.248.155 (108.170.248.155)  12.812 ms  108.170.248.138 (108.170.248.138)  11.019 ms  108.170.248.155 (108.170.248.155)  17.974 ms
 9  142.251.224.82 (142.251.224.82)  25.888 ms  25.869 ms  25.818 ms
10  142.251.77.181 (142.251.77.181)  25.530 ms  74.125.242.241 (74.125.242.241)  24.562 ms  74.125.242.225 (74.125.242.225)  50.081 ms
11  74.125.242.225 (74.125.242.225)  50.055 ms  142.251.65.221 (142.251.65.221)  42.631 ms  74.125.242.241 (74.125.242.241)  42.556 ms
12  142.251.65.221 (142.251.65.221)  42.541 ms  42.521 ms  41.178 ms
13  bud02s35-in-f14.1e100.net (142.250.201.206)  35.436 ms  28.634 ms  27.795 ms
student@vm2:~$
```

vm 3

```
student@vm3:~$ nslookup softserve.com
Server:      10.10.10.1
Address:     10.10.10.1#53

Non-authoritative answer:
Name:   softserve.com
Address: 23.227.38.32

student@vm3:~$ _
```