Лабораторная работа

Номер 3

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Информация

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Цель работы

Приобретение практических навыков по установке и конфигурированию DHCP-сервера.

Запуск сервера

```
C:\work_asp\dmmosharov\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.
==> 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.
```

Рис. 1: Запуск сервера

Установка kea

```
[root@server.dmmosharov.net ~]# dnf -y install kea
Rocky Linux 10 - BaseOS                                          3.1 kB/s | 4.3 kB     00:01
Rocky Linux 10 - AppStream                                       5.3 kB/s | 4.3 kB     00:00
Rocky Linux 10 - CRB                                             4.1 kB/s | 4.3 kB     00:01
Rocky Linux 10 - Extras                                          3.0 kB/s | 3.1 kB     00:01
Dependencies resolved.
================================================================================================
 Package                    Architecture   Version                    Repository      Size
================================================================================================
Installing:
 kea                        x86_64         3.0.1-2.el10_1             baseos          1.4 M
Installing dependencies:
 kea-libs                   x86_64         3.0.1-2.el10_1             baseos          3.1 M
 libpq                      x86_64         16.8-2.el10_0              baseos          255 k
 log4cplus                  x86_64         2.1.1-8.el10               baseos          351 k
 mariadb-connector-c        x86_64         3.4.4-1.el10               baseos          206 k
 mariadb-connector-c-config noarch         3.4.4-1.el10               baseos          8.9 k

Transaction Summary
================================================================================================
Install  6 Packages

Total download size: 5.3 M
Installed size: 19 M
Downloading Packages:
(1/6): libpq-16.8-2.el10_0.x86_64.rpm                            233 kB/s | 255 kB     00:01
(2/6): kea-libs-3.0.1-2.el10_1.x86_64.rpm                        2.3 MB/s | 3.1 MB     00:01
(3/6): kea-3.0.1-2.el10_1.x86_64.rpm                             915 kB/s | 1.4 MB     00:01
(4/6): mariadb-connector-c-config-3.4.4-1.el10.noarch.rpm         31 kB/s | 8.9 kB     00:00
(5/6): log4cplus-2.1.1-8.el10.x86_64.rpm                         380 kB/s | 351 kB     00:00
(6/6): mariadb-connector-c-3.4.4-1.el10.x86_64.rpm               276 kB/s | 206 kB     00:00
------------------------------------------------------------------------------------------------
Total                                                            2.1 MB/s | 5.3 MB     00:02
```

Рис. 2: Установка kea

Бекап конфига

```
complete!
[root@server.dmmosharov.net ~]# cp /etc/kea/kea-dhcp4.conf /etc/kea/kea-dhcp4.conf__$(date -I)
[root@server.dmmosharov.net ~]# nano /etc/kea/kea-dhcp4.conf
```

Рис. 3: Бекап конфига

Редактирование конфига

```
  GNU nano 8.1                    /etc/kea/kea-dhcp4.conf                    Modified
        // 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 this instead:
        {
            "name": "domain-name-servers",
            "data": "192.168.1.1"
        },

        // Typically people prefer to refer to options by their names, so they
        // don't need to remember the code names. However, some people like
        // to use numerical values. For example, option "domain-name" uses
        // option code 15, so you can reference to it either by
        // "name": "domain-name" or "code": 15.
        {
            "code": 15,
            "data": "dmmosharov.net"
        },
        {
            "name": "domain-search",
            "data": "dmmosharov.net"
        },

        // Domain search is also a popular option. It tells the client to
        // attempt to resolve names within those specified domains. For
        // example, name "foo" would be attempted to be resolved as
        // foo.mydomain.example.com and if it fails, then as foo.example.com
        {
            "name": "domain-search",
            "data": "mydomain.example.com, example.com"
```

Рис. 4: Редактирование конфига

Настройка подсети

```
GNU nano 8.1                    /etc/kea/kea-dhcp4.conf                    Modified
  // structures.
  "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 define the actual part of your subnet that is governed
          // by Kea. Technically this is optional parameter, but it's
          // almost always needed for DHCP to do its job. If you omit it,
          // clients won't be able to get addresses, unless there are
          // host reservations defined for them.
          "pools": [ { "pool": "192.168.1.30 - 192.168.1.199" } ],

          // This is one of the subnet selectors. Uncomment the "interface

          "option-data": [
              {
                  // For each IPv4 subnet you most likely need to specify at
                  // least one router.
                  "name": "routers",
                  "data": "192.168.1.1"
              }
          ],
```

Рис. 5: Настройка подсети

Установка интерфейса

```
// DHCPv4 configuration starts here. This section will be read by DHCPv4 server
// and will be ignored by other components.
"Dhcp4": {
    // Add names of your network interfaces to listen on.
    "interfaces-config": {
        // See section 8.2.4 for more details. You probably want to add just
        // interface name (e.g. "eth0" or specific IPv4 address on that
        // interface name (e.g. "eth0/192.0.2.1").
        "interfaces": ["eth1"]

        // Kea DHCPv4 server by default listens using raw sockets. This ensures
        // all packets, including those sent by directly connected clients
        // that don't have IPv4 address yet, are received. However, if your
        // traffic is always relayed, it is often better to use regular
        // UDP sockets. If you want to do that, uncomment this line:
        // "dhcp-socket-type": "udp"
    },
```

Рис. 6: Установка интерфейса

Загрузка конфига

```
2025-12-17 00:12:25.544 INFO  [kea-dhcp4.dhcpsrv/32183.139784297804928] DHCPSRV_CFGMGR_SOCKET_TYP
E_DEFAULT "dhcp-socket-type" not specified , using default socket type raw
2025-12-17 00:12:25.544 INFO  [kea-dhcp4.dhcpsrv/32183.139784297804928] DHCPSRV_LEASE_MGR_BACKEND
S_REGISTERED the following lease backend types are available: memfile
2025-12-17 00:12:25.544 INFO  [kea-dhcp4.hosts/32183.139784297804928] HOSTS_BACKENDS_REGISTERED t
he following host backend types are available:
2025-12-17 00:12:25.544 INFO  [kea-dhcp4.dhcpsrv/32183.139784297804928] DHCPSRV_FORENSIC_BACKENDS
_REGISTERED the following forensic backend types are available:
2025-12-17 00:12:25.544 INFO  [kea-dhcp4.database/32183.139784297804928] CONFIG_BACKENDS_REGISTER
ED the following config backend types are available:
```

Рис. 7: Загрузка конфига

Перезагрузка демонов

```
[root@server.dmmosharov.net ~]# systemctl --system daemon-reload
[root@server.dmmosharov.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'.
```

Рис. 8: Перезагрузка демонов

Редактирование fz

```
  GNU nano 8.1          /var/named/master/fz/dmmosharov.net
$TTL 1D
@       IN SOA  @ server.dmmosharov.net. (
                                        2025121701      ; serial
                                        1D      ; refresh
                                        1H      ; retry
                                        1W      ; expire
                                        3H )    ; minimum
        NS      @
        A       192.168.1.1
$ORIGIN dmmosharov.net.
server A 192.168.1.1
ns A 192.168.1.1
dhcp A 192.168.1.1
```

Рис. 9: Редактирование fz

rz

```
  GNU nano 8.1            /var/named/master/rz/192.168.1
$TTL 1D
@       IN SOA  @ server.dmmosharov.net. (
                                        2025121701      ; serial
                                        1D      ; refresh
                                        1H      ; retry
                                        1W      ; expire
                                        3H )    ; minimum
        NS      @
        A       192.168.1.1
        PTR     server.dmmosharov.net.
$ORIGIN 1.168.192.in-addr.arpa.
1 PTR server.dmmosharov.net.
1 PTR ns.dmmosharov.net.
1 PTR dhcp.dmmosharov.net
```

Рис. 10: rz

Пинг dhcp

```
[root@server.dmmosharov.net ~]# systemctl restart named
[root@server.dmmosharov.net ~]# ping dhcp.dmmosharov.net
PING dhcp.dmmosharov.net (192.168.1.1) 56(84) bytes of data.
64 bytes from dhcp.dmmosharov.net.1.168.192.in-addr.arpa (192.168.1.1): icmp_se
q=1 ttl=64 time=0.042 ms
64 bytes from dhcp.dmmosharov.net.1.168.192.in-addr.arpa (192.168.1.1): icmp_se
q=2 ttl=64 time=0.062 ms
64 bytes from dhcp.dmmosharov.net.1.168.192.in-addr.arpa (192.168.1.1): icmp_se
q=3 ttl=64 time=0.059 ms
64 bytes from dhcp.dmmosharov.net.1.168.192.in-addr.arpa (192.168.1.1): icmp_se
q=4 ttl=64 time=0.083 ms
64 bytes from dhcp.dmmosharov.net.1.168.192.in-addr.arpa (192.168.1.1): icmp_se
```

Рис. 11: Пинг dhcp

firewall и selinux

```
[root@server.dmmosharov.net ~]# firewall-cmd --list-services
cockpit dhcpv6-client dns ssh
[root@server.dmmosharov.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 audit ausweisapp2 bacula bacula-client
 bareos-director bareos-filedaemon bareos-storage bb bgp bitcoin bitcoin-rpc bitcoin-testnet bitcoin-testnet-rpc bittorrent-lsd ceph ceph-exporter ceph-mon cfengine che
ckmk-agent civilization-iv civilization-v cockpit collectd condor-collector cratedb ctdb dds dds-multicast dds-unicast dhcp dhcpv6 dhcpv6-client distcc dns dns-over-qui
c dns-over-tls docker-registry docker-swarm dropbox-lansync elasticsearch etcd-client etcd-server factorio finger foreman foreman-proxy freeipa-4 freeipa-ldap freeipa-l
daps freeipa-replication freeipa-trust ftp galera ganglia-client ganglia-master git gpsd grafana gre high-availability http http3 https ident imap imaps iperf2 iperf3 i
pfs ipp ipp-client ipsec irc ircs iscsi-target isns jenkins kadmin kdeconnect kerberos kibana klogin kpasswd kprop kshell kube-api kube-apiserver kube-control-plane kub
e-control-plane-secure kube-controller-manager kube-controller-manager-secure kube-nodeport-services kube-scheduler kube-scheduler-secure kube-worker kubelet kubelet-re
adonly kubelet-worker ldap ldaps libvirt libvirt-tls lightning-network llmnr llmnr-client llmnr-tcp llmnr-udp managesieve matrix mdns memcache minecraft minidlna mndp m
ongodb mosh mountd mpd mqtt mqtt-tls ms-wbt mssql murmur mysql nbd nebula need-for-speed-most-wanted netbios-ns netdata-dashboard nfs nfs3 nmea-0183 nrpe ntp nut opente
lemetry openvpn ovirt-imageio ovirt-storageconsole ovirt-vmconsole plex pmcd pmproxy pmwebapi pmwebapis pop3 pop3s postgresql privoxy prometheus prometheus-node-exporte
r proxy-dhcp ps2link ps3netsrv ptp pulseaudio puppetmaster quassel radius radsec rdp redis redis-sentinel rootd rpc-bind rquotad rsh rsyncd rtsp salt-master samba samba
-client samba-dc sane settlers-history-collection sip sips slimevr slp smtp smtp-submission smtps snmp snmptls snmptls-trap snmptrap spideroak-lansync spotify-sync squi
d ssdp ssh statsrv steam-lan-transfer steam-streaming stellaris stronghold-crusader stun stuns submission supertuxkart svdrp svn syncthing syncthing-gui syncthing-relay
 synergy syscomlan syslog syslog-tls telnet tentacle terraria tftp tile38 tinc tor-socks transmission-client turn turns upnp-client vdsm vnc-server vrrp warpinator wbem
-http wbem-https wireguard ws-discovery ws-discovery-client ws-discovery-host ws-discovery-tcp ws-discovery-udp wsdd wsdd-http wsman wsmans xdmcp xmpp-bosh xmpp-client
xmpp-local xmpp-server zabbix-agent zabbix-java-gateway zabbix-server zabbix-trapper zabbix-web-service zero-k zerotier
[root@server.dmmosharov.net ~]# firewall-cmd --add-service=dhcp
success
[root@server.dmmosharov.net ~]# firewall-cmd --add-service=dhcp --permanent
success
[root@server.dmmosharov.net ~]#
```

Рис. 12: firewall и selinux

Логи сервера

```
Dec 17 00:34:14 server systemd[1]: systemd-coredump@1771-35638-0.service: Deactivated successfully.
Dec 17 00:34:19 server kernel: traps: VBoxClient[35649] trap int3 ip:41db4b sp:7fca19235cd0 error:0 in VBoxClient[1db4b,400000+bb000]
Dec 17 00:34:19 server systemd-coredump[35650]: Process 35646 (VBoxClient) of user 1001 terminated abnormally with signal 5/TRAP, processing...
Dec 17 00:34:19 server systemd[1]: Started systemd-coredump@1772-35650-0.service - Process Core Dump (PID 35650/UID 0).
Dec 17 00:34:19 server systemd-coredump[35651]: Process 35646 (VBoxClient) of user 1001 dumped core.#012#012Module libXau.so.6 from rpm libXau-1.0.11-8.el10.x86_64#012
Module libxcb.so.1 from rpm libxcb-1.17.0-3.el10.x86_64#012Module libX11.so.6 from rpm libX11-1.8.10-1.el10.x86_64#012Module libffi.so.8 from rpm libffi-3.4.4-9.el10.x
86_64#012Module libwayland-client.so.0 from rpm wayland-1.23.0-2.el10.x86_64#012Stack trace of thread 35649:#012#0  0x000000000041db4b n/a (n/a + 0x0)#012#1  0x0000000
00041dac4 n/a (n/a + 0x0)#012#2  0x0000000000450a7c n/a (n/a + 0x0)#012#3  0x0000000000435890 n/a (n/a + 0x0)#012#4  0x00007fca27914b68 start_thread (libc.so.6 + 0x94b
68)#012#5  0x00007fca279856bc __clone3 (libc.so.6 + 0x1056bc)#012#012Stack trace of thread 35646:#012#0  0x00007fca279834bd syscall (libc.so.6 + 0x1034bd)#012#1  0x000
00000004347a2 n/a (n/a + 0x0)#012#2  0x00000000004506c6 n/a (n/a + 0x0)#012#3  0x0000000000405123 n/a (n/a + 0x0)#012#4  0x00007fca278aa30e __libc_start_call_main (lib
c.so.6 + 0x2a30e)#012#5  0x00007fca278aa3c9 __libc_start_main@@GLIBC_2.34 (libc.so.6 + 0x2a3c9)#012#6  0x00000000004044aa n/a (n/a + 0x0)#012ELF object binary architec
ture: AMD x86-64
Dec 17 00:34:19 server systemd[1]: systemd-coredump@1772-35650-0.service: Deactivated successfully.
Dec 17 00:34:24 server kernel: traps: VBoxClient[35660] trap int3 ip:41db4b sp:7fca19235cd0 error:0 in VBoxClient[1db4b,400000+bb000]
Dec 17 00:34:24 server systemd-coredump[35661]: Process 35657 (VBoxClient) of user 1001 terminated abnormally with signal 5/TRAP, processing...
Dec 17 00:34:24 server systemd[1]: Started systemd-coredump@1773-35661-0.service - Process Core Dump (PID 35661/UID 0).
Dec 17 00:34:24 server systemd-coredump[35662]: Process 35657 (VBoxClient) of user 1001 dumped core.#012#012Module libXau.so.6 from rpm libXau-1.0.11-8.el10.x86_64#012
Module libxcb.so.1 from rpm libxcb-1.17.0-3.el10.x86_64#012Module libX11.so.6 from rpm libX11-1.8.10-1.el10.x86_64#012Module libffi.so.8 from rpm libffi-3.4.4-9.el10.x
86_64#012Module libwayland-client.so.0 from rpm wayland-1.23.0-2.el10.x86_64#012Stack trace of thread 35660:#012#0  0x000000000041db4b n/a (n/a + 0x0)#012#1  0x0000000
00041dac4 n/a (n/a + 0x0)#012#2  0x0000000000450a7c n/a (n/a + 0x0)#012#3  0x0000000000435890 n/a (n/a + 0x0)#012#4  0x00007fca27914b68 start_thread (libc.so.6 + 0x94b
68)#012#5  0x00007fca279856bc __clone3 (libc.so.6 + 0x1056bc)#012#012Stack trace of thread 35657:#012#0  0x00007fca279834bd syscall (libc.so.6 + 0x1034bd)#012#1  0x000
00000004347a2 n/a (n/a + 0x0)#012#2  0x00000000004506c6 n/a (n/a + 0x0)#012#3  0x0000000000405123 n/a (n/a + 0x0)#012#4  0x00007fca278aa30e __libc_start_call_main (lib
c.so.6 + 0x2a30e)#012#5  0x00007fca278aa3c9 __libc_start_main@@GLIBC_2.34 (libc.so.6 + 0x2a3c9)#012#6  0x00000000004044aa n/a (n/a + 0x0)#012ELF object binary architec
ture: AMD x86-64
Dec 17 00:34:24 server systemd[1]: systemd-coredump@1773-35661-0.service: Deactivated successfully.
```

Рис. 13: Логи сервера

Запуск dhcp

```
[root@server.dmmosharov.net ~]# systemctl start kea-dhcp4.service
[root@server.dmmosharov.net ~]#
```

Рис. 14: Запуск dhcp

Сверка по логу

```
86_64#012Module libwayland-client.so.0 from rpm wayland-1.23.0-2.el10.x86_64#012Stack trace of thread 36103:#012#0  0x00000000004 1db4b n/a (n/a + 0x0)#012#1  0x0000000
00041dac4 n/a (n/a + 0x0)#012#2  0x0000000000450a7c n/a (n/a + 0x0)#012#3  0x0000000000435890 n/a (n/a + 0x0)#012#4  0x00007fca27914b68 start_thread (libc.so.6 + 0x94b
68)#012#5  0x00007fca279856bc __clone3 (libc.so.6 + 0x1056bc)#012#012Stack trace of thread 36100:#012#0  0x00007fca279834bd syscall (libc.so.6 + 0x1034bd)#012#1  0x000
00000004347a2 n/a (n/a + 0x0)#012#2  0x00000000004506c6 n/a (n/a + 0x0)#012#3  0x0000000000405123 n/a (n/a + 0x0)#012#4  0x00007fca278aa30e __libc_start_call_main (lib
c.so.6 + 0x2a30e)#012#5  0x00007fca278aa3c9 __libc_start_main@@GLIBC_2.34 (libc.so.6 + 0x2a3c9)#012#6  0x00000000004044aa n/a (n/a + 0x0)#012ELF object binary architec
ture: AMD x86-64
Dec 17 00:37:05 server systemd[1]: systemd-coredump@1804-36104-0.service: Deactivated successfully.
Dec 17 00:37:10 server kernel: traps: VBoxClient[36113] trap int3 ip:41db4b sp:7fca19235cd0 error:0 in VBoxClient[1db4b,400000+bb000]
Dec 17 00:37:10 server systemd-coredump[36114]: Process 36110 (VBoxClient) of user 1001 terminated abnormally with signal 5/TRAP, processing...
Dec 17 00:37:10 server systemd[1]: Started systemd-coredump@1805-36114-0.service - Process Core Dump (PID 36114/UID 0).
Dec 17 00:37:10 server systemd-coredump[36115]: Process 36110 (VBoxClient) of user 1001 dumped core.#012#012Module libXau.so.6 from rpm libXau-1.0.11-8.el10.x86_64#012
Module libxcb.so.1 from rpm libxcb-1.17.0-3.el10.x86_64#012Module libX11.so.6 from rpm libX11-1.8.10-1.el10.x86_64#012Module libffi.so.8 from rpm libffi-3.4.4-9.el10.x
86_64#012Module libwayland-client.so.0 from rpm wayland-1.23.0-2.el10.x86_64#012Stack trace of thread 36113:#012#0  0x00000000004 1db4b n/a (n/a + 0x0)#012#1  0x0000000
00041dac4 n/a (n/a + 0x0)#012#2  0x0000000000450a7c n/a (n/a + 0x0)#012#3  0x0000000000435890 n/a (n/a + 0x0)#012#4  0x00007fca27914b68 start_thread (libc.so.6 + 0x94b
68)#012#5  0x00007fca279856bc __clone3 (libc.so.6 + 0x1056bc)#012#012Stack trace of thread 36110:#012#0  0x00007fca279834bd syscall (libc.so.6 + 0x1034bd)#012#1  0x000
00000004347a2 n/a (n/a + 0x0)#012#2  0x00000000004506c6 n/a (n/a + 0x0)#012#3  0x0000000000405123 n/a (n/a + 0x0)#012#4  0x00007fca278aa30e __libc_start_call_main (lib
c.so.6 + 0x2a30e)#012#5  0x00007fca278aa3c9 __libc_start_main@@GLIBC_2.34 (libc.so.6 + 0x2a3c9)#012#6  0x00000000004044aa n/a (n/a + 0x0)#012ELF object binary architec
ture: AMD x86-64
Dec 17 00:37:10 server systemd[1]: systemd-coredump@1805-36114-0.service: Deactivated successfully.
```

Рис. 15: Сверка по логу

Скрипт для клиента

$ 01-routing.sh ×

C: > work_asp > dmmosharov > vagrant > provision > client > $ 01-routing.sh

```
#!/bin/bash

echo "Provisioning script $0"

nmcli connection modify "System eth1" ipv4.gateway "192.168.1.1"
nmcli connection up "System 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. 16: Скрипт для клиента

Vagrantfile

```
110     client.vm.provision "client dummy",
111                         type: "shell",
112                         preserve_order: true,
113                         path: "provision/client/01-dummy.sh"
114
115     client.vm.provision "client routing",
116                         type: "shell",
117                         preserve_order: true,
118                         run: "always",
119                         path: "provision/client/01-routing.sh"
```

Рис. 17: Vagrantfile

Запуск клиента

```
C:\work_asp\dmmosharov\vagrant>vagrant up client --provision
Bringing machine 'client' up with 'virtualbox' provider...
==> client: Clearing any previously set forwarded ports...
==> client: Fixed port collision for 22 => 2222. Now on port 2200.
==> client: Clearing any previously set network interfaces...
==> client: Preparing network interfaces based on configuration...
    client: Adapter 1: nat
    client: Adapter 2: intnet
==> client: Forwarding ports...
    client: 22 (guest) => 2200 (host) (adapter 1)
==> client: Running 'pre-boot' VM customizations...
==> client: Booting VM...
```

Рис. 18: Запуск клиента

ifconfig

```
eth1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.1.30  netmask 255.255.255.0  broadcast 192.168.1.255
        inet6 fe80::527:9849:94c7:d79e  prefixlen 64  scopeid 0x20<link>
        ether 08:00:27:9a:3e:01  txqueuelen 1000  (Ethernet)
        RX packets 328  bytes 42793 (41.7 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 889  bytes 72631 (70.9 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Рис. 19: ifconfig

Таблица с назначениями

```
  GNU nano 8.1                                                    /var/lib/kea/kea-leases4.csv
address,hwaddr,client_id,valid_lifetime,expire,subnet_id,fqdn_fwd,fqdn_rev,hostname,state,user_context,pool_id
192.168.1.30,08:00:27:9a:3e:01,01:08:00:27:9a:3e:01,3600,1765938337,1,0,0,client,0,,0
```

Рис. 20: Таблица с назначениями

Ключ sha512

```
[root@server.dmmosharov.net ~]# mkdir -p /etc/named/keys
[root@server.dmmosharov.net ~]# tsig-keygen -a HMAC-SHA512 DHCP_UPDATER > /
etc/named/keys/dhcp_updater.key
[root@server.dmmosharov.net ~]# cat etc/named/keys/dhcp_updater.key
cat: etc/named/keys/dhcp_updater.key: No such file or directory
[root@server.dmmosharov.net ~]# cat /etc/named/keys/dhcp_updater.key
key "DHCP_UPDATER" {
        algorithm hmac-sha512;
        secret "xPISaBX6DeMwhr3jRrdGArdhLCwYynXXvyV8pAud8svkz55ld+h5eNrzQZq
pmwZEvyV3shfty2rK6AuYNQDUoA==";
};
[root@server.dmmosharov.net ~]#
```

Рис. 21: Ключ sha512

Добавление ключа

```
  GNU nano 8.1                  /etc/named.conf                   Modified
        */
        recursion yes;

        dnssec-validation no;

        managed-keys-directory "/var/named/dynamic";
        geoip-directory "/usr/share/GeoIP";

        pid-file "/run/named/named.pid";
        session-keyfile "/run/named/session.key";

        /* https://fedoraproject.org/wiki/Changes/CryptoPolicy */
        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/dmmosharov.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. 22: Добавление ключа

Обновление файла

```
  GNU nano 8.1                /etc/named/dmmosharov.net
//
// Provided by Red Hat caching-nameserver package
//
// ISC BIND named zone configuration for zones recommended by
// RFC 1912 section 4.1 : localhost TLDs and address zones
// and https://tools.ietf.org/html/rfc6303
// (c)2007 R W Franks
//
// See /usr/share/doc/bind*/sample/ for example named configuration files.
//
// Note: empty-zones-enable yes; option is default.
// If private ranges should be forwarded, add
// disable-empty-zone "."; into options
//


zone "dmmosharov.net" IN {
        type master;
        file "master/fz/user.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.arpa PTR DHCID;
        };
};
                              [ Wrote 31 lines ]
^G Help      ^O Write Out   ^F Where Is    ^K Cut       ^T Execute
^X Exit      ^R Read File   ^\ Replace     ^U Paste     ^J Justify
```

Рис. 23: Обновление файла

Применение изменений

```
[root@server.dmmosharov.net ~]# nano /etc/named/dmmosharov.net
[root@server.dmmosharov.net ~]# named-checkconf
[root@server.dmmosharov.net ~]# systemctl restart named
[root@server.dmmosharov.net ~]# touch /etc/kea/tsig-keys.json
[root@server.dmmosharov.net ~]#
```

Рис. 24: Применение изменений

Порядок монтирования

root@server:~ — sudo -i

dmmosharov@server:~ — sudo tail -f /var/log/messages

```
  GNU nano 8.1                    /etc/kea/tsig-keys.json                    Modified
"tsig-keys": [
{
"name": "DHCP_UPDATER"
"algorithm": "hmac-sha512",
"secret": "xPISaBX6DeMwhr3jRrdGArdhLCwYynXXvyV8pAud8svkz55ld+h5eNrzQZqpmwZEvyV3shfty2rK6AuYNQ>
}
],
```

Рис. 25: Порядок монтирования

Смена прав файла

```
[root@server.dmmosharov.net ~]# chown kea:kea /etc/kea/tsig-keys.json
[root@server.dmmosharov.net ~]# chmod 640 /etc/kea/tsig-keys.json
```

Рис. 26: Смена прав файла

Изменение конфигурации

```
  GNU nano 8.1              /etc/kea/kea-dhcp-ddns.conf
{

"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": "dmmosharov.net."
                "key-name": "DHCP_UPDATER",
                "dns-servers": [
                        { "ip-address": 192.168.1.1" }
                ]
                }
        ]
},
"reverse-ddns" : {
        "ddns-domains" : [
        {
                "name": "1.168.192.in-addr.arpa.",
                "key-name": "DHCP_UPDATER",
                "dns-servers": [
                        { "ip-address": "192.168.1.1" }
                        ]
                }
                                [ Read 57 lines ]
^G Help      ^O Write Out   ^W Where Is    ^K Cut       ^T Execute
^X Exit      ^R Read File   ^\ Replace     ^U Paste     ^J Justify
```

Рис. 27: Изменение конфигурации

Перезапуск ddns

```
ied: '/var/run/kea', supported path is '/run/kea'
Dec 17 20:22:33 server.dmmosharov.net systemd[1]: kea-dhcp-ddns.service: Main
process exited, code=exited, status=1/FAILURE
Dec 17 20:22:33 server.dmmosharov.net systemd[1]: kea-dhcp-ddns.service: Faile
d with result 'exit-code'.
[root@server.dmmosharov.net ~]# sed -i 's|"/var/run/kea/|"/run/kea/|g' /etc/ke
a/kea-dhcp-ddns.conf
[root@server.dmmosharov.net ~]# grep socket-name /etc/kea/kea-dhcp-ddns.conf
            "socket-name": "/run/kea/kea-ddns-ctrl-socket"
[root@server.dmmosharov.net ~]# systemctl restart kea-dhcp-ddns
systemctl status kea-dhcp-ddns
● kea-dhcp-ddns.service - Kea DHCP-DDNS Server
     Loaded: loaded (/usr/lib/systemd/system/kea-dhcp-ddns.service; enabled; >
     Active: active (running) since Wed 2025-12-17 20:25:02 UTC; 16ms ago
 Invocation: 8056c7f0d42e447988f9f909f74e3962
       Docs: man:kea-dhcp-ddns(8)
   Main PID: 35308 ((hcp-ddns))
      Tasks: 1 (limit: 22834)
     Memory: 1.7M (peak: 1.7M)
        CPU: 4ms
     CGroup: /system.slice/kea-dhcp-ddns.service
             └─35308 "(hcp-ddns)"

Dec 17 20:25:02 server.dmmosharov.net systemd[1]: Started kea-dhcp-ddns.servi>
lines 1-13/13 (END)
```

Рис. 28: Перезапуск ddns

Добавление информации о ddns

```
    "renew-timer": 900,
    "rebind-timer": 1800,
    "valid-lifetime": 3600,
"dhcp-ddns": {
        "enable-updates": true
        },
"ddns-qualifying-suffix": "dmmosharov.net",
"ddns-override-client-update": true,
    "option-data": [
      {
        "name": "domain-name-servers",
        "data": "192.168.1.1"
      },
```

Рис. 29: Добавление информации о ddns

Перезапуск службы с приминением изменений

```
ns lookup is always performed first.
2025-12-17 20:29:19.996 INFO  [kea-dhcp4.dhcpsrv/35874.139723378295936] DHCPSR
V_CFGMGR_NEW_SUBNET4 a new subnet has been added to configuration: 192.168.1.0
/24 with params: t1=900, t2=1800, valid-lifetime=3600
2025-12-17 20:29:19.996 INFO  [kea-dhcp4.dhcpsrv/35874.139723378295936] DHCPSR
V_CFGMGR_SOCKET_TYPE_SELECT using socket type raw
2025-12-17 20:29:19.996 INFO  [kea-dhcp4.dhcpsrv/35874.139723378295936] DHCPSR
V_CFGMGR_ADD_IFACE listening on interface eth1
2025-12-17 20:29:19.996 INFO  [kea-dhcp4.dhcpsrv/35874.139723378295936] DHCPSR
V_CFGMGR_SOCKET_TYPE_DEFAULT "dhcp-socket-type" not specified , using default
socket type raw
2025-12-17 20:29:19.996 INFO  [kea-dhcp4.dhcpsrv/35874.139723378295936] DHCPSR
V_LEASE_MGR_BACKENDS_REGISTERED the following lease backend types are availabl
e: memfile
2025-12-17 20:29:19.996 INFO  [kea-dhcp4.hosts/35874.139723378295936] HOSTS_BA
CKENDS_REGISTERED the following host backend types are available:
2025-12-17 20:29:19.996 INFO  [kea-dhcp4.dhcpsrv/35874.139723378295936] DHCPSR
V_FORENSIC_BACKENDS_REGISTERED the following forensic backend types are availa
ble:
2025-12-17 20:29:19.996 INFO  [kea-dhcp4.database/35874.139723378295936] CONFI
G_BACKENDS_REGISTERED the following config backend types are available:
[root@server.dmmosharov.net ~]# systemctl restart kea-dhcp4.service
[root@server.dmmosharov.net ~]# systemctl status kea-dhcp4.service
● kea-dhcp4.service - Kea DHCPv4 Server
     Loaded: loaded (/usr/lib/systemd/system/kea-dhcp4.service; enabled; pres
     Active: active (running) since Wed 2025-12-17 20:29:31 UTC; 8s ago
 Invocation: ef17d150e87f47408a7a7ad1327e0d06
       Docs: man:kea-dhcp4(8)
   Main PID: 35912 (kea-dhcp4)
     Status: "Dispatching packets..."
      Tasks: 9 (limit: 22834)
     Memory: 2.5M (peak: 6.1M)
        CPU: 28ms
     CGroup: /system.slice/kea-dhcp4.service
             └─35912 /usr/sbin/kea-dhcp4 -c /etc/kea/kea-dhcp4.conf
```

Рис. 30: Перезапуск службы с приминением изменений

Обновление данных

```
[dmmosharov@client.dmmosharov.net ~]$ nmcli connection down eth1
Connection 'eth1' successfully deactivated (D-Bus active path: /org/freedeskt
op/NetworkManager/ActiveConnection/4)
[dmmosharov@client.dmmosharov.net ~]$ nmcli connection up eth1
Connection successfully activated (D-Bus active path: /org/freedesktop/Networ
kManager/ActiveConnection/6)
[dmmosharov@client.dmmosharov.net ~]$
```

Рис. 31: Обновление данных

dig

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

; <<>> DiG 9.18.33 <<>> @192.168.1.1 client.dmmosharov.net
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 59287
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 6cdae30253f866d1010000006943133846cffe0da90db136 (good)
;; QUESTION SECTION:
;client.dmmosharov.net.         IN      A

;; ANSWER SECTION:
client.dmmosharov.net.  1200    IN      A       192.168.1.30

;; Query time: 1 msec
;; SERVER: 192.168.1.1#53(192.168.1.1) (UDP)
;; WHEN: Wed Dec 17 20:31:48 UTC 2025
;; MSG SIZE  rcvd: 94

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

Рис. 32: dig

Перенос конфигурации

```
[root@server.dmmosharov.net ~]# cd /vagrant/provision/server
[root@server.dmmosharov.net server]# mkdir -p /vagrant/provision/server/dhcp/e
tc/kea
[root@server.dmmosharov.net server]# cp -R /etc/kea/* /vagrant/provision/serve
r/dhcp/etc/kea/
[root@server.dmmosharov.net server]# cd /vagrant/provision/server/dns/
[root@server.dmmosharov.net dns]# cp -R /var/named/* /vagrant/provision/server
/dns/var/named/
cp: overwrite '/vagrant/provision/server/dns/var/named/master/fz/dmmosharov.ne
t'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/master/rz/192.168.1'? y
[root@server.dmmosharov.net dns]# cp -R /etc/named/* /vagrant/provision/server
/dns/etc/named/
cp: overwrite '/vagrant/provision/server/dns/etc/named/dmmosharov.net'? y
[root@server.dmmosharov.net dns]# cd /vagrant/provision/server
[root@server.dmmosharov.net server]# touch dhcp.sh
[root@server.dmmosharov.net server]# chmod +x dhcp.sh
[root@server.dmmosharov.net server]#
```

Рис. 33: Перенос конфигурации

Скрипт vagrant

```
GNU nano 8.1                    dhcp.sh
#!/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. 34: Скрипт vagrant

Vagrantfile

```
81
82      server.vm.provision "server dns",
83                          type: "shell",
84                          preserve_order: true,
85                          path: "provision/server/dns.sh"
86
87      server.vm.provision "server dhcp",
88                          type: "shell",
89                          preserve_order: true,
90                          path: "provision/server/dhcp.sh"
91    end
92
93
```

Рис. 35: Vagtantfile

Выводы

в результате выполнения работы были получены навыки настройки dhcp