

Лабораторная №3

Администрирование сетевых подсистем - Жибицкая Е.Д.

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Цель

- Изучение принципов работы DHCP, приобретение навыков по установке и конфигурированию DHCP-сервера

Ход работы

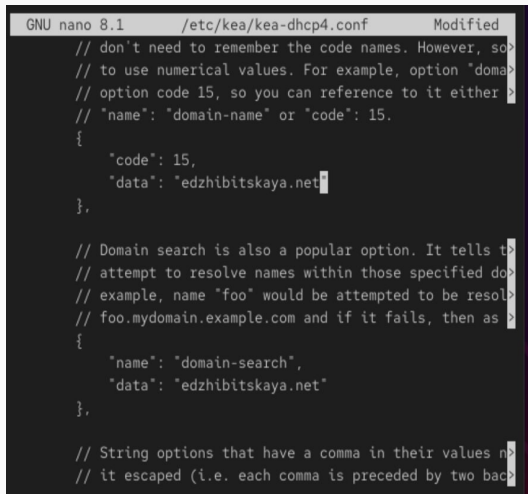
```
PS C:\Users\janes> cd C:\work\edzhbitskaya\vagrant
PS C:\work\edzhbitskaya\vagrant> vagrant up server
Bringing machine 'server' up with 'virtualbox' provider...
==> server: You assigned a static IP ending in ".1" or ":1" to this machine.
==> server: This is very often used by the router and can cause the
==> server: network to not work properly. If the network doesn't work
==> server: properly, try changing this IP.
==> server: You assigned a static IP ending in ".1" or ":1" to this machine.
```

Рис. 1: Запуск ОС

```
[edzhbitskaya@server.edzhbitskaya.net ~]$ sudo -i
[sudo] password for edzhbitskaya:
[root@server.edzhbitskaya.net ~]# dnf -y install kea
Extra Packages for Enterprise 6.6 kB/s | 11 kB      00:01
Extra Packages for Enterprise 3.6 MB/s | 4.7 MB      00:01
Rocky Linux 10 - BaseOS      2.1 kB/s | 3.9 kB      00:01
Rocky Linux 10 - AppStream    9.6 kB/s | 3.9 kB      00:00
Rocky Linux 10 - CRB          11 kB/s | 3.9 kB      00:00
Rocky Linux 10 - Extras       5.7 kB/s | 3.1 kB      00:00
```

Рис. 2: Установка Kea

На всякий случай сохраняем файл конфигурации(копируем его), открываем на редактирование и меняем шаблон. Указываем имя, адрес подсети, диапазон адресов для распределения клиентам, адрес маршрутизатора и broadcast-адрес. Также настраиваем привязку dhcpd к интерфейсу eth1



```
GNU nano 8.1 /etc/kea/kea-dhcp4.conf Modified
// don't need to remember the code names. However, sob
// to use numerical values. For example, option "domab
// option code 15, so you can reference to it either >
// "name": "domain-name" or "code": 15.
{
    "code": 15,
    "data": "edzhibitskaya.net"
},

// Domain search is also a popular option. It tells to
// attempt to resolve names within those specified do
// example, name "foo" would be attempted to be resol
// foo.mydomain.example.com and if it fails, then as >
{
    "name": "domain-search",
    "data": "edzhibitskaya.net"
},

// String options that have a comma in their values no
// it escaped (i.e. each comma is preceded by two back
```

Настройка файла

```
GNU nano 8.1 /etc/kea/kea-dhcp4.conf Modified
// use encapsulate options. csv-format defaults to "t
// this is also correct, unless you want to specify t
// option value as long hex string. For example, to s
// domain-name-servers you could do this:
// {
//   "name": "domain-name-servers",
//   "code": 6,
//   "csv-format": "true",
//   "space": "dhcp4",
//   "data": "192.0.2.1, 192.0.2.2"
// }
// but it's a lot of writing, so it's easier to do th
{
  "name": "domain-name-servers",
  "data": "192.168.1.1"
},
// Typically people prefer to refer to options by the
```

Рис. 4: Domain-name-servers

```
"subnet4": [
{
  // This defines the whole subnet. Kea will use this information to
  // determine where the clients are connected. This is the whole
  // subnet in your network.

  // Subnet identifier should be unique for each subnet.
  "id": 1,

  // This is mandatory parameter for each subnet.
  "subnet": "192.168.1.0/24",

  "pools": [ { "pool": "192.168.1.30 - 192.168.1.199" } ],

  "option-data": [
    {
      "name": "routers",
      "data": "192.168.1.1"
    }
  ],
},
],
```

Рис. 5: Subnet4

Проверяем правильность командой
“kea-dhcp4 -t /etc/kea/kea-dhcp4.conf” и
перезапускаем конфигурацию, разрешаем
загрузку при запуске

```
[root@server.edzhibitskaya.net ~]# systemctl --system daemon-reload
[root@server.edzhibitskaya.net ~]# systemctl enable kea-dhcp4.service
Created symlink '/etc/systemd/system/multi-user.target.wants/kea-dhcp4.service' → '/usr/lib/systemd/system/kea-dhcp4.service'.
[root@server.edzhibitskaya.net ~]# █
```

Рис. 6: Перезапуск dhcp

Файлы прямой и обратной зоны DNS

```
/var/named/master/fz/edzhibitskaya.net
$TTL 1D
@      IN SOA  @ server.edzhibitskaya.net. (
        2025091700      ; serial
        1D      ; refresh
        1H      ; retry
        1W      ; expire
        3H )    ; minimum

NS     @
A      192.168.1.1
$ORIGIN edzhibitskaya.net.
server A 192.168.1.1
ns     A 192.168.1.1
dhcp   A 192.168.1.1
```

Рис. 7: Файл прямой DNS-зоны

```
GNU nano 8.1 /var/named/master/rz/192.168.1 Modified
$TTL 1D
@      IN SOA  @ server.edzhibitskaya.net. (
        2025091700      ; serial
        1D      ; refresh
        1H      ; retry
        1W      ; expire
        3H )    ; minimum

NS     @
A      192.168.1.1
PTR    server.edzhibitskaya.net
$ORIGIN 1.168.192.in-addr.arpa.
1      PTR    server.edzhibitskaya.net.
1      PTR    ns.edzhibitskaya.net.
1      PTR    dhcp.edzhibitskaya.net.
```

Рис. 8: Файл обратной DNS-зоны

Перезапуск. Проверка ping

```
[root@server.edzhibitskaya.net rz]# ping dhcp.edzhibitskaya.net
PING dhcp.edzhibitskaya.net (192.168.1.1) 56(84) bytes of data.
64 bytes from server.edzhibitskaya.net (192.168.1.1): icmp_seq=1 ttl=64 time
4 ms
64 bytes from server.edzhibitskaya.net (192.168.1.1): icmp_seq=2 ttl=64 time
2 ms
64 bytes from server.edzhibitskaya.net (192.168.1.1): icmp_seq=3 ttl=64 time
9 ms
64 bytes from server.edzhibitskaya.net (192.168.1.1): icmp_seq=4 ttl=64 time
3 ms
64 bytes from server.edzhibitskaya.net (192.168.1.1): icmp_seq=5 ttl=64 time
0 ms
```

Перезапускаем named, проверяем, что обращение по имени возможно

Рис. 9: Обращение к DHCP-серверу по имени

Затем вносим изменения в настройки межсетевого экрана узла server, разрешив работу с DHC и восстанавливаем контекст безопасности в SELinux

```
[root@server.edzhibitskaya.net ~]# firewall-cmd --get-services
0-AD RH-Satellite-6 RH-Satellite-6-capsule afp alvr amanda-client
amanda-k5-client amqp amqps anno-1602 anno-1800 apcupsd aseqnet au
dit ausweisapp2 bacula bacula-client bareos-director bareos-fileda
emon bareos-storage bb bgp bitcoin bitcoin-rpc bitcoin-testnet bit
coin-testnet-rpc bittorrent-lsd ceph ceph-exporter ceph-mon cfengi
ne checkmk-agent civilization-iv civilization-v cockpit collectd c
ondor-collector cratedb ctdb dds dds-multicast dds-unicast dhcp dh
cpv6 dhcpv6-client distcc dns dns-over-quic dns-over-tls docker-re
gistry docker-swarm dropbox-lansync elasticsearch etcd-client etcd
-server factorio finger foreman foreman-proxy freeipa-4 freeipa-ld
ap freeipa-ldaps freeipa-replication freeipa-trust ftp galera gang
lia-client ganglia-master git gpsd grafana gre high-availability h
ttp http3 https ident imap imaps iperf2 iperf3 ipfs ipp ipp-client
ipsec irc ircs iscsi-target isns jenkins kadmin kdeconnect kerber
```

Рис. 10: firewall-cmd --get-services

```
[root@server.edzhibitskaya.net ~]# firewall-cmd --add-service=dhcp
success
[root@server.edzhibitskaya.net ~]# firewall-cmd --add-service=dhcp
--permanent
success
[root@server.edzhibitskaya.net ~]#
```

Рис. 11: Добавление dhcp

```
[root@server.edzhibitskaya.net ~]# restorecon -vR /etc
Relabeled /etc/NetworkManager/system-connections/eth1.nmconnecti
from unconfined_u:object_r:user_tmp_t:s0 to unconfined_u:object
:NetworkManager_etc_rw_t:s0
[root@server.edzhibitskaya.net ~]# restorecon -vR /var/named
[root@server.edzhibitskaya.net ~]# restorecon -vR /var/lib/k
kdump/ kea/ kpatch/
[root@server.edzhibitskaya.net ~]# restorecon -vR /var/lib/kea/
[root@server.edzhibitskaya.net ~]#
```

Рис. 12: Восстановление контекста безопасности

Перед запуском виртуальной машины `client` в каталоге с проектом подкаталоге `client` создаем файл `01-routing.sh`, добавляем скрипт настройки `NetworkManager`, чтобы весь трафик `client` шёл по умолчанию через `eth1`. Добавляем соответствующий скрипт в `Vagrantfile`.

Файл Изменить Просмотр

```
#!/bin/bash

echo "Provisioning script $0"

nmcli connection modify "eth1" ipv4.gateway "192.168.1.1"
nmcli connection up "eth1"

nmcli connection modify eth0 ipv4.never-default true
nmcli connection modify eth0 ipv6.never-default true

nmcli connection down eth0
nmcli connection up eth0

# systemctl restart NetworkManager
|
```

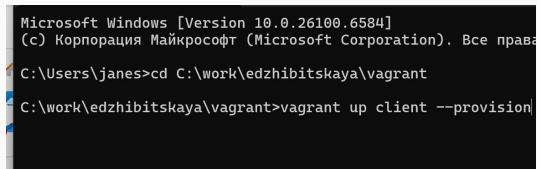
Рис. 13: Файл 01-routing.sh

```
client.vm.provision "client routing",
  type: "shell",
  preserve_order: true,
  run: "always",
  path: "provision/client/01-routing.sh"

end
```

Рис. 14: Vagrantfile

Запускаем машину client с внесенными изменениями. На машине server на терминале с мониторингом можно увидеть записи о подключении к виртуальной внутренней сети узла client и выдачи ему IP-адреса из соответствующего диапазона адресов.



```
Microsoft Windows [Version 10.0.26100.6584]
(c) Корпорация Майкрософт (Microsoft Corporation). Все права защищены.

C:\Users\janes>cd C:\work\edzhibitskaya\vagrant

C:\work\edzhibitskaya\vagrant>vagrant up client --provision
```

Рис. 15: Запуск client

```
edzhibitskaya@client:~  
[edzhibitskaya@client.edzhibitskaya.net ~]$ ifconfig  
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet 10.0.2.15 netmask 255.255.255.0 broadcast 10.0.2.255  
    inet6 fd17:625c:f037:2:a00:27ff:feeb:945 prefixlen 64 scopeid 0x0  
al>  
    inet6 fe80::a00:27ff:feeb:945 prefixlen 64 scopeid 0x20<link>  
    ether 08:00:27:cb:09:45 txqueuelen 1000 (Ethernet)  
    RX packets 820 bytes 112782 (110.1 KiB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 716 bytes 141457 (138.1 KiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500  
    inet6 fe80::d369:5368:7719:ef3f prefixlen 64 scopeid 0x20<link>  
    ether 08:00:27:a2:8c:0f txqueuelen 1000 (Ethernet)  
    RX packets 0 bytes 0 (0.0 B)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 85 bytes 21796 (21.2 KiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
```

Рис. 16: Интерфейсы

```
root@server.edzhibitskaya.net kea]# cat dhcp4.leases  
address,hwaddr,client_id,valid_lifetime,expire,subnet_id,fqdn_fwd,fqdn_rev,hostna  
e,state,user_context,pool_id  
92.168.1.30,08:00:27:a2:8c:0f,01:08:00:27:a2:8c:0f,4000,1758107633,1,0,0,client,  
,,0  
92.168.1.30,08:00:27:a2:8c:0f,01:08:00:27:a2:8c:0f,4000,1758108633,1,0,0,client,  
,,0  
92.168.1.30,08:00:27:a2:8c:0f,01:08:00:27:a2:8c:0f,4000,1758109632,1,0,0,client,  
,,0  
92.168.1.30,08:00:27:a2:8c:0f,01:08:00:27:a2:8c:0f,4000,1758110424,1,1,1,client.  
edzhibitskaya.net,,0  
92.168.1.30,08:00:27:a2:8c:0f,01:08:00:27:a2:8c:0f,4000,1758111424,1,1,1,client.  
edzhibitskaya.net,,0  
92.168.1.30,08:00:27:a2:8c:0f,01:08:00:27:a2:8c:0f,4000,1758111424,1,0,0,,2,,0  
92.168.1.30,08:00:27:a2:8c:0f,01:08:00:27:a2:8c:0f,0,1758107424,1,0,0,,2,,0  
92.168.1.30,08:00:27:a2:8c:0f,01:08:00:27:a2:8c:0f,4000,1758184489,1,1,1,client.  
edzhibitskaya.net,,0
```

Рис. 17: Выданные адреса

Настройки обновления DNS-зоны

```
[edzhibitskaya@server.edzhibitskaya.net ~]$ sudo -i
[sudo] password for edzhibitskaya:
[root@server.edzhibitskaya.net ~]# mkdir -p /etc/named/keys
[root@server.edzhibitskaya.net ~]# tsig-keygen -a HMAC-SHA512 DHCP
_UPDATER > /etc/named/keys/dhcp_updater.key
[root@server.edzhibitskaya.net ~]# cat etc/named/keys/dhcp_updater
.key
cat: etc/named/keys/dhcp_updater.key: No such file or directory
[root@server.edzhibitskaya.net ~]# cd /etc/named/keys/
[root@server.edzhibitskaya.net keys]# ls
dhcp_updater.key
[root@server.edzhibitskaya.net keys]# cat dhcp_updater.key
key "DHCP_UPDATER" {
    algorithm hmac-sha512;
    secret "cjHqH8yrqUjCDolkZREvLZvinB7yqlsc2H0tH5JlXaDTPCYFXZ
SvuMyVBQtr//TVM8N8DTueokp30x8BYkEjdw==";
};
[root@server.edzhibitskaya.net keys]#
```

Рис. 18: Создание ключа

```
[root@server.edzhibitskaya.net keys]# chown -R named:named /etc/na
med/keys
[root@server.edzhibitskaya.net keys]# nano /etc/named.conf
[root@server.edzhibitskaya.net keys]#
```

Рис. 19: Права доступа

Настройки обновления DNS-зоны

```
GNU nano 8.1 /etc/named.conf
include "/etc/crypto-policies/back-ends/bind.config";
};

logging {
    channel default_debug {
        file "data/named.run";
        severity dynamic;
    };
};

zone "." IN {
    type hint;
    file "named.ca";
};

include "/etc/named.rfc1912.zones";
include "/etc/named.root.key";
include "/etc/named/edzhibitskaya.net";
include "/etc/named/keys/dhcp_updater.key";

[ Wrote 62 lines ]
^G Help      ^O Write Out ^F Where Is  ^K Cut       ^T Execute
^X Exit      ^R Read File ^\ Replace   ^U Paste     ^J Justify
```

Рис. 20: Подключение в файле

```
GNU nano 8.1 /etc/named/edzhibitskaya.net
// If private ranges should be forwarded, add
// disable-empty-zone "."; into options
//

zone "edzhibitskaya.net" IN {
    type master;
    file "master/fz/edzhibitskaya.net";
    update-policy {
        grant DHCP_UPDATER wildcard *.user.net A DHCID;
    };
};

zone "1.168.192.in-addr.arpa" IN {
    type master;
    file "master/rz/192.168.1";
    update-policy {
        grant DHCP_UPDATER wildcard *.1.168.192.in-addr.a
    };
};
```

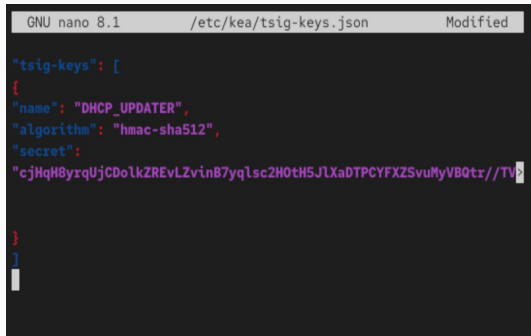
Рис. 21: Разрешение обновления

```
[root@server.edzhibitskaya.net keys]# nano /etc/named/edzhibitskaya.net
a.net
[root@server.edzhibitskaya.net keys]# nano /etc/named/edzhibitskaya.net
a.net
[root@server.edzhibitskaya.net keys]# named-checkconf
/etc/named/edzhibitskaya.net:22: missing ';' before '}'
[root@server.edzhibitskaya.net keys]# nano /etc/named/edzhibitskaya.net
a.net
[root@server.edzhibitskaya.net keys]# named-checkconf
[root@server.edzhibitskaya.net keys]# systemctl restart named
[root@server.edzhibitskaya.net keys]#
```

Проверяем на наличие опечаток, исправляем и перезапускаем named

Рис. 22: Перезапуск DNS-сервера

Далее формируем ключ. Меняем владельца и поправляем права доступа.



```
GNU nano 8.1 /etc/kea/tsig-keys.json Modified

"tsig-keys": [
{
  "name": "DHCP_UPDATER",
  "algorithm": "hmac-sha512",
  "secret":
  "cjhqH8yrqUjCDolKZREvLZvinB7yqlsc2H0tH5JlXaDTPCYFXZSvuMyVBQtr//TV>
}
]
```

Рис. 23: Формирование ключа

Файл /etc/kea/kea-dhcp-ddns.conf

```
GNU nano 8.1 /etc/kea/kea-dhcp-ddns.conf Modified
/ If configurations for other Kea services are also included in
/ are ignored by the DHCP DDNS daemon.

"DhcpDdns": {
  "ip-address": "127.0.0.1",
  "port": 53001,
  "control-socket": {
    "socket-type": "unix",
    "socket-name": "/run/kea/kea-ddns-ctrl-socket"
  },
  <?include "/etc/kea/tsig-keys.json"?>

  "forward-ddns": {
    "ddns-domains": [
      {
        "name": "edzhibitskaya.net.",
        "key-name": "DHCP_UPDATER",
        "dns-servers": [
          { "ip-address": "192.168.1.1" }
        ]
      }
    ]
  }
}
```

В файле /etc/kea/kea-dhcp-ddns.conf
прописываем все настройки

Рис. 24: kea-dhcp-ddns.conf

Проверяем на наличие ошибок, меняем владельца “chown kea:kea /etc/kea/kea-dhcp-ddns.conf” и запускаем службу

```
[root@server.edzhibitskaya.net keys]# systemctl enable --now kea-dhcp-ddns.service
Created symlink '/etc/systemd/system/multi-user.target.wants/kea-dhcp-ddns.service' → '/usr/lib/systemd/system/kea-dhcp-ddns.service'.
[root@server.edzhibitskaya.net keys]# systemctl status kea-dhcp-ddns.service
● kea-dhcp-ddns.service - Kea DHCP-DDNS Server
   Loaded: loaded (/usr/lib/systemd/system/kea-dhcp-ddns.service; enabled; preset=disabled)
   Active: active (running) since Wed 2025-09-17 10:45:39 UTC; 11s ago
     Invocation: 7675b9487cfb479d9bebb27e84344748
       Docs: man:kea-dhcp-ddns(8)
    Main PID: 42054 (kea-dhcp-ddns)
      Tasks: 5 (limit: 10370)
     Memory: 2.5M (peak: 6.5M)
        CPU: 95ms
    CGroup: /system.slice/kea-dhcp-ddns.service
            └─42054 /usr/sbin/kea-dhcp-ddns -c /etc/kea/kea-dhcp-ddns.conf

Sep 17 10:45:39 server.edzhibitskaya.net systemd[1]: Started kea-dhcp-ddns.service.
Sep 17 10:45:40 server.edzhibitskaya.net kea-dhcp-ddns[42054]: 2025-09-17 10:45:40.000000 [INFO] COMMAND_ACCO
Sep 17 10:45:40 server.edzhibitskaya.net kea-dhcp-ddns[42054]: INFO  COMMAND_ACCO
Sep 17 10:45:40 server.edzhibitskaya.net kea-dhcp-ddns[42054]: INFO  DCTL_CONFIGG
Sep 17 10:45:40 server.edzhibitskaya.net kea-dhcp-ddns[42054]: INFO  DHCP_DDNS_S
lines 1-17/17 (END)
```

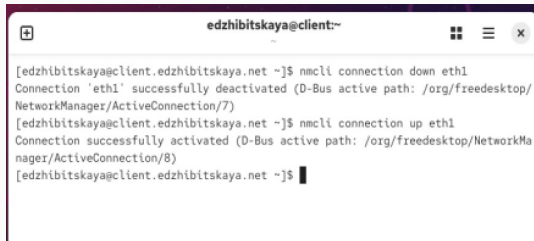
Рис. 25: Запуск dhcp-ddns

```
    },  
  
    "dhcp-ddns": {  
        "enable-updates": true  
    },  
  
    "ddns-qualifying-suffix": "edzhibitskaya.net",  
    "ddns-override-client-update": true  
}
```

Рис. 26: kea-dhcp4.conf

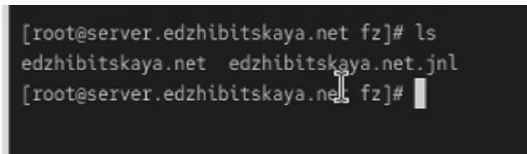
```
[root@server.edzhibitskaya.net keys]# systemctl status kea-dhcp4.service  
● kea-dhcp4.service - Kea DHCPv4 Server  
   Loaded: loaded (/usr/lib/systemd/system/kea-dhcp4.service; enabled; preset:  
   Active: active (running) since Wed 2025-09-17 10:52:38 UTC; 17s ago  
  Invocation: 6be07e72beba40299c7cba878cc5017c  
     Docs: man:kea-dhcp4(8)  
    Main PID: 42985 (kea-dhcp4)  
       Tasks: 7 (limit: 10370)  
      Memory: 3M (peak: 6.1M)  
         CPU: 101ms  
    CGroup: /system.slice/kea-dhcp4.service  
            └─42985 /usr/sbin/kea-dhcp4 -c /etc/kea/kea-dhcp4.conf  
  
Sep 17 10:52:38 server.edzhibitskaya.net kea-dhcp4[42985]: 2025-09-17 10:52:38.3>  
Sep 17 10:52:38 server.edzhibitskaya.net kea-dhcp4[42985]: 2025-09-17 10:52:38.3>  
Sep 17 10:52:38 server.edzhibitskaya.net kea-dhcp4[42985]: 2025-09-17 10:52:38.3>  
Sep 17 10:52:38 server.edzhibitskaya.net kea-dhcp4[42985]: 2025-09-17 10:52:38.3>  
Sep 17 10:52:38 server.edzhibitskaya.net kea-dhcp4[42985]: 2025-09-17 10:52:38.3>  
Sep 17 10:52:38 server.edzhibitskaya.net kea-dhcp4[42985]: 2025-09-17 10:52:38.3>
```

Рис. 27: Запуск dhcp



```
edzhibitskaya@client:~  
[edzhibitskaya@client.edzhibitskaya.net ~]$ nmcli connection down eth1  
Connection 'eth1' successfully deactivated (D-Bus active path: /org/freedesktop/  
NetworkManager/ActiveConnection/7)  
[edzhibitskaya@client.edzhibitskaya.net ~]$ nmcli connection up eth1  
Connection successfully activated (D-Bus active path: /org/freedesktop/NetworkMa  
nager/ActiveConnection/8)  
[edzhibitskaya@client.edzhibitskaya.net ~]$
```

Рис. 28: Переполучение адреса



```
[root@server.edzhibitskaya.net fz]# ls  
edzhibitskaya.net  edzhibitskaya.net.jnl  
[root@server.edzhibitskaya.net fz]#
```

Рис. 29: edzhibitskaya.net.jnl

На машине client с помощью утилиты dig убедимся в наличии DNS-записи о клиенте в прямой DNS-зоне

```
[edzhbitskaya@client.edzhbitskaya.net ~]$ dig @192.168.1.1 client.edzhbitskaya.net

;<> DiG 9.18.33-RH <> @192.168.1.1 client.edzhbitskaya.net
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 9516
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 1, ADDITIONAL: 2

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: a1b2c3d4e5f67890 (good)
;; QUESTION SECTION:
;client.edzhbitskaya.net. IN A

;; ANSWER SECTION:
;client.edzhbitskaya.net. 86400 IN A 192.168.1.30

;; AUTHORITY SECTION:
;edzhbitskaya.net. 86400 IN NS server.edzhbitskaya.net.

;; ADDITIONAL SECTION:
;server.edzhbitskaya.net. 86400 IN A 192.168.1.1

;; Query time: 1 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Thu Sep 18 09:31:56 UTC 2025
;; MSG SIZE rcvd: 125

[edzhbitskaya@client.edzhbitskaya.net ~]$
```

Рис. 30: Запись о клиенте

```
[root@server.edzhbitskaya.net server]# cd /vagrant/provision/server/dns/
[root@server.edzhbitskaya.net dns]# cp -R /var/named/* /vagrant/provision/server/
/dns/var/named/
cp: overwrite '/vagrant/provision/server/dns/var/named/master/fz/edzhbitskaya.net'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/master/rz/192.168.1'? y
[root@server.edzhbitskaya.net dns]# cp -R /etc/named/* /vagrant/provision/server/
/dns/etc/named/
cp: overwrite '/vagrant/provision/server/dns/etc/named/edzhbitskaya.net'? y
[root@server.edzhbitskaya.net dns]# y
```

Рис. 31: Каталог DHCP

```
root@server:/vagrant/provision/server - su x edzhbitskaya@server:~
[root@server.edzhbitskaya.net fz]# cd /vagrant/provision/server
[root@server.edzhbitskaya.net server]# mkdir -p /vagrant/provision/server/dhcp/e
tc/kea
[root@server.edzhbitskaya.net server]# cp -R /etc/kea/* /vagrant/provision/serve
r/dhcp/etc/kea/
[root@server.edzhbitskaya.net server]#
```

Рис. 32: Замена файлов

```
GNU nano 8.1          dhcp.sh          Modified
#!/bin/bash
echo "Provisioning script $0"
echo "Install needed packages"
dnf -y install kea
echo "Copy configuration files"
cp -R /vagrant/provision/server/dhcp/etc/kea/* /etc/kea/
echo "Fix permissions"
chown -R kea:kea /etc/kea
chmod 640 /etc/kea/tsig-keys.json
restorecon -vR /etc
restorecon -vR /var/lib/kea
echo "Configure firewall"
firewall-cmd --add-service dhcp
firewall-cmd --add-service dhcp --permanent
echo "Start dhcpd service"
systemctl --system daemon-reload
systemctl enable --now kea-dhcp4.service
systemctl enable --now kea-dhcp-ddns.service
```

Рис. 33: Создание файла

```
[root@server.edzhibitskaya.net dns]# cd /vagrant/provision/server
[root@server.edzhibitskaya.net server]# touch dhcp.sh
[root@server.edzhibitskaya.net server]# chmod +x dhcp.sh
```

Рис. 34: Файл dhcp.sh

```
--no-tty          Enable non-interactive output  
C:\work\edzhibitskaya\vagrant>vagrant halt server  
==> server: Attempting graceful shutdown of VM...  
C:\work\edzhibitskaya\vagrant>vagrant halt |client
```

Рис. 35: Выключение

Вывод

- В ходе работы были изучены принципы работы DHCP и приобретены навыки по установке и конфигурированию DHCP-сервера