

# Лабораторная работа №2

Дисциплина: Администрирование сетевых подсистем

Ибрахим Мохсейн Алькамаль

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# Раздел 1

## 1. Цель работы

## 1.1 Цель работы

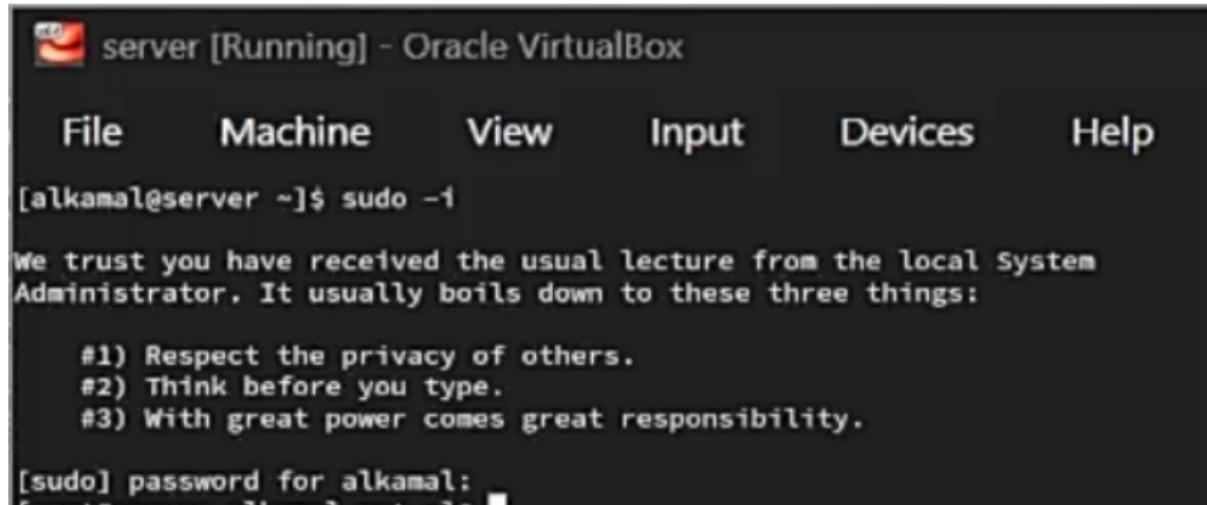
- Формулировка цели лабораторной работы согласно методическим указаниям
- Упрощение подготовки отчётов с использованием шаблона
- Ознакомление с возможностями разметки Markdown

## Раздел 2

### 2. Выполнение лабораторной работы

## 2.1 Установка DNS-сервера

- Выполнен вход под пользователем alkamal
- Переход в режим суперпользователя sudo -i
- Подтверждена смена приглашения на root



The screenshot shows a terminal window titled "server [Running] - Oracle VirtualBox". The window has a menu bar with File, Machine, View, Input, Devices, and Help. The main area of the terminal shows the command "[alkamal@server ~]\$ sudo -i" being run. A message follows: "We trust you have received the usual lecture from the local System Administrator. It usually boils down to these three things:" followed by a list of three items: "#1) Respect the privacy of others.", "#2) Think before you type.", and "#3) With great power comes great responsibility.". At the bottom of the terminal, it asks for a password: "[sudo] password for alkamal:". The background of the terminal window is dark, and the text is white.

Рисунок 1: Переход в режим суперпользователя sudo -i

- Установлены пакеты bind и bind-utils
- Использована команда dnf -y install
- Транзакция завершена успешно

```
[root@server.alkamal.net ~]# dnf -y install bind bind-utils
Rocky Linux 9 - Baseos
Rocky Linux 9 - Appstream
Rocky Linux 9 - Extras
Package bind-utils-32:9.16.23-34.el9_7.1.x86_64 is already installed.
Dependencies resolved.

=====
| Package           | Architecture | Version      | Repository | Size |
|=====|
| Installing:      |             |              |            |       |
|   bind            | x86_64      | 32:9.16.23-34.el9_7.1 | appstream | 488 k |
| Installing dependencies: |             |              |            |       |
|   bind-dnssec-doc | noarch      | 32:9.16.23-34.el9_7.1 | appstream | 45 k  |
|   python3-bind    | noarch      | 32:9.16.23-34.el9_7.1 | appstream | 61 k  |
|   python3-ply     | noarch      | 3.11-14.el9.0.1       | baseos   | 103 k |
| Installing weak dependencies: |             |              |            |       |
|   bind-dnssec-utils | x86_64      | 32:9.16.23-34.el9_7.1 | appstream | 113 k |
| Transaction Summary |             |              |            |       |
|=====|
| Install 5 Packages |             |              |            |       |
| Total download size: 809 k |             |              |            |       |
| Installed size: 2.5 M |             |              |            |       |
| Downloading Packages: |             |              |            |       |
| (1/5): bind-dnssec-doc-9.16.23-34.el9_7.1.noarch.rpm | 221 kB/s | 45 kB  | 00:00 |
| (2/5): python3-ply-3.11-14.el9.0.1.noarch.rpm | 357 kB/s | 103 kB | 00:00 |
| (3/5): bind-dnssec-utils-9.16.23-34.el9_7.1.x86_64.rpm | 1.3 MB/s | 113 kB | 00:00 |
| (4/5): bind-9.16.23-34.el9_7.1.x86_64.rpm | 1.4 MB/s | 488 kB | 00:00 |
| (5/5): python3-bind-9.16.23-34.el9_7.1.noarch.rpm | 762 kB/s | 61 kB  | 00:00 |
| Total |             |              |            |       |
| Running transaction check |             |              |            |       |
| Transaction check succeeded. |             |              |            |       |
| Running transaction test |             |              |            |       |
| Transaction test succeeded. |             |              |            |       |
| Running transaction |             |              |            |       |
|   Preparing : |             |              |            | 1/1  |
|   Installing : bind-dnssec-doc-32:9.16.23-34.el9_7.1.noarch | 1/5  |
|   Installing : python3-ply-3.11-14.el9.0.1.noarch | 2/5  |
|   Installing : python3-bind-32:9.16.23-34.el9_7.1.noarch | 3/5  |
|   Installing : bind-dnssec-utils-32:9.16.23-34.el9_7.1.x86_64 | 4/5  |
|   Running scriptlet: bind-32:9.16.23-34.el9_7.1.x86_64 | 5/5  |
|   Installing : bind-32:9.16.23-34.el9_7.1.x86_64 | 5/5  |
|   Running scriptlet: bind-32:9.16.23-34.el9_7.1.x86_64 | 5/5  |
|   Verifying  : python3-ply-3.11-14.el9.0.1.noarch | 1/5  |
|   Verifying  : bind-32:9.16.23-34.el9_7.1.x86_64 | 2/5  |
|   Verifying  : bind-dnssec-doc-32:9.16.23-34.el9_7.1.noarch | 3/5  |
|   Verifying  : bind-dnssec-utils-32:9.16.23-34.el9_7.1.x86_64 | 4/5  |
|   Verifying  : python3-bind-32:9.16.23-34.el9_7.1.noarch | 5/5  |
| Installed: bind-32:9.16.23-34.el9_7.1.x86_64 |             |             |       |
| bind-dnssec-doc-32:9.16.23-34.el9_7.1.noarch |             |             |       |
| bind-dnssec-utils-32:9.16.23-34.el9_7.1.x86_64 |             |             |       |
| python3-bind-32:9.16.23-34.el9_7.1.noarch |             |             |       |

```

- Выполнен запрос dig www.yandex.ru
- Статус ответа NOERROR
- Получены три A-записи
- Подтверждено корректное разрешение имени

```
complete.
[root@server.alkamal.net ~]# dig www.yandex.ru

; <>> DiG 9.16.23-RH <>> www.yandex.ru
;; global options: +cmd
;; Got answer:
;; ->>HEADER<- opcode: QUERY, status: NOERROR, id: 27330
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; MBZ: 0x0187, udp: 512
;; QUESTION SECTION:
;www.yandex.ru.          IN      A

;; ANSWER SECTION:
www.yandex.ru.      391      IN      A      77.88.44.55
www.yandex.ru.      391      IN      A      77.88.55.88
www.yandex.ru.      391      IN      A      5.255.255.77

;; Query time: 25 msec
;; SERVER: 172.249.0.7#53(172.249.0.7)
;; WHEN: Sat Feb 07 13:34:04 UTC 2026
;; MSG SIZE  rcvd: 129
```



## 2.2 Конфигурирование кэширующего DNS-сервера

- Проанализирован /etc/resolv.conf
- Указан домен alkamal.net
- Заданы внешние DNS-серверы

```
[root@server.alkamal.net ~]# cat /etc/resolv.conf
# Generated by NetworkManager
search rudn.ru alkamal.net
nameserver 172.249.0.7
nameserver 8.8.8.8
nameserver 8.8.4.4
```

Рисунок 4: Содержимое файла /etc/resolv.conf

- Проанализирован /etc/named.conf
- Включена рекурсия recursion yes
- Прослушивание на 127.0.0.1
- Разрешены запросы от localhost

```
[root@server.alkamal.net ~]# cat /etc/named.conf
//
// named.conf
//
// Provided by Red Hat bind package to configure the ISC BIND named(8) DNS
// server as a caching only nameserver (as a localhost DNS resolver only).
//
// See /usr/share/doc/bind*/sample/ for example named configuration files.
//

options {
    listen-on port 53 { 127.0.0.1; };
    listen-on-v6 port 53 { ::1; };
    directory      "/var/named";
    dump-file     "/var/named/data/cache_dump.db";
    statistics-file "/var/named/data/named_stats.txt";
    memstatistics-file "/var/named/data/named_mem_stats.txt";
    secroots-file  "/var/named/data/named.secroots";
    recursing-file "/var/named/data/named.recurse";
    allow-query    { localhost; };

    /*
     - If you are building an AUTHORITATIVE DNS server, do NOT enable recursion.
     - If you are building a RECURSIVE (caching) DNS server, you need to enable
       recursion.
     - If your recursive DNS server has a public IP address, you MUST enable access
       control to limit queries to your legitimate users. Failing to do so will
       cause your server to become part of large scale DNS amplification
       attacks. Implementing BCP38 within your network would greatly
       reduce such attack surface
    */
    recursion yes;
}

dnssec-validation yes;

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";
};
```

- Рассмотрен файл named.ca
- Содержит корневые NS, A, AAAA-записи

```
[root@server.alkamal.net ~]# cat /var/named/named.ca
;
; <>> DiG 9.18.20 <>> -4 +tcp +norec +nostats @d.root-servers.net
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<- opcode: QUERY, status: NOERROR, id: 47286
;; flags: qr aa; QUERY: 1, ANSWER: 13, AUTHORITY: 0, ADDITIONAL: 27
;
;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 1450
;; QUESTION SECTION:
;
;          IN      NS
;
;; ANSWER SECTION:
.
.
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.
.
.
.
.
.
.
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.
518400 IN      NS      a.root-servers.net.
518400 IN      NS      b.root-servers.net.
518400 IN      NS      c.root-servers.net.
518400 IN      NS      d.root-servers.net.
518400 IN      NS      e.root-servers.net.
518400 IN      NS      f.root-servers.net.
518400 IN      NS      g.root-servers.net.
518400 IN      NS      h.root-servers.net.
518400 IN      NS      i.root-servers.net.
518400 IN      NS      j.root-servers.net.
518400 IN      NS      k.root-servers.net.
518400 IN      NS      l.root-servers.net.
518400 IN      NS      m.root-servers.net.
;
;; ADDITIONAL SECTION:
a.root-servers.net.   518400 IN      A      198.41.0.4
b.root-servers.net.   518400 IN      A      178.247.170.2
c.root-servers.net.   518400 IN      A      192.33.4.12
d.root-servers.net.   518400 IN      A      199.7.91.13
e.root-servers.net.   518400 IN      A      192.203.230.16
f.root-servers.net.   518400 IN      A      192.5.5.241
g.root-servers.net.   518400 IN      A      192.112.36.4
h.root-servers.net.   518400 IN      A      198.97.190.53
i.root-servers.net.   518400 IN      A      192.36.148.17
j.root-servers.net.   518400 IN      A      192.58.128.30
k.root-servers.net.   518400 IN      A      193.6.14.129
l.root-servers.net.   518400 IN      A      199.7.83.42
m.root-servers.net.   518400 IN      A      202.12.27.33
a.root-servers.net.   518400 IN      AAAA   2001:503:ba3e::2:30
b.root-servers.net.   518400 IN      AAAA   2001:1b8:10::b
c.root-servers.net.   518400 IN      AAAA   2001:500::1:c
d.root-servers.net.   518400 IN      AAAA   2001:500:2d::d
e.root-servers.net.   518400 IN      AAAA   2001:500:a8:e
f.root-servers.net.   518400 IN      AAAA   2001:500:2f::f
```

- Рассмотрен файл named.localhost
- Определена зона localhost

```
[root@server.alkamal.net ~]# cat /var/named/named.localhost
$TTL 1D
@      IN SOA  @ rname.invalid. (
                           0           ; serial
                           1D          ; refresh
                           1H          ; retry
                           1W          ; expire
                           3H )        ; minimum
NS      @
A       127.0.0.1
AAAA    ::1
```

Рисунок 7: Содержимое файла named.localhost

- Рассмотрен файл named.loopback
- Настроено обратное разрешение 127.0.0.1

```
AAAA    ::1
[root@server.alkamal.net ~]# cat /var/named/named.loopback
$TTL 1D
@      IN SOA  @ rname.invalid. (
                      0      ; serial
                      1D     ; refresh
                      1H     ; retry
                      1W     ; expire
                      3H )   ; minimum
NS      @
A       127.0.0.1
AAAA   ::1
PTR    localhost.
[root@server.alkamal.net ~]
```

Рисунок 8: Содержимое файла named.loopback

- Выполнены `systemctl start named` и `enable named`
- Сравнены запросы `dig`
- Локальный сервер не отвечал до изменения настроек

```
[root@server.alkamal.net ~]# systemctl start named
[root@server.alkamal.net ~]# systemctl enable named
[root@server.alkamal.net ~]# dig www.yandex.ru

; <>> DiG 9.16.23-RH <>> www.yandex.ru
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 28173
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; MBZ: 0x00ad, udp: 512
;; QUESTION SECTION:
;www.yandex.ru.           IN      A

;; ANSWER SECTION:
www.yandex.ru.        173      IN      A      77.88.44.55
www.yandex.ru.        173      IN      A      77.88.55.88
www.yandex.ru.        173      IN      A      5.255.255.77

;; Query time: 45 msec
;; SERVER: 8.8.8.8#53(8.8.8.8)
;; WHEN: Sat Feb 07 14:29:46 UTC 2026
;; MSG SIZE  rcvd: 129

[root@server.alkamal.net ~]# dig @127.0.0.1 www.yandex.ru
```

- Через nmcli установлен DNS 127.0.0.1
- Отключён auto-DNS
- После перезапуска изменён /etc/resolv.conf

```
[root@server.alkamal.net ~]# nmcli connection edit eth0
===[| nmcli interactive connection editor |==

Editing existing '802-3-ethernet' connection: 'eth0'

Type 'help' or '?' for available commands.
Type 'print' to show all the connection properties.
Type 'describe [<setting>.<prop>]' for detailed property description.

You may edit the following settings: connection, 802-3-ethernet (ethernet), 802-1x, dcb, sriov, ethtool,
  match, ipv4, ipv6, prefix-delegation, hostname, link, tc, proxy
nmcli> remove ipv4.dns
nmcli> set ipv4.ignore-auto-dns yes
nmcli> set ipv4.dns 127.0.0.1
nmcli> save
Connection 'eth0' (d9959f89-4530-41f4-b47c-eb8665daf556) successfully updated.
nmcli> ^[[200~quit
Unknown command: 'quit'
nmcli> quit
[root@server.alkamal.net ~]# nmcli connection edit System\ eth0
===[| nmcli interactive connection editor |==

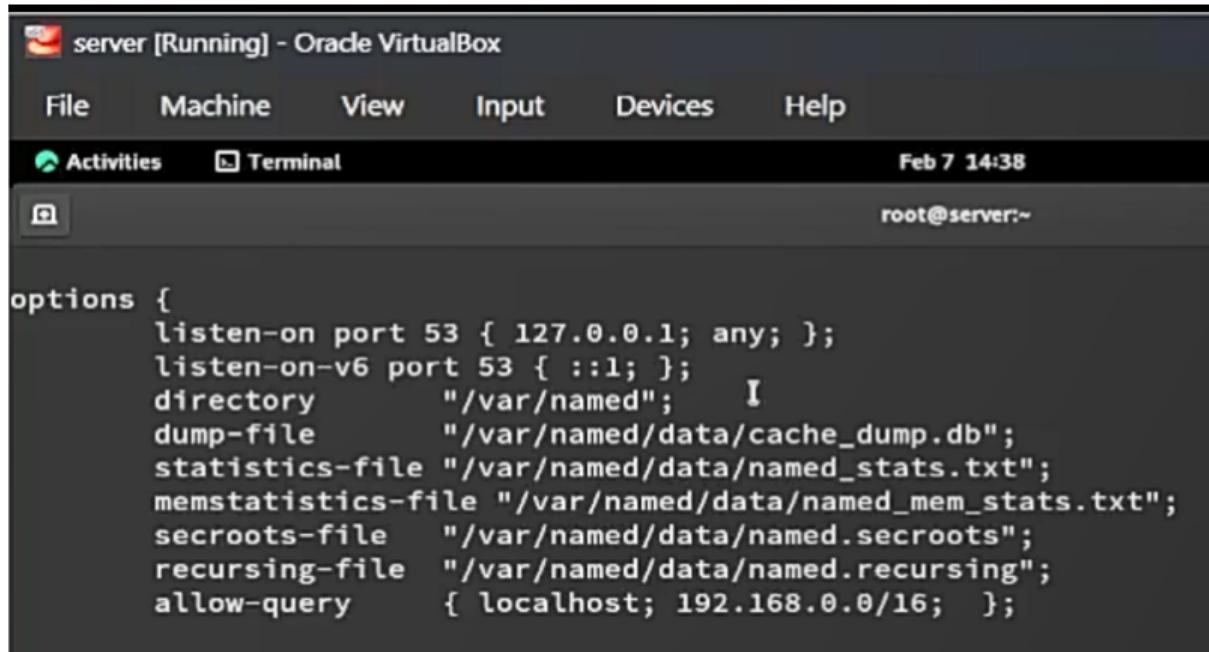
Editing existing '802-3-ethernet' connection: 'System eth0'

Type 'help' or '?' for available commands.
Type 'print' to show all the connection properties.
Type 'describe [<setting>.<prop>]' for detailed property description.

You may edit the following settings: connection, 802-3-ethernet (ethernet), 802-1x, dcb, sriov, ethtool,
  match, ipv4, ipv6, prefix-delegation, hostname, link, tc, proxy
nmcli> remove ipv4.dns
nmcli> set ipv4.ignore-auto-dns yes
nmcli> set ipv4.dns 127.0.0.1
nmcli> save
```



- В named.conf добавлено listen-on { 127.0.0.1; any; }
- Разрешены запросы от 192.168.0.0/16
- В firewall открыт сервис DNS



```
server [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Activities Terminal Feb 7 14:38
root@server:~>

options {
    listen-on port 53 { 127.0.0.1; any; };
    listen-on-v6 port 53 { ::1; };
    directory      "/var/named";
    dump-file      "/var/named/data/cache_dump.db";
    statistics-file "/var/named/data/named_stats.txt";
    memstatistics-file "/var/named/data/named_mem_stats.txt";
    secroots-file   "/var/named/data/named.secroots";
    recursing-file  "/var/named/data/named.recurse";
    allow-query     { localhost; 192.168.0.0/16; };
}
```

Рисунок 11: Изменение параметров listen-on и allow-query

- Проверено прослушивание порта 53
- Процесс named активен (UDP)

```
[root@server.alkamal.net ~]# firewall-cmd --add-service=dns
success
[root@server.alkamal.net ~]# firewall-cmd --add-service=dns --permanent
success
[root@server.alkamal.net ~]# lsof | grep UDP
lsof: WARNING: can't stat() fuse.gvfsd-fuse file system /run/user/1001/gvfs
      Output information may be incomplete.
lsof: WARNING: can't stat() fuse.portal file system /run/user/1001/doc
      Output information may be incomplete.
avahi-dae  558                               avahi   12u    IPv4          21230    0t0    UDP  *
mdns
avahi-dae  558                               avahi   13u    IPv6          21231    0t0    UDP  *
mdns
chronyd   604                               chrony   5u    IPv4          21300    0t0    UDP  lo
calhost:323
chronyd   604                               chrony   6u    IPv6          21301    0t0    UDP  lo
calhost:323
named     947                               named   21u    IPv4          22889    0t0    UDP  lo
calhost:domain
named     947                               named   24u    IPv6          22891    0t0    UDP  lo
calhost:domain
named     947   948 isc-net-0               named   21u    IPv4          22889    0t0    UDP  lo
calhost:domain
named     947   948 isc-net-0               named   24u    IPv6          22891    0t0    UDP  lo
calhost:domain
named     947   949 isc-net-0               named   21u    IPv4          22889    0t0    UDP  lo
calhost:domain
named     947   949 isc-net-0               named   24u    IPv6          22891    0t0    UDP  lo
calhost:domain
named     947   950 isc-timer              named   21u    IPv4          22889    0t0    UDP  lo
calhost:domain
named     947   950 isc-timer              named   24u    IPv6          22891    0t0    UDP  lo
calhost:domain
named     947   951 isc-socket             named   21u    IPv4          22889    0t0    UDP  lo
calhost:domain
named     947   951 isc-socket             named   24u    IPv6          22891    0t0    UDP  lo
NetworkMa 10969                           root    27u    IPv4          53305    0t0    UDP  se
```

- Добавлены forwarders {127.0.0.1;}
- Установлен forward first
- Отключены dnssec-enable и dnssec-validation

```
options {  
    listen-on port 53 { 127.0.0.1; any; };  
    listen-on-v6 port 53 { ::1; };  
    directory "/var/named";  
    dump-file "/var/named/data/cache_dump.db";  
    statistics-file "/var/named/data/named_stats.txt";  
    memstatistics-file "/var/named/data/named_mem_stats.txt";  
    secroots-file "/var/named/data/named.secroots";  
    recursing-file "/var/named/data/named.recurising";  
    allow-query { localhost; 192.168.0.0/16; };  
    forwarders { 127.0.0.1; };  
    forward first;  
  
    /*  
     * If you are building an AUTHORITATIVE DNS server, do NOT enable recursion.  
     * If you are building a RECURSIVE (caching) DNS server, you need to enable  
     * recursion.  
     * If your recursive DNS server has a public IP address, you MUST enable access  
     * control to limit queries to your legitimate users. Failing to do so will  
     * cause your server to become part of large scale DNS amplification  
     * attacks. Implementing BCP38 within your network would greatly  
     * reduce such attack surface  
    */  
    recursion yes;  
    dnssec-enable no;  
    dnssec-validation no;  
    /* dnssec-validation yes; */
```

Рисунок 13: Добавление forwarders и отключение DNSSEC в named.conf

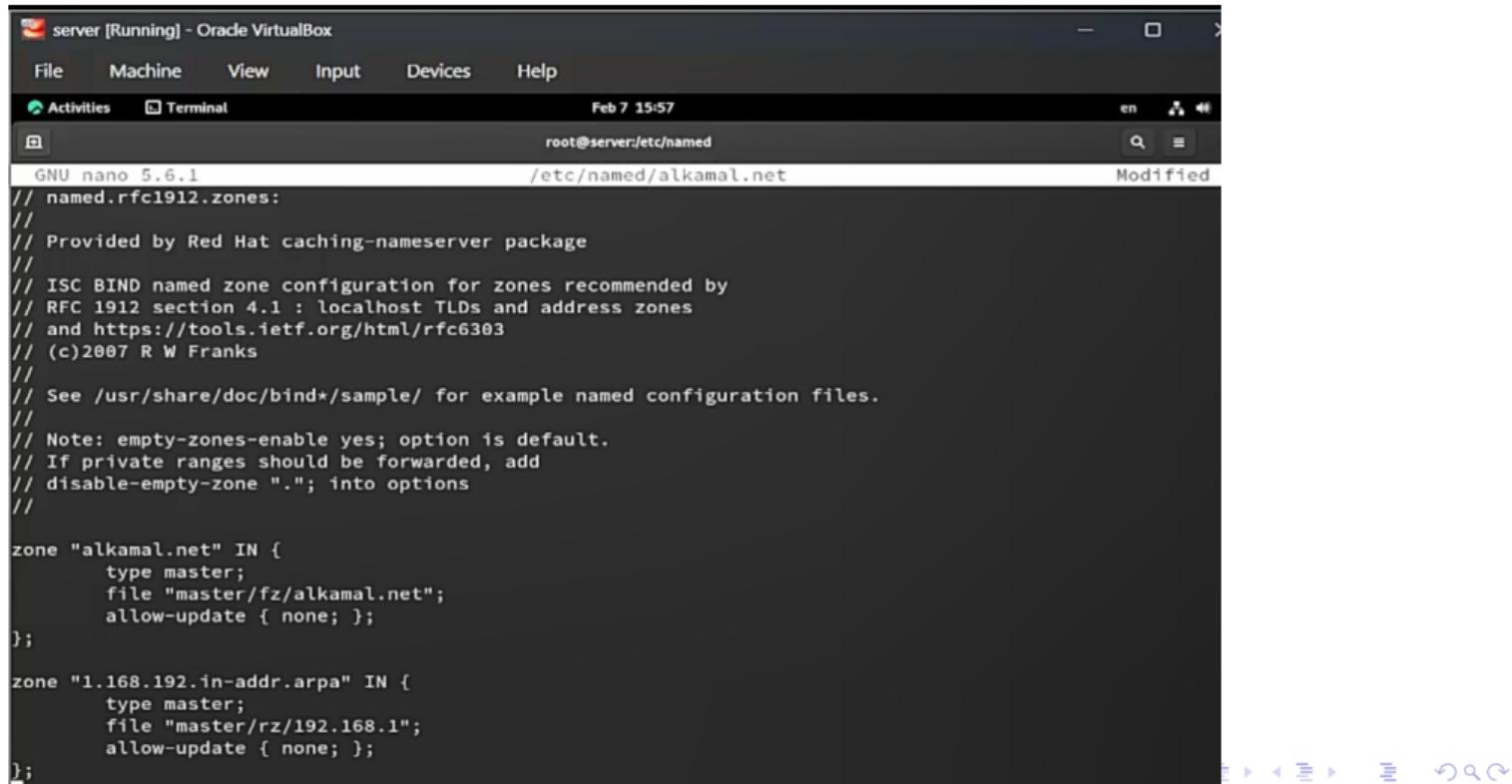
## 2.3 Конфигурирование первичного DNS-сервера

- Скопирован named.rfc1912.zones
- Переименован в alkamal.net
- Подключён через include в named.conf

```
[root@server.alkamal.net ~]# cp /etc/named.rfc1912.zones /etc/named/
[root@server.alkamal.net ~]# cd /etc/named
[root@server.alkamal.net named]# mv /etc/named/named.rfc1912.zones /etc/named/alkamal.net
[root@server.alkamal.net named]# nano /etc/named.conf
[root@server.alkamal.net named]#
```

Рисунок 14: Копирование и подключение файла зоны alkamal.net в named.conf

- Определена прямая зона alkamal.net
- Определена обратная зона 1.168.192.in-addr.arpa
- Указаны файлы зон



The screenshot shows a terminal window titled "server [Running] - Oracle VirtualBox". The window has a dark theme and displays the contents of the /etc/named/alkamal.net configuration file. The file contains several comments and two zone definitions: one for the "alkamal.net" domain and another for the "1.168.192.in-addr.arpa" domain.

```

server [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Activities Terminal Feb 7 15:57
root@server:/etc/named
GNU nano 5.6.1 /etc/named/alkamal.net Modified
// named.rfc1912.zones:
//
// 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 "alkamal.net" IN {
    type master;
    file "master/fz/alkamal.net";
    allow-update { none; };
};

zone "1.168.192.in-addr.arpa" IN {
    type master;
    file "master/rz/192.168.1";
    allow-update { none; };
};

```

- Созданы каталоги master/fz и master/rz
- Подготовлен файл прямой зоны

```
[root@server.alkamal.net named]# cd /var/named
[root@server.alkamal.net named]# pwd
/var/named
[root@server.alkamal.net named]# mkdir -p /var/named/master/fz
[root@server.alkamal.net named]# mkdir -p /var/named/master/rz
[root@server.alkamal.net named]# ls
data dynamic master named.ca named.empty named.localhost named.loopback slaves
[root@server.alkamal.net named]# cd master/
[root@server.alkamal.net master]# ls
fz rz
[root@server.alkamal.net master]# cp /var/named/named.localhost /var/named/master/fz/
[root@server.alkamal.net master]# cd /var/named/master/fz/
[root@server.alkamal.net fz]# mv named.localhost alkamal.net
[root@server.alkamal.net fz]# ls
alkamal.net
```

Рисунок 16: Создание каталогов master/fz и master/rz и подготовка файла прямой зоны

- Настроен файл обратной зоны
- Указан \$TTL 1D
- Добавлена SOA-запись
- Установлен серийный номер
- Добавлены A- и PTR-записи
- Установлен \$ORIGIN

The screenshot shows a terminal window titled "server [Running] - Oracle VirtualBox". The window has a dark theme with white text. The title bar includes "File", "Machine", "View", "Input", "Devices", and "Help" menu items, and "Activities" and "Terminal" tabs. The status bar at the top right shows the date and time: "Feb 7 16:06". The terminal window title is "root@server:/var/named/master/rz". The command line shows the path "/var/named/master/rz/192.168.1". The content of the terminal is a named configuration file:

```

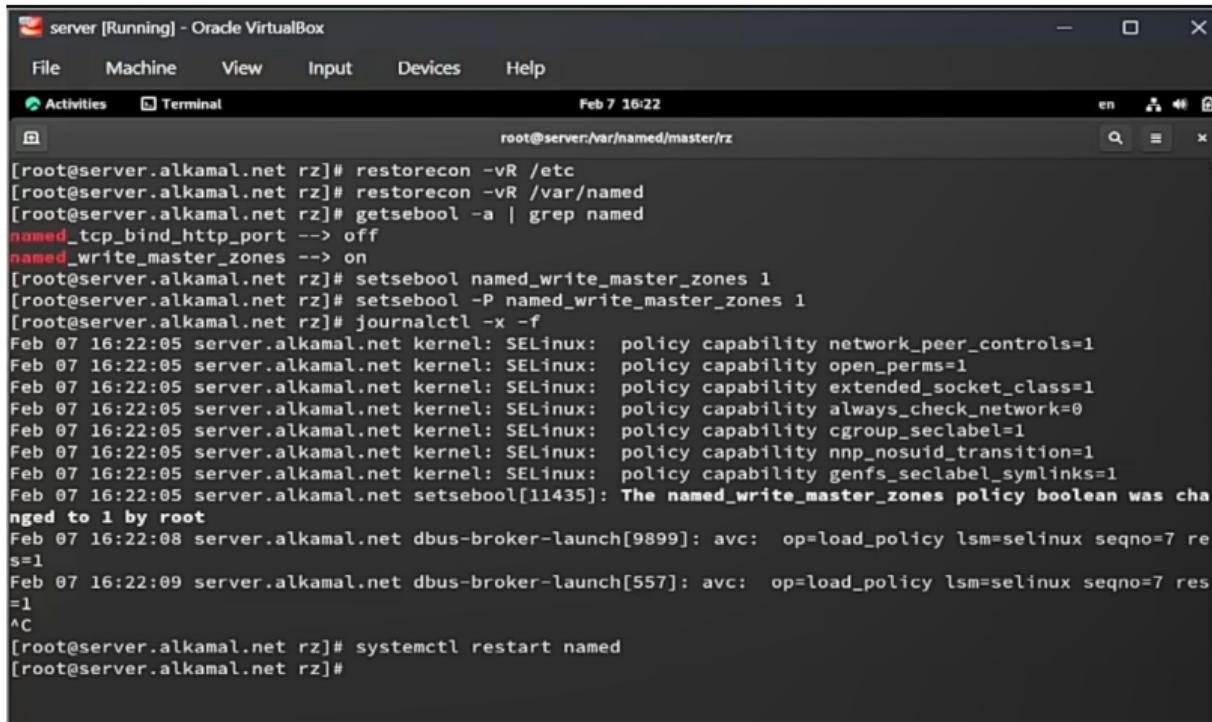
GNU nano 5.6.1
/var/named/master/rz/192.168.1

$TTL 1D
@ IN SOA @ server.alkamal.net. (
    2024072700; serial
    1D ; refresh
    1H ; retry
    1W ; expire
    3H ) ; minimum

NS @
A 192.168.1.1
PTR server.alkamal.net.

```

- Восстановлены SELinux-контексты
- Активирован named\_write\_master\_zones
- Выполнен systemctl restart named



```

server [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Activities Terminal Feb 7 16:22
root@server:~#
root@server:~# restorecon -vR /etc
root@server:~# restorecon -vR /var/named
root@server:~# getsebool -a | grep named
named_tcp_bind_http_port --> off
named_write_master_zones --> on
root@server:~# setsebool named_write_master_zones 1
root@server:~# setsebool -P named_write_master_zones 1
root@server:~# journalctl -x -f
Feb 07 16:22:05 server.alkamal.net kernel: SELinux: policy capability network_peer_controls=1
Feb 07 16:22:05 server.alkamal.net kernel: SELinux: policy capability open_perms=1
Feb 07 16:22:05 server.alkamal.net kernel: SELinux: policy capability extended_socket_class=1
Feb 07 16:22:05 server.alkamal.net kernel: SELinux: policy capability always_check_network=0
Feb 07 16:22:05 server.alkamal.net kernel: SELinux: policy capability cgroup_seclabel=1
Feb 07 16:22:05 server.alkamal.net kernel: SELinux: policy capability nnp_nosuid_transition=1
Feb 07 16:22:05 server.alkamal.net kernel: SELinux: policy capability genfs_seclabel_symlinks=1
Feb 07 16:22:05 server.alkamal.net setsebool[11435]: The named_write_master_zones policy boolean was changed to 1 by root
Feb 07 16:22:08 server.alkamal.net dbus-broker-launch[9899]: avc: op=load_policy lsm=selinux seqno=7 res=s=1
Feb 07 16:22:09 server.alkamal.net dbus-broker-launch[557]: avc: op=load_policy lsm=selinux seqno=7 res=s=1
^C
root@server:~# systemctl restart named
root@server:~#
```

Рисунок 18: Восстановление SELinux-контекста и перезапуск службы named

## 2.4 Проверка работоспособности первичного DNS-сервера

- Выполнен dig ns.alkamal.net
- Статус NOERROR
- Получена А-запись 192.168.1.1
- Сервер 127.0.0.1#53

```
[root@server.alkamal.net rz]# dig ns.alkamal.net

; <>> DDG 9.16.23-RH <>> ns.alkamal.net
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 23157
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 1232
;; COOKIE: f26d31abcba8b90501000000698766d71e79e3e79341671c (good)
;; QUESTION SECTION:
;ns.alkamal.net.           IN      A

;; ANSWER SECTION:
ns.alkamal.net.      86400   IN      A      192.168.1.1

;; Query time: 0 msec
;; SERVER: 127.0.0.1#53(127.0.0.1)
;; WHEN: Sat Feb 07 16:22:47 UTC 2026
;; MSG SIZE  rcvd: 87
```

Рисунок 19: Результат выполнения команды dig для ns.alkamal.net



- Выполнена передача зоны host -l alkamal.net
- Отображены NS- и A-записи
- Подтверждена корректность прямой зоны

```
[root@server.alkamal.net rz]# host -l alkamal.net
alkamal.net name server server.alkamal.net.
alkamal.net has address 192.168.1.1
ns.alkamal.net has address 192.168.1.1
server.alkamal.net has address 192.168.1.1
```

Рисунок 20: Вывод команды host -l для зоны alkamal.net

- Выполнен запрос host -a alkamal.net
- Отображены SOA, NS, A-записи
- Проверен серийный номер зоны

```
[root@server.alkamal.net rz]# host -a alkamal.net
Trying "alkamal.net"
;; -->>HEADER<<- opcode: QUERY, status: NOERROR, id: 26115
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;alkamal.net.           IN      ANY

;; ANSWER SECTION:
alkamal.net.        86400   IN      SOA     alkamal.net. server.alkamal.net. 2026020701 86400 3600 6
04800 10800
alkamal.net.        86400   IN      NS      server.alkamal.net.
alkamal.net.        86400   IN      A       192.168.1.1

Received 102 bytes from 127.0.0.1#53 in 0 ms
```

Рисунок 21: Расширенный запрос host -a для alkamal.net

- Проверено прямое разрешение A
- Проверено обратное разрешение PTR
- Подтверждена корректность зоны 1.168.192.in-addr.arpa

```
[root@server.alkamal.net rz]# host -t A alkamal.net
alkamal.net has address 192.168.1.1
[root@server.alkamal.net rz]# host -t PTR alkamal.net
alkamal.net has no PTR record
[root@server.alkamal.net rz]# host -t PTR 192.168.1.1
1.1.168.192.in-addr.arpa domain name pointer server.alkamal.net.
1.1.168.192.in-addr.arpa domain name pointer ns.alkamal.net.
```

Рисунок 22: Проверка A- и PTR-записей зоны alkamal.net

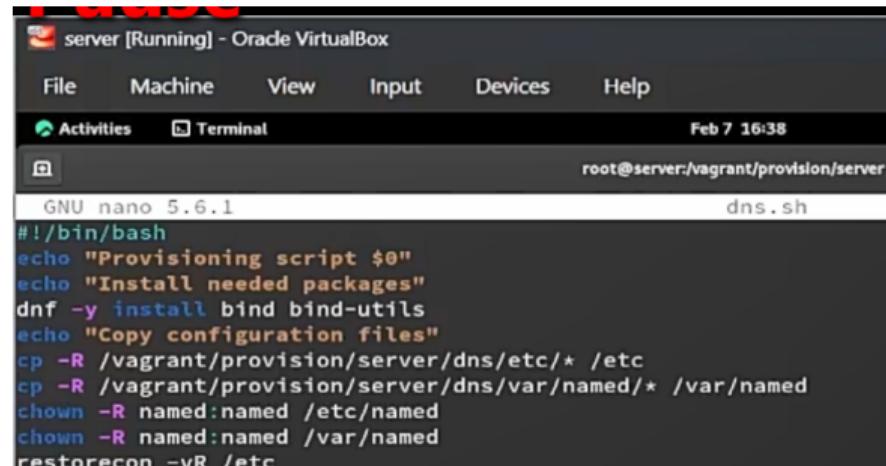
## 2.5 Внесение изменений в настройки внутреннего окружения виртуальной машины

- Созданы каталоги в /vagrant/provision/server/dns
- Скопированы named.conf и файлы зон
- Подготовлена структура provisioning

```
[root@server.alkamal.net rz]# cd /vagrant
[root@server.alkamal.net vagrant]# mkdir -p /vagrant/provision/server/dns/etc/named
[root@server.alkamal.net vagrant]# mkdir -p /vagrant/provision/server/dns/var/named/master/
[root@server.alkamal.net vagrant]# cp -R /etc/named.conf /vagrant/provision/server/dns/etc/
[root@server.alkamal.net vagrant]# cp -R /etc/named/* /vagrant/provision/server/dns/etc/named/
[root@server.alkamal.net vagrant]# cp -R /var/named/master/* /vagrant/provision/server/dns/var/named/master/
[root@server.alkamal.net vagrant]# touch dns.sh
[root@server.alkamal.net vagrant]# chmod +x dns.sh
```

Рисунок 23: Подготовка структуры каталогов и копирование конфигурации DNS в /vagrant

- Создан исполняемый скрипт dns.sh
- Установка bind и bind-utils
- Копирование файлов в /etc и /var/named
- Изменение владельца на named:named
- Восстановление SELinux-контекстов
- Открытие DNS в firewall
- Включение named\_write\_master\_zones
- Установка DNS 127.0.0.1
- Запуск и включение named



```

server [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Activities Terminal Feb 7 16:38
root@server:vagrant/provision/server
GNU nano 5.6.1 dns.sh
#!/bin/bash
echo "Provisioning script $0"
echo "Install needed packages"
dnf -y install bind bind-utils
echo "Copy configuration files"
cp -R /vagrant/provision/server/dns/etc/* /etc
cp -R /vagrant/provision/server/dns/var/named/* /var/named
chown -R named:named /etc/named
chown -R named:named /var/named
restorecon -vR /etc

```

- В Vagrantfile добавлен provision-блок shell
- Указан путь provision/server/dns.sh
- Сохранена последовательность выполнения

```
C: > work > alkamal > vagrant > Vagrantfile

19  ## Server configuration
20  config.vm.define "server", autostart: false do |server|
21    server.vm.box = "rocky9"
22    server.vm.hostname = 'server'
23    server.vm.boot_timeout = 1440
24    server.ssh.insert_key = false
25    server.ssh.username = 'vagrant'
26    server.ssh.password = 'vagrant'
27    server.vm.network :private_network,
28      ip: "192.168.1.1",
29      virtualbox_intnet: true
30    server.vm.provision "server dummy",
31      type: "shell",
32      preserve_order: true,
33      path: "provision/server/01-dummy.sh"
34    server.vm.provision "server dns",
```



## Раздел 3

### 3. Выводы

## 3.1 Выводы

- Установлен и настроен DNS-сервер BIND
- Реализован режим кэширующего и первичного сервера
- Настроены зоны `alkamal.net` и `1.168.192.in-addr.arpa`
- Созданы корректные A- и PTR-записи
- Подтверждена авторитетность сервера
- Открыт DNS в firewall
- Настроены параметры SELinux
- Сервер назначен DNS по умолчанию (127.0.0.1)
- Реализована автоматизация через `dns.sh` и `Vagrantfile`