

Лабораторная работа №3

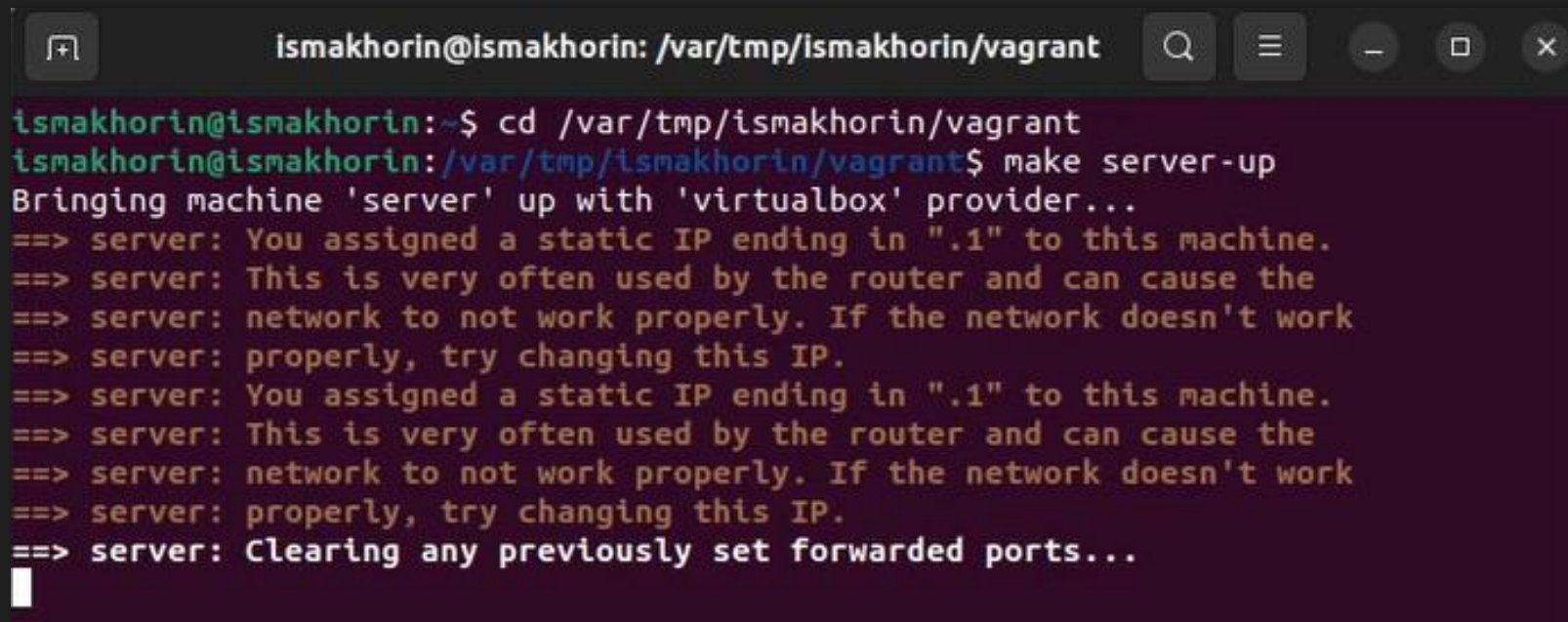
Настройка DHCP-сервера

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НПИБД-02-21

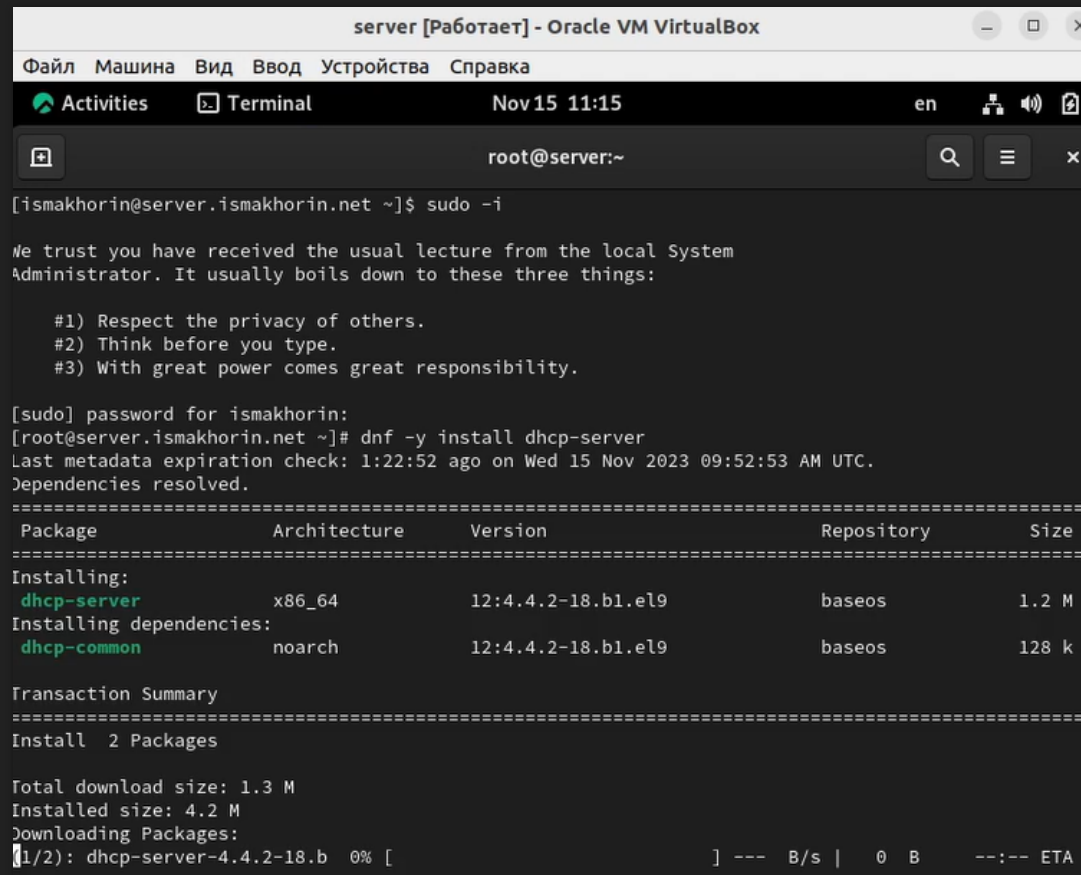
Установка DHCP-сервера



```
ismakhorin@ismakhorin: /var/tmp/ismakhorin/vagrant
ismakhorin@ismakhorin:~$ cd /var/tmp/ismakhorin/vagrant
ismakhorin@ismakhorin:/var/tmp/ismakhorin/vagrant$ make server-up
Bringing machine 'server' up with 'virtualbox' provider...
==> server: You assigned a static IP ending in ".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" 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: Clearing any previously set forwarded ports...
```

Рис. 1.1. Открытие рабочего каталога с проектом и запуск виртуальной машины server.

Установка DHCP-сервера



```
server [Работает] - Oracle VM VirtualBox
Файл  Машина  Вид  Ввод  Устройства  Справка
Activities  Terminal  Nov 15 11:15  en  [Icons]
root@server:~

[ismakhorin@server.ismakhorin.net ~]$ sudo -i

We trust you have received the usual lecture from the local System
Administrator. It usually boils down to these three things:

#1) Respect the privacy of others.
#2) Think before you type.
#3) With great power comes great responsibility.

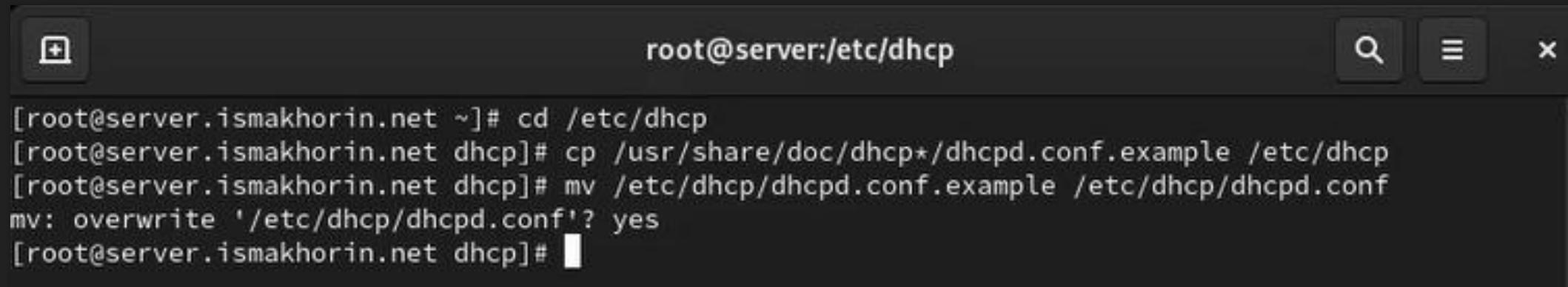
[sudo] password for ismakhorin:
[root@server.ismakhorin.net ~]# dnf -y install dhcp-server
Last metadata expiration check: 1:22:52 ago on Wed 15 Nov 2023 09:52:53 AM UTC.
Dependencies resolved.
=====
Package                Architecture      Version           Repository        Size
=====
Installing:
dhcp-server             x86_64            12:4.4.2-18.el9   baseos            1.2 M
Installing dependencies:
dhcp-common             noarch            12:4.4.2-18.el9   baseos            128 k

Transaction Summary
=====
Install 2 Packages

Total download size: 1.3 M
Installed size: 4.2 M
Downloading Packages:
[1/2]: dhcp-server-4.4.2-18.b  0% [          ] --- B/s | 0 B  --:-- ETA
```

Рис. 1.2. Переход в режим суперпользователя и установка dhcp.

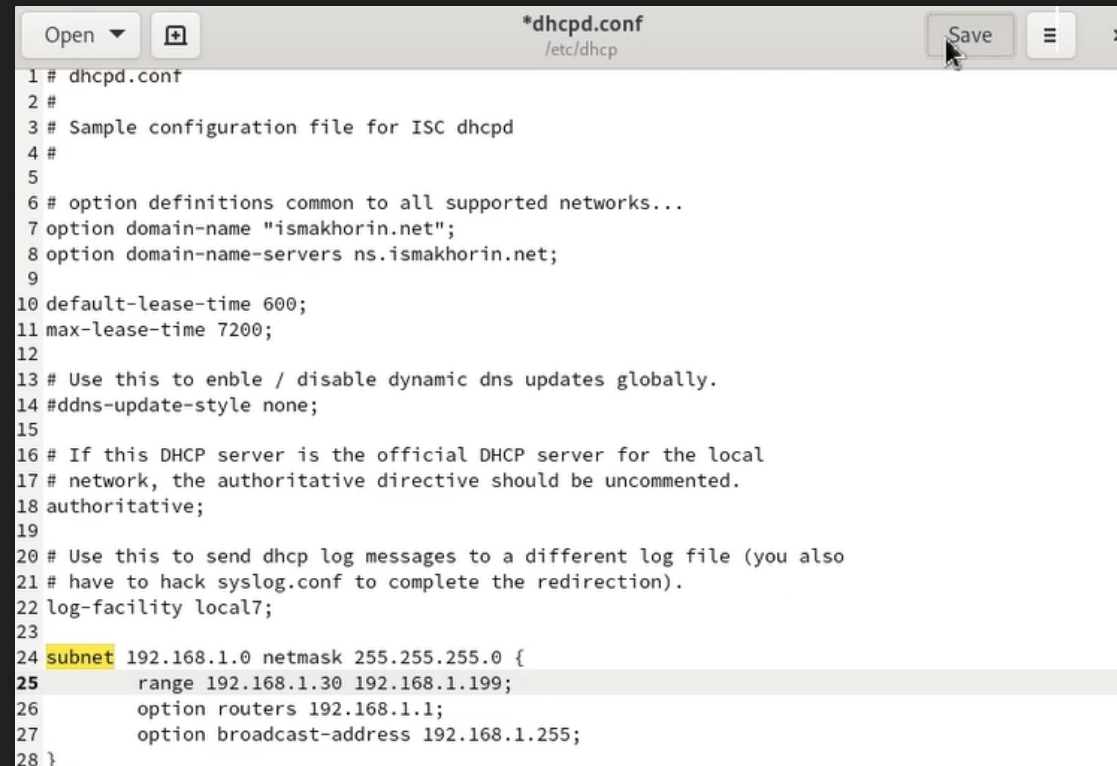
Конфигурирование DHCP-сервера

A terminal window with a dark background and light text. The title bar at the top reads 'root@server:/etc/dhcp'. On the left is a window icon with a plus sign. On the right are search, menu, and close icons. The terminal content shows a series of commands: 'cd /etc/dhcp', 'cp /usr/share/doc/dhcp*/dhcpd.conf.example /etc/dhcp', and 'mv /etc/dhcp/dhcpd.conf.example /etc/dhcp/dhcpd.conf'. The last command prompts for confirmation to overwrite the file, and 'yes' is entered. The prompt returns to the root user in the /etc/dhcp directory.

```
root@server:/etc/dhcp  
[root@server.ismakhorin.net ~]# cd /etc/dhcp  
[root@server.ismakhorin.net dhcp]# cp /usr/share/doc/dhcp*/dhcpd.conf.example /etc/dhcp  
[root@server.ismakhorin.net dhcp]# mv /etc/dhcp/dhcpd.conf.example /etc/dhcp/dhcpd.conf  
mv: overwrite '/etc/dhcp/dhcpd.conf'? yes  
[root@server.ismakhorin.net dhcp]#
```

Рис. 2.1. Копирование файла примера конфигурации DHCP и изменение его названия.

Конфигурирование DHCP-сервера



```
1 # dhcpd.conf
2 #
3 # Sample configuration file for ISC dhcpd
4 #
5
6 # option definitions common to all supported networks...
7 option domain-name "ismakhorin.net";
8 option domain-name-servers ns.ismakhorin.net;
9
10 default-lease-time 600;
11 max-lease-time 7200;
12
13 # Use this to enable / disable dynamic dns updates globally.
14 #ddns-update-style none;
15
16 # If this DHCP server is the official DHCP server for the local
17 # network, the authoritative directive should be uncommented.
18 authoritative;
19
20 # Use this to send dhcp log messages to a different log file (you also
21 # have to hack syslog.conf to complete the redirection).
22 log-facility local7;
23
24 subnet 192.168.1.0 netmask 255.255.255.0 {
25     range 192.168.1.30 192.168.1.199;
26     option routers 192.168.1.1;
27     option broadcast-address 192.168.1.255;
28 }
```

Рис. 2.2. Открытие файла `/etc/dhcp/dhcpd.conf` на редактирование. Замена строки `option domain-name` и `option domain-name-servers`, снятие комментария со строки `authoritative`, создание собственной конфигурации dhcp-сети.

Конфигурирование DHCP-сервера

```
[root@server.ismakhorin.net dhcp]# cp /lib/systemd/system/dhcpd.service /etc/systemd/system  
[root@server.ismakhorin.net dhcp]#
```

Рис. 2.3. Настройка привязки dhcpd к интерфейсу eth1 виртуальной машины server.

Конфигурирование DHCP-сервера



The image shows a text editor window titled '*dhcpcd.service' with the path '/etc/systemd/system' below it. The window has 'Open', 'Save', and a close button. The content is a systemd service unit file for dhcpcd. The text is as follows:

```
1 [Unit]
2 Description=DHCPv4 Server Daemon
3 Documentation=man:dhcpcd(8) man:dhcpcd.conf(5)
4 Wants=network-online.target
5 After=network-online.target
6 After=time-sync.target
7
8 [Service]
9 Type=notify
10 EnvironmentFile=/etc/sysconfig/dhcpd
11 ExecStart=/usr/sbin/dhcpd -f -cf /etc/dhcp/dhcpd.conf -user dhcpd -group dhcpd --no-pid eth1
   $DHCPDARGS
12 StandardError=null
13
14 [Install]
15 WantedBy=multi-user.target
```

Рис. 2.4. Открытие файла `/etc/systemd/system/dhcpd.service` на редактирование и замена в нём строки.

Конфигурирование DHCP-сервера

```
[root@server.ismakhorin.net dhcp]# systemctl --system daemon-reload
[root@server.ismakhorin.net dhcp]# systemctl enable dhcpd
Created symlink /etc/systemd/system/multi-user.target.wants/dhcpd.service → /etc/systemd/system/dhcpd.service.
[root@server.ismakhorin.net dhcp]# █
```

Рис. 2.5. Перезагрузка конфигурации dhcpd и разрешение загрузки DHCP-сервера при запуске виртуальной машины server.

Конфигурирование DHCP-сервера



```
1 $TTL 1D
2 @      IN SOA  @ server.ismakhorin.net. (
3                               2020110500      ; serial
4                               1D              ; refresh
5                               1H              ; retry
6                               1W              ; expire
7                               3H )            ; minimum
8      NS   @
9      A    192.168.1.1
10 $ORIGIN ismakhorin.net.
11 server A   192.168.1.1
12 ns     A   192.168.1.1
13 dhcp   A   192.168.1.1
```

Рис. 2.6. Добавление записи для DHCP-сервера в конце файла прямой DNS-зоны /var/named/master/fz/ismakhorin.net.

Конфигурирование DNS-сервера



```
*192.168.1
/var/named/master/rz

1 $TTL 1D
2 @      IN SOA  @ server.ismakhorin.net. (
3                               2020110500      ; serial
4                               1D              ; refresh
5                               1H              ; retry
6                               1W              ; expire
7                               3H )            ; minimum
8      NS   @
9      A    192.168.1.1
10 $ORIGIN 1.168.192.in-addr.arpa.
11 1       PTR    server.ismakhorin.net.
12 1       PTR    ns.ismakhorin.net.
13 1       PTR    dhcp.ismakhorin.net.
```

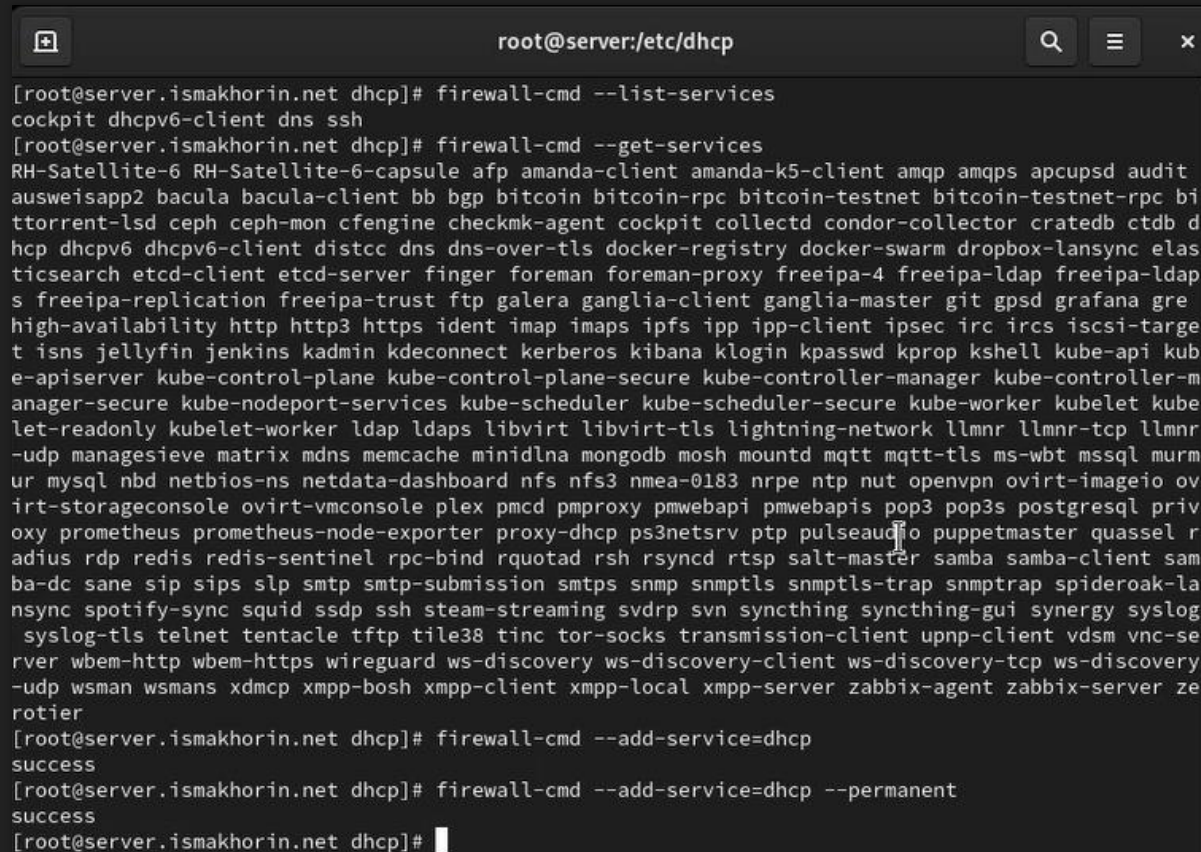
Рис. 2.7. Добавление записи для DHCP-сервера в конце файла обратной DNS-зоны /var/named/master/rz/192.168.1.

Конфигурирование DHCP-сервера

```
[root@server.ismakhorin.net dhcp]# systemctl restart named
[root@server.ismakhorin.net dhcp]# ping dhcp.ismakhorin.net
PING dhcp.ismakhorin.net (192.168.1.1) 56(84) bytes of data.
64 bytes from dhcp.ismakhorin.net (192.168.1.1): icmp_seq=1 ttl=64 time=0.061 ms
64 bytes from dhcp.ismakhorin.net (192.168.1.1): icmp_seq=2 ttl=64 time=0.076 ms
64 bytes from dhcp.ismakhorin.net (192.168.1.1): icmp_seq=3 ttl=64 time=0.075 ms
64 bytes from server.ismakhorin.net (192.168.1.1): icmp_seq=4 ttl=64 time=0.095 ms
64 bytes from ns.ismakhorin.net (192.168.1.1): icmp_seq=5 ttl=64 time=0.090 ms
64 bytes from dhcp.ismakhorin.net (192.168.1.1): icmp_seq=6 ttl=64 time=0.093 ms
64 bytes from dhcp.ismakhorin.net (192.168.1.1): icmp_seq=7 ttl=64 time=0.129 ms
64 bytes from server.ismakhorin.net (192.168.1.1): icmp_seq=8 ttl=64 time=0.088 ms
^C
--- dhcp.ismakhorin.net ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7163ms
rtt min/avg/max/mdev = 0.061/0.088/0.129/0.018 ms
[root@server.ismakhorin.net dhcp]#
```

Рис. 2.8. Перезапуск named и выполнение проверки, что можно обратиться к DHCP-серверу по имени.

Конфигурирование DHCP-сервера



```
root@server:/etc/dhcp
[root@server.ismakhorin.net dhcp]# firewall-cmd --list-services
cockpit dhcpv6-client dns ssh
[root@server.ismakhorin.net dhcp]# firewall-cmd --get-services
RH-Satellite-6 RH-Satellite-6-capsule afp amanda-client amanda-k5-client amqp amqps apcupsd audit
ausweisapp2 bacula bacula-client bb bgp bitcoin bitcoin-rpc bitcoin-testnet bitcoin-testnet-rpc bi
ttorrent-bsd ceph ceph-mon cfengine checkmk-agent cockpit collectd condor-collector cratedb ctdb d
hcp dhcpv6 dhcpv6-client distcc dns dns-over-tls docker-registry docker-swarm dropbox-lansync elas
ticsearch etcd-client etcd-server finger foreman foreman-proxy freeipa-4 freeipa-ldap freeipa-ldap
s freeipa-replication freeipa-trust ftp galera ganglia-client ganglia-master git gpsd grafana gre
high-availability http http3 https ident imap imaps ipfs ipp ipp-client ipsec irc ircs iscsi-targe
t isns jellyfin jenkins kadmin kdeconnect kerberos kibana klogin kpasswd kprop kshell kube-api kub
e-apiserver kube-control-plane kube-control-plane-secure kube-controller-manager kube-controller-m
anager-secure kube-nodeport-services kube-scheduler kube-scheduler-secure kube-worker kubelet kube
let-readonly kubelet-worker ldap ldaps libvirt libvirt-tls lightning-network llmnr llmnr-tcp llmnr
-udp managesieve matrix mdns memcache minidlna mongodb mosh mountd mqtt mqtt-tls ms-wbt mssql murm
ur mysql nbd netbios-ns netdata-dashboard nfs nfs3 nmap-0183 nrpe ntp nut openvpn ovirt-imageio ov
irt-storageconsole ovirt-vmconsole plex pmcd pmproxy pmwebapi pmwebapis pop3 pop3s postgresql priv
oxy prometheus prometheus-node-exporter proxy-dhcp ps3netsrv ptp pulseaudio puppetmaster quassel r
adius rdp redis redis-sentinel rpc-bind rquotad rsh rsyncd rtsp salt-master samba samba-client sam
ba-dc sane sip sips slp smtp smtp-submission smtps snmp snmptls snmptls-trap snmptrap spideroak-la
nsync spotify-sync squid ssdp ssh steam-streaming svdrp svn syncthing syncthing-gui synergy syslog
syslog-tls telnet tentacle tftp tile38 tinc tor-socks transmission-client upnp-client vds vnc-se
rver wbem-http wbem-https wireguard ws-discovery ws-discovery-client ws-discovery-tcp ws-discovery
-udp wsman wsmans xdmcp xmpp-bosh xmpp-client xmpp-local xmpp-server zabbix-agent zabbix-server ze
rotier
[root@server.ismakhorin.net dhcp]# firewall-cmd --add-service=dhcp
success
[root@server.ismakhorin.net dhcp]# firewall-cmd --add-service=dhcp --permanent
success
[root@server.ismakhorin.net dhcp]#
```

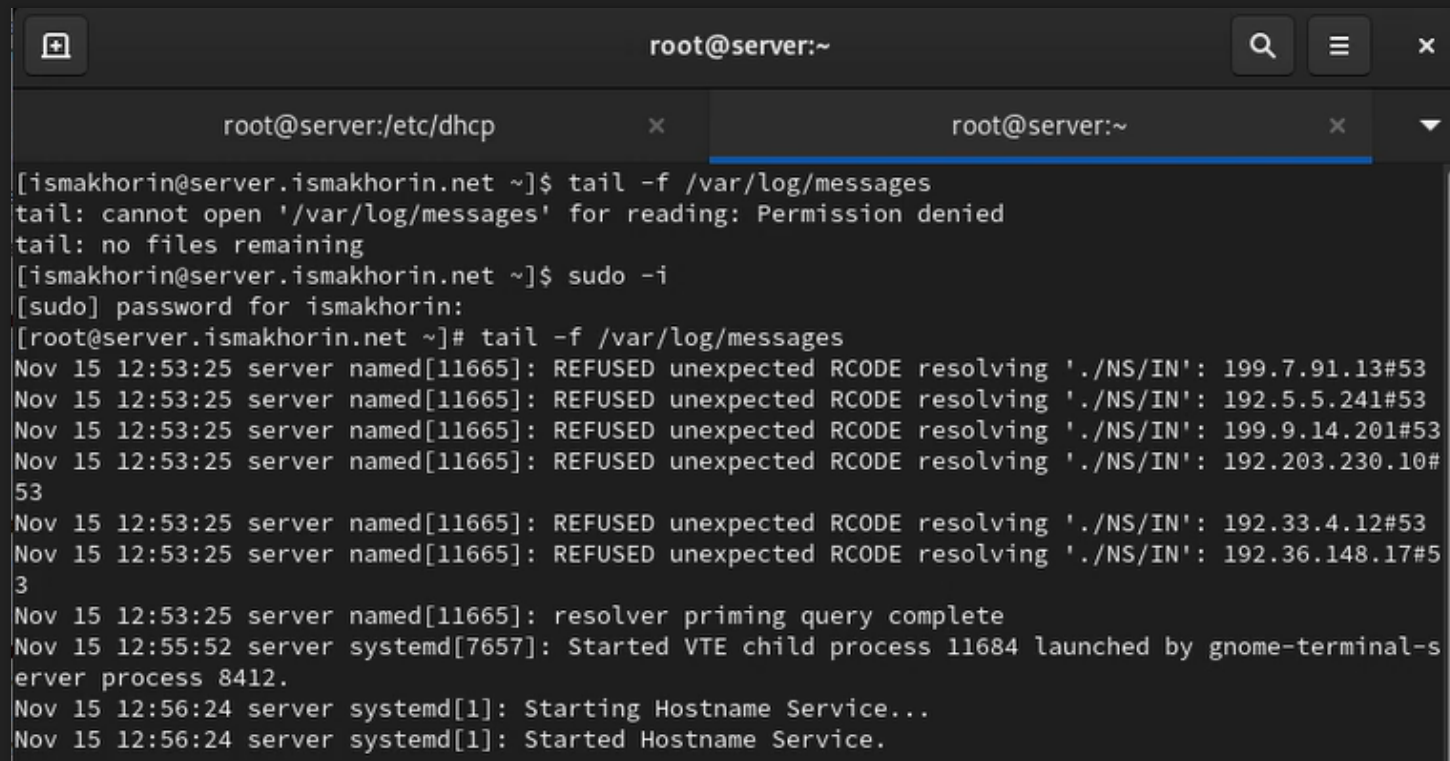
Рис. 2.9. Внесение изменений в настройки межсетевого экрана узла server, разрешив работу с DHCP.

Конфигурирование DHCP-сервера

```
[root@server.ismakhorin.net dhcp]# restorecon -vR /etc
Relabeled /etc/named.conf from unconfined_u:object_r:etc_t:s0 to unconfined_u:object_r:named_conf_t:s0
[root@server.ismakhorin.net dhcp]# restorecon -vR /var/named
[root@server.ismakhorin.net dhcp]# restorecon -vR /etc/named
[root@server.ismakhorin.net dhcp]# restorecon -vR /var/lib/dhcpd/
[root@server.ismakhorin.net dhcp]#
```

Рис. 2.10. Восстановление контекста безопасности в SELinux.

Конфигурирование DHCP-сервера



```
root@server:~  
[ismakhorin@server.ismakhorin.net ~]$ tail -f /var/log/messages  
tail: cannot open '/var/log/messages' for reading: Permission denied  
tail: no files remaining  
[ismakhorin@server.ismakhorin.net ~]$ sudo -i  
[sudo] password for ismakhorin:  
[root@server.ismakhorin.net ~]# tail -f /var/log/messages  
Nov 15 12:53:25 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 199.7.91.13#53  
Nov 15 12:53:25 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 192.5.5.241#53  
Nov 15 12:53:25 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 199.9.14.201#53  
Nov 15 12:53:25 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 192.203.230.10#53  
Nov 15 12:53:25 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 192.33.4.12#53  
Nov 15 12:53:25 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 192.36.148.17#53  
Nov 15 12:53:25 server named[11665]: resolver priming query complete  
Nov 15 12:55:52 server systemd[7657]: Started VTE child process 11684 launched by gnome-terminal-server process 8412.  
Nov 15 12:56:24 server systemd[1]: Starting Hostname Service...  
Nov 15 12:56:24 server systemd[1]: Started Hostname Service.
```

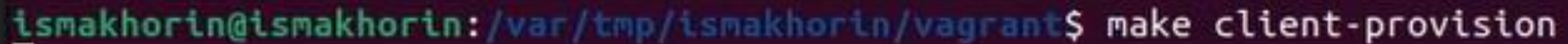
Рис. 2.11. Запуск в дополнительном терминале мониторинга происходящих в системе процессов в реальном времени.

Конфигурирование DHCP-сервера

```
[root@server.ismakhorin.net dhcp]# systemctl start dhcpd  
[root@server.ismakhorin.net dhcp]#
```

Рис. 2.12. Запуск в основном рабочем терминале DHCP-сервера.

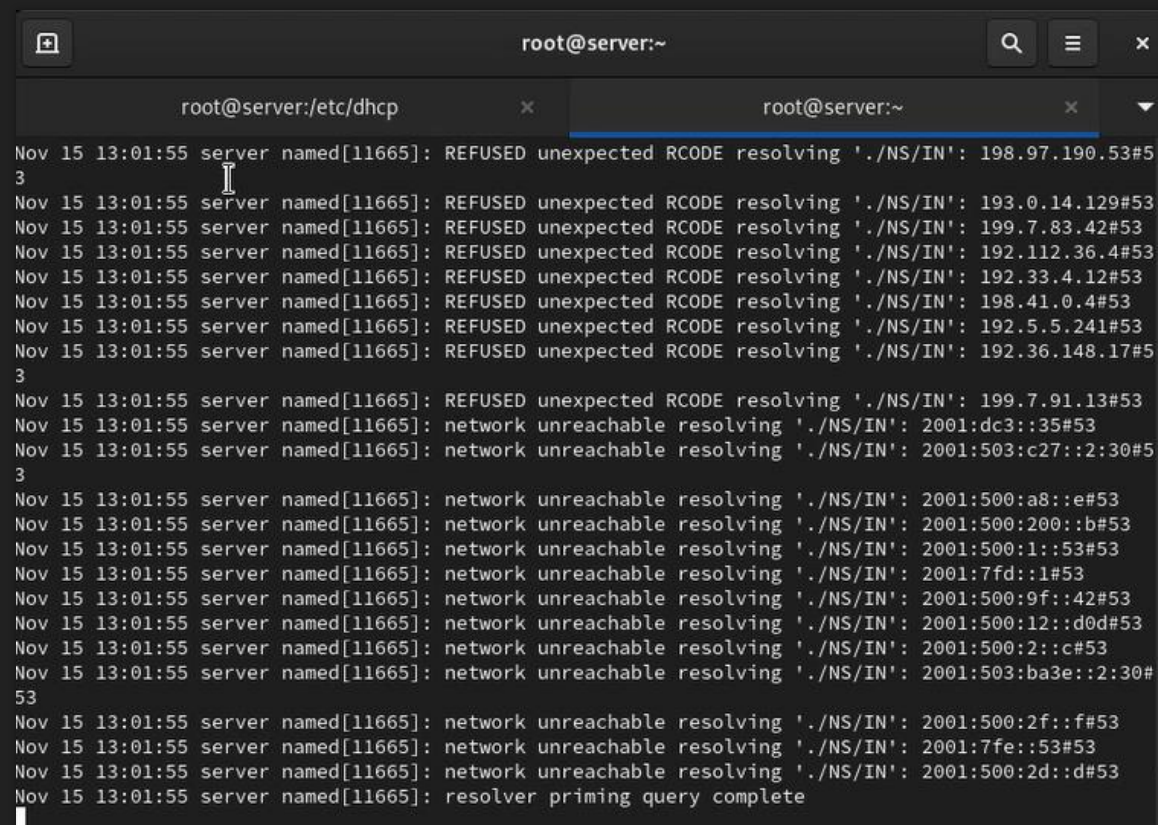
Анализ работы DHCP-сервера

A terminal window with a dark purple background. The prompt is 'ismakhorin@ismakhorin:/var/tmp/ismakhorin/vagrant\$'. The command 'make client-provision' has been entered and is followed by a white cursor. The text is in a monospaced font with syntax highlighting: 'ismakhorin@ismakhorin' is green, '/var/tmp/ismakhorin/vagrant\$' is blue, and 'make client-provision' is white.

```
ismakhorin@ismakhorin:/var/tmp/ismakhorin/vagrant$ make client-provision
```

Рис. 3.1. Фиксация внесённых изменений для внутренних настроек виртуальной машины client и её запуск.

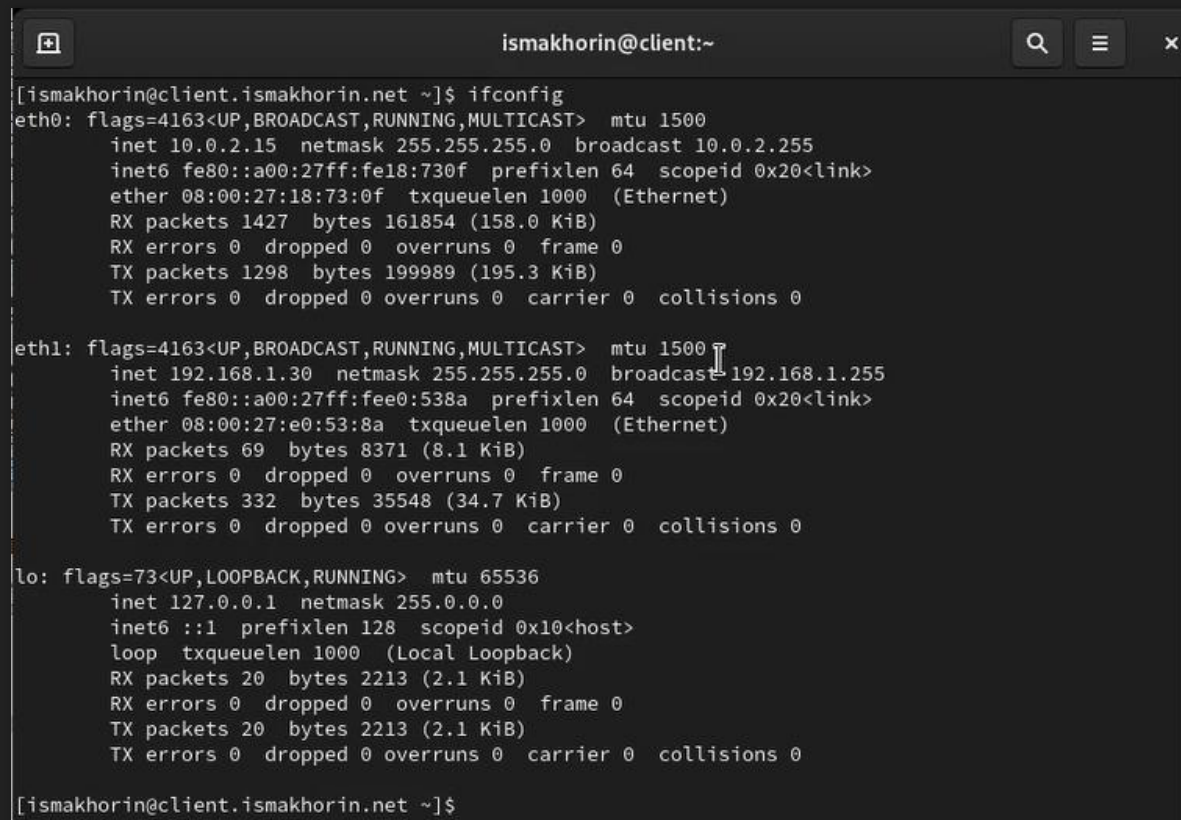
Анализ работы DHCP-сервера



```
root@server:~  
root@server:/etc/dhcp  
Nov 15 13:01:55 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 198.97.190.53#53  
Nov 15 13:01:55 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 193.0.14.129#53  
Nov 15 13:01:55 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 199.7.83.42#53  
Nov 15 13:01:55 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 192.112.36.4#53  
Nov 15 13:01:55 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 192.33.4.12#53  
Nov 15 13:01:55 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 198.41.0.4#53  
Nov 15 13:01:55 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 192.5.5.241#53  
Nov 15 13:01:55 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 192.36.148.17#53  
Nov 15 13:01:55 server named[11665]: REFUSED unexpected RCODE resolving './NS/IN': 199.7.91.13#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:dc3::35#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:503:c27::2:30#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:500:a8::e#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:500:200::b#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:500:1::53#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:7fd::1#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:500:9f::42#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:500:12::d0d#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:500:2::c#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:503:ba3e::2:30#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:500:2f::f#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:7fe::53#53  
Nov 15 13:01:55 server named[11665]: network unreachable resolving './NS/IN': 2001:500:2d::d#53  
Nov 15 13:01:55 server named[11665]: resolver priming query complete
```

Рис. 3.2. Просмотр записей о подключении к виртуальной внутренней сети узла client и выдачи ему IP-адреса из соответствующего диапазона адресов.

Анализ работы DHCP-сервера



```
ismakhorin@client:~  
[ismakhorin@client.ismakhorin.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 fe80::a00:27ff:fe18:730f prefixlen 64 scopeid 0x20<link>  
    ether 08:00:27:18:73:0f txqueuelen 1000 (Ethernet)  
    RX packets 1427 bytes 161854 (158.0 KiB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 1298 bytes 199989 (195.3 KiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
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::a00:27ff:fee0:538a prefixlen 64 scopeid 0x20<link>  
    ether 08:00:27:e0:53:8a txqueuelen 1000 (Ethernet)  
    RX packets 69 bytes 8371 (8.1 KiB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 332 bytes 35548 (34.7 KiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536  
    inet 127.0.0.1 netmask 255.0.0.0  
    inet6 ::1 prefixlen 128 scopeid 0x10<host>  
    loop txqueuelen 1000 (Local Loopback)  
    RX packets 20 bytes 2213 (2.1 KiB)  
    RX errors 0 dropped 0 overruns 0 frame 0  
    TX packets 20 bytes 2213 (2.1 KiB)  
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0  
  
[ismakhorin@client.ismakhorin.net ~]$
```

Рис. 3.3. Вывод на экран информации об имеющихся интерфейсах.

Настройка обновления DNS-зоны

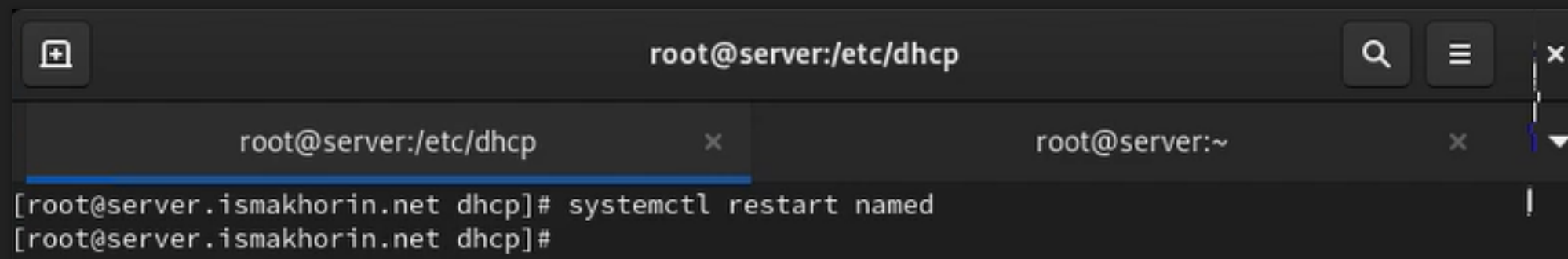


The image shows a text editor window with a light gray title bar. The title bar contains the text "ismakhorin.net" and "/etc/named" below it. On the left side of the title bar are buttons for "Open" (with a dropdown arrow) and a "+" icon. On the right side are buttons for "Save", a hamburger menu icon, and a close button (with an "x" icon). The main area of the window contains a text file with DNS zone configuration. The text is as follows:

```
1 zone "ismakhorin.net" IN {  
2     type master;  
3     file "master/fz/ismakhorin.net";  
4     allow-update { 127.0.0.1; };  
5 };  
6  
7 zone "1.168.192.in-addr.arpa" IN {  
8     type master;  
9     file "master/rz/192.168.1";  
10    allow-update { 127.0.0.1; };  
11 };
```

Рис. 4.1. Настройка обновления DNS-зоны при появлении в виртуальной внутренней сети новых узлов.

Настройка обновления DNS-зоны

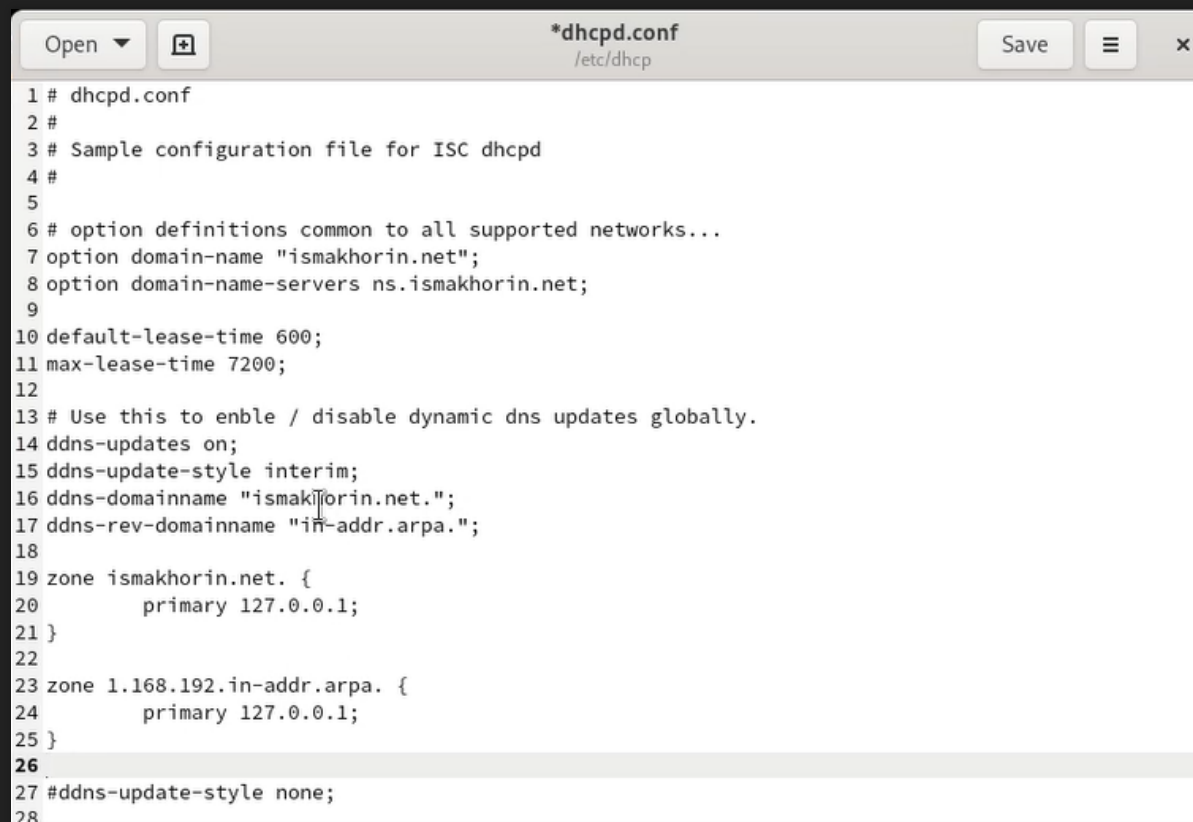


A terminal window with a dark background. The title bar shows 'root@server:/etc/dhcp' and search, menu, and close icons. Below the title bar, there are two tabs: 'root@server:/etc/dhcp' (active) and 'root@server:~'. The terminal content shows the command 'systemctl restart named' being executed in the '/etc/dhcp' directory. The prompt is '[root@server.ismakhorin.net dhcp]#'. The output of the command is not visible.

```
root@server:/etc/dhcp  
[root@server.ismakhorin.net dhcp]# systemctl restart named  
[root@server.ismakhorin.net dhcp]#
```

Рис. 4.2. Перезапуск DNS-сервера.

Настройка обновления DNS-зоны



```
1 # dhcpd.conf
2 #
3 # Sample configuration file for ISC dhcpd
4 #
5
6 # option definitions common to all supported networks...
7 option domain-name "ismakhorin.net";
8 option domain-name-servers ns.ismakhorin.net;
9
10 default-lease-time 600;
11 max-lease-time 7200;
12
13 # Use this to enable / disable dynamic dns updates globally.
14 ddns-updates on;
15 ddns-update-style interim;
16 ddns-domainname "ismakhorin.net.";
17 ddns-rev-domainname "in-addr.arpa.";
18
19 zone ismakhorin.net. {
20     primary 127.0.0.1;
21 }
22
23 zone 1.168.192.in-addr.arpa. {
24     primary 127.0.0.1;
25 }
26
27 #ddns-update-style none;
28
```

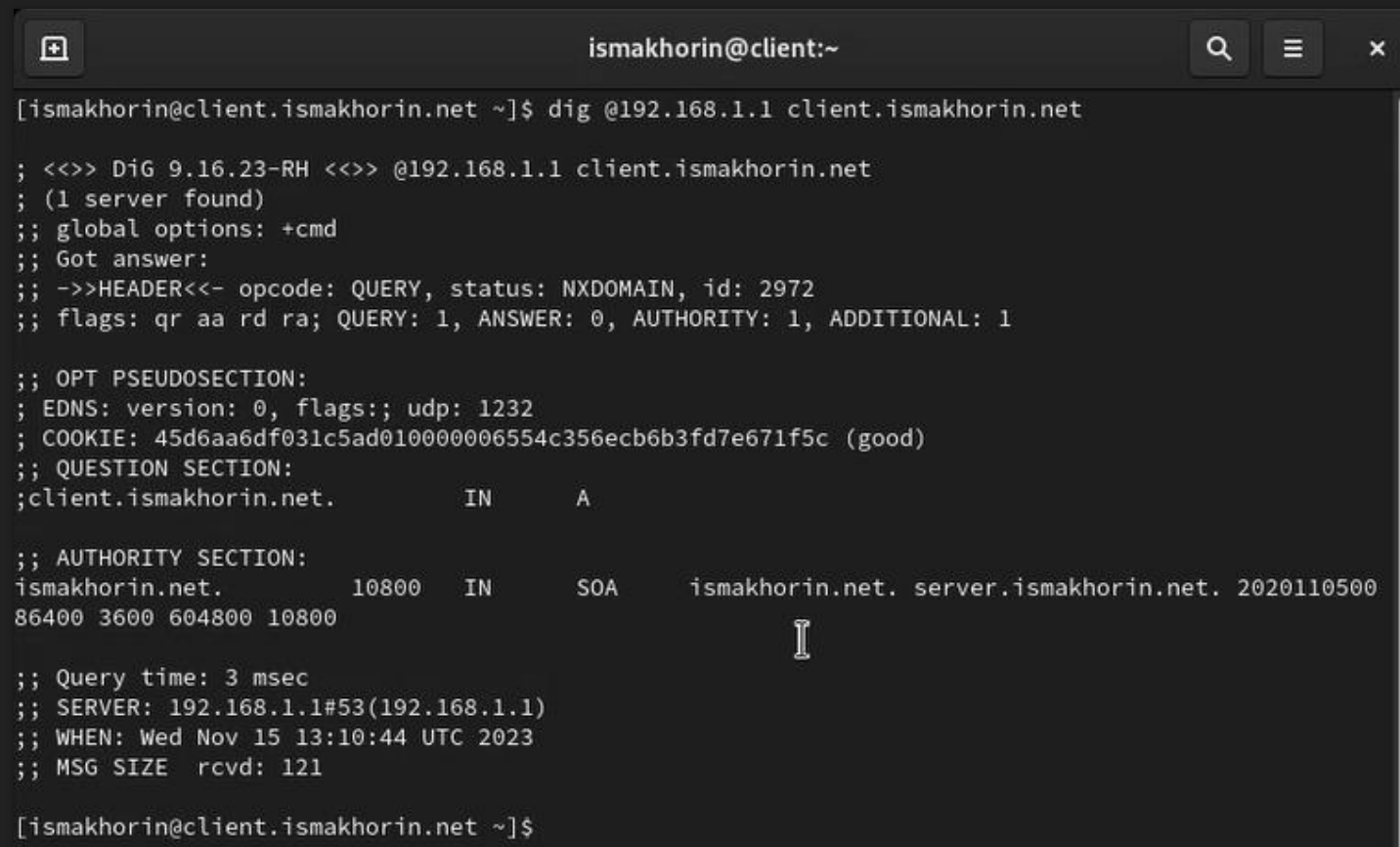
Рис. 4.3. Внесение изменений в конфигурационный файл `/etc/dhcp/dhcpd.conf`, добавив в него разрешение на динамическое обновление DNS-записей с локального узла прямой и обратной зон.

Настройка обновления DNS-зоны

```
[root@server.ismakhorin.net dhcp]# systemctl restart dhcpd  
[root@server.ismakhorin.net dhcp]#
```

Рис. 4.4. Перезапуск DHCP-сервера.

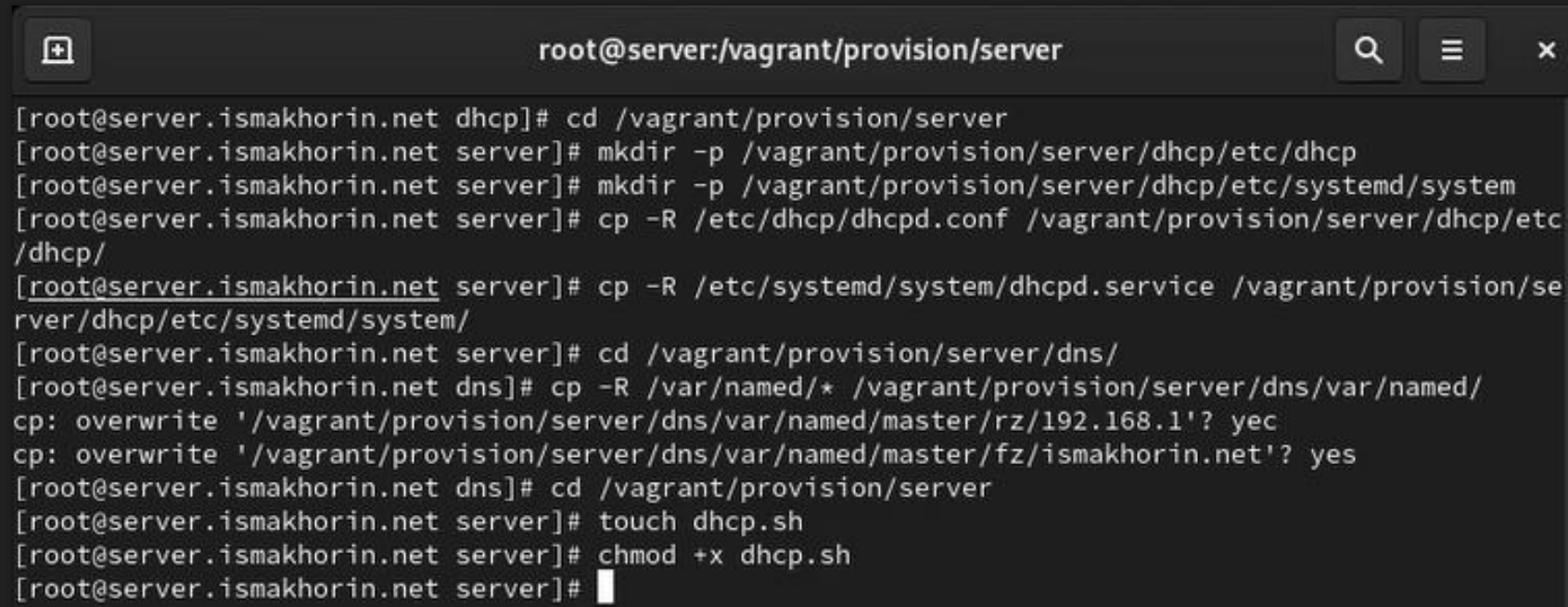
Анализ работы DNSР-сервера после настройки обновления DNS-зоны



```
ismakhorin@client:~  
[ismakhorin@client.ismakhorin.net ~]$ dig @192.168.1.1 client.ismakhorin.net  
  
; <<>> DiG 9.16.23-RH <<>> @192.168.1.1 client.ismakhorin.net  
; (1 server found)  
;; global options: +cmd  
;; Got answer:  
;; ->>HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 2972  
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1  
  
;; OPT PSEUDOSECTION:  
; EDNS: version: 0, flags:; udp: 1232  
; COOKIE: 45d6aa6df031c5ad010000006554c356ecb6b3fd7e671f5c (good)  
;; QUESTION SECTION:  
;client.ismakhorin.net.          IN      A  
  
;; AUTHORITY SECTION:  
ismakhorin.net.                10800   IN      SOA     ismakhorin.net. server.ismakhorin.net. 2020110500  
86400 3600 604800 10800  
  
;; Query time: 3 msec  
;; SERVER: 192.168.1.1#53(192.168.1.1)  
;; WHEN: Wed Nov 15 13:10:44 UTC 2023  
;; MSG SIZE  rcvd: 121  
  
[ismakhorin@client.ismakhorin.net ~]$
```

Рис. 5. Проверка наличия DNS-записи о клиенте в прямой DNS-зоне.

Внесение изменений в настройки внутреннего окружения виртуальной машины



```
root@server:/vagrant/provision/server

[root@server.ismakhorin.net dhcp]# cd /vagrant/provision/server
[root@server.ismakhorin.net server]# mkdir -p /vagrant/provision/server/dhcp/etc/dhcp
[root@server.ismakhorin.net server]# mkdir -p /vagrant/provision/server/dhcp/etc/systemd/system
[root@server.ismakhorin.net server]# cp -R /etc/dhcp/dhcpd.conf /vagrant/provision/server/dhcp/etc/dhcp/
[root@server.ismakhorin.net server]# cp -R /etc/systemd/system/dhcpd.service /vagrant/provision/server/dhcp/etc/systemd/system/
[root@server.ismakhorin.net server]# cd /vagrant/provision/server/dns/
[root@server.ismakhorin.net dns]# cp -R /var/named/* /vagrant/provision/server/dns/var/named/
cp: overwrite '/vagrant/provision/server/dns/var/named/master/rz/192.168.1'? yec
cp: overwrite '/vagrant/provision/server/dns/var/named/master/fz/ismakhorin.net'? yes
[root@server.ismakhorin.net dns]# cd /vagrant/provision/server
[root@server.ismakhorin.net server]# touch dhcp.sh
[root@server.ismakhorin.net server]# chmod +x dhcp.sh
[root@server.ismakhorin.net server]#
```

Рис. 6.1. Открытие на виртуальной машине server каталога для внесения изменений в настройки внутреннего окружения `/vagrant/provision/server/`, создание в нём каталога `dhcp`. Замена конфигурационных файлов DNS-сервера. Создание в каталоге `/vagrant/provision/server` исполняемого файла `dhcp.sh`.

Внесение изменений в настройки внутреннего окружения виртуальной машины



The image shows a code editor window titled `*dhcp.sh` with the file path `/vagrant/provision/server`. The editor contains a shell script for provisioning a DHCP server. The script includes comments and commands for installing packages, copying configuration files, setting permissions, restoring permissions, configuring the firewall, and enabling the DHCP service.

```
1 #!/bin/bash
2
3 echo "Provisioning script $0"
4
5 echo "Install needed packages"
6 dnf -y install dhcp-server
7
8 echo "Copy configuration files"
9 cp -R /vagrant/provision/server/dhcp/etc/* /etc
10
11 chown -R dhcpd:dhcpd /etc/dhcp
12
13 restorecon -vR /etc
14 restorecon -vR /var/lib/dhcpd
15
16 echo "Configure firewall"
17 firewall-cmd --add-service=dhcp
18 firewall-cmd --add-service=dhcp --permanent
19 |
20 echo "Start dhcpd service"
21 systemctl --system daemon-reload
22 systemctl enable dhcpd
```

Рис. 6.2. Открытие файла на редактирование и помещение в него скрипта.

Внесение изменений в настройки внутреннего окружения виртуальной машины

```
36         virtualbox__intnet: true
37
38     server.vm.provision "server dummy",
39         type: "shell",
40         preserve_order: true,
41         path: "provision/server/01-dummy.sh"
42
43     server.vm.provision "server dns",
44         type: "shell",
45         preserve_order: true,
46         path: "provision/server/dns.sh"
47
48     server.vm.provision "server dhcp",
49         type: "shell",
50         preserve_order: true,
51         path: "provision/server/dhcp.sh"
52
```

Рис. 6.3. Настройка отработки созданного скрипта во время загрузки виртуальной машины server.

ВЫВОД

- В ходе выполнения лабораторной работы были приобретены практические навыки по установке и конфигурированию DHCP-сервера.

Спасибо за внимание!