

# Лабораторная работа №4

Дисциплина: Администрирование сетевых подсистем

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2 2. Выполнение лабораторной работы

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# Раздел 1

## 1. Цель работы

## 1.1 Цель работы

- Приобретение практических навыков установки и базового конфигурирования HTTP-сервера Apache

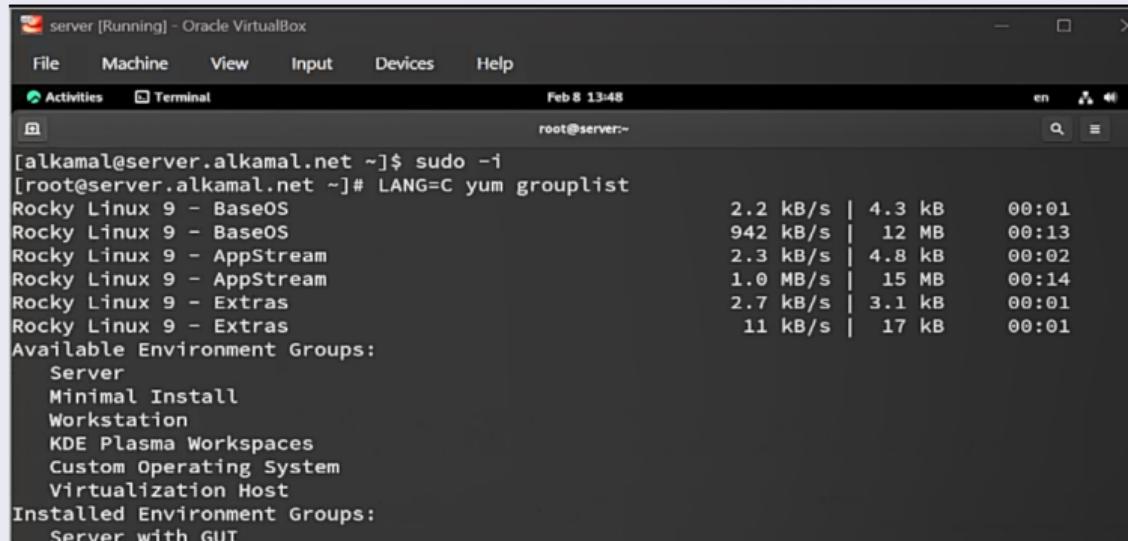
## Раздел 2

### 2. Выполнение лабораторной работы

## 2. Выполнение лабораторной работы

### 2.0.1 Установка HTTP-сервера

- Выполнен `yum grouplist`
- Обнаружена группа Basic Web Server
- Установлена среда Server with GUI



The screenshot shows a terminal window titled "server [Running] - Oracle VirtualBox". The window has a dark theme and contains the following terminal session:

```
[alkamal@server.alkamal.net ~]$ sudo -i
[root@server.alkamal.net ~]# LANG=C yum grouplist
Rocky Linux 9 - BaseOS
Rocky Linux 9 - BaseOS
Rocky Linux 9 - AppStream
Rocky Linux 9 - AppStream
Rocky Linux 9 - Extras
Rocky Linux 9 - Extras
Available Environment Groups:
  Server
  Minimal Install
  Workstation
  KDE Plasma Workspaces
  Custom Operating System
  Virtualization Host
Installed Environment Groups:
  Server with GUI
```

The output shows the results of the `yum grouplist` command, listing various groups available on the system. It includes two entries for "Rocky Linux 9 - BaseOS", two for "AppStream", and two for "Extras". Below this, it lists the "Available Environment Groups" and "Installed Environment Groups", both of which contain a single entry: "Server with GUI".

- Выполнена установка группы Basic Web Server
- Установлены пакеты httpd, mod\_ssl, mod\_fcgid
- Установлены зависимости apr, apr-util

```
[root@server.alkamal.net ~]# dnf -y groupinstall "Basic Web Server"
Last metadata expiration check: 0:00:18 ago on Sun 08 Feb 2026 01:48:25 PM UTC.
Dependencies resolved.
=====
          Package           Architecture   Version      Repository  Size
=====
Installing group/module packages:
  httpd             x86_64        2.4.62-7.el9_7.3    appstream   45 k
  httpd-manual      noarch       2.4.62-7.el9_7.3    appstream   2.2 M
  mod_fcgid         x86_64        2.3.9-28.el9      appstream   74 k
  mod_ssl           x86_64        1:2.4.62-7.el9_7.3  appstream  110 k
Installing dependencies:
  apr               x86_64        1.7.0-12.el9_3    appstream   122 k
  apr-util          x86_64        1.6.1-23.el9     appstream   94 k
  apr-util-bdb      x86_64        1.6.1-23.el9     appstream   12 k
  httpd-core        x86_64        2.4.62-7.el9_7.3  appstream   1.4 M
  httpd-filesystem  noarch       2.4.62-7.el9_7.3  appstream   12 k
  httpd-tools        x86_64        2.4.62-7.el9_7.3  appstream   79 k
  rocky-logos-httpd noarch       90.16-1.el9      appstream   24 k
Installing weak dependencies:
  apr-util-openssl  x86_64        1.6.1-23.el9     appstream   14 k
  mod_http2          x86_64        2.0.26-5.el9     appstream  163 k
  mod_lua            x86_64        2.4.62-7.el9_7.3  appstream   59 k
Installing Groups:
  Basic Web Server

Transaction Summary
=====
Install 14 Packages

Total download size: 4.4 M
Installed size: 14 M
```



## 2.1 Базовое конфигурирование HTTP-сервера

- Просмотрен каталог /etc/httpd/conf.d
- Обнаружены ssl.conf, welcome.conf, userdir.conf
- Подтверждена стандартная конфигурация Apache

```
[root@server.alkamal.net ~]# ls /etc/httpd/conf.d
autoindex.conf    manual.conf    rocky-snipolicy.conf    userdir.conf
fcgid.conf        README        ssl.conf            welcome.conf
[root@server.alkamal.net ~]# firewall-cmd --list-services
```

Рисунок 3: Содержимое каталога /etc/httpd/conf.d

- В firewalld добавлена служба http
- Правило добавлено временно и постоянно

```
[root@server.alkamal.net ~]# firewall-cmd --get-services
RH-Satellite-6 RH-Satellite-6-capsule afp amanda-client amanda-k5-client amqp amqps apcup
sd audit ausweisapp2 bacula bacula-client bareos-director bareos-filedaemon bareos-storag
e bb bgp bitcoin bitcoin-rpc bitcoin-testnet bitcoin-testnet-rpc bittorrent-lsd ceph ceph
-exporter ceph-mon cfengine checkmk-agent cockpit collectd condor-collector cratedb ctdb
dds dds-multicast dds-unicast dhcp dhcpcv6 dhcpcv6-client distcc dns dns-over-tls docker-re
gistry docker-swarm dropbox-lansync elasticsearch etcd-client etcd-server finger foreman
foreman-proxy freeipa-4 freeipa-ldap freeipa-ldaps freeipa-replication freeipa-trust ftp
galera ganglia-client ganglia-master git gpgsql grafana gre high-availability http http3 ht
tps ident imap imaps ipfs ipp ipp-client ipsec irc ircs iscsi-target jenkins kadmin
kdeconnect kerberos kibana klogin kpasswd kprop kshell kube-api kube-apiserver kube-contr
ol-plane kube-control-plane-secure kube-controller-manager kube-controller-manager-secure
kube-nodeport-services kube-scheduler kube-scheduler-secure kube-worker kubelet kubelet-
readonly kubelet-worker ldap ldaps libvirt libvirt-tls lightning-network llmnr llmnr-clie
nt llmnr-tcp llmnr-udp managesieve matrix mdns memcache minidlna mongodb mosh mountd mqtt
mqtt-tls ms-wbt mssql murmur mysql nbd nebula netbios-ns netdata-dashboard nfs nfs3 nmea
-0183 nrpe ntp nut opentelemetry openvpn ovirt-imageio ovirt-storageconsole ovirt-vmconsol
e plex pmcd pmproxy pmwebapi pmwebapis pop3 pop3s postgresql privoxy prometheus promethe
us-node-exporter proxy-dhcp ps2link ps3netsrv ptp pulseaudio puppetmaster quassel radius
rdp redis redis-sentinel rootd rpc-bind rquotad rsh rsyncd rtsp salt-master samba samba-c
lient samba-dc sane sip sips slp smtp smtp-submission smtptls snmp snmptls snmptls-trap snm
ptrap spideroak-lansync spotify-sync squid ssdp ssh steam-streaming svdrp svn syncthing s
yncthing-gui syncthing-relay synergy syslog syslog-tls telnet tentacle tftp tile38 tinc t
or-socks transmission-client upnp-client vdsm vnc-server warpinator 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 zerotier
[root@server.alkamal.net ~]# firewall-cmd --add-service=http
success
[root@server.alkamal.net ~]# firewall-cmd --add-service=http --permanent
success
[root@server.alkamal.net ~]#
```

Рисунок 4: Настройка firewalld для разрешения службы http

- Запущен мониторинг journalctl -x -f
- Контроль состояния службы в реальном времени

```
[root@server.alkamal.net ~]# journalctl -x -f
Feb 08 13:51:25 server.alkamal.net systemd[6928]: Starting Cleanup of User's Temporary Files and Directories...
Subject: A start job for unit UNIT has begun execution
Defined-By: systemd
Support: https://wiki.rockylinux.org/rocky/support

A start job for unit UNIT has begun execution.

The job identifier is 589.
Feb 08 13:51:25 server.alkamal.net systemd[6928]: Finished Cleanup of User's Temporary Files and Directories.
Subject: A start job for unit UNIT has finished successfully
Defined-By: systemd
Support: https://wiki.rockylinux.org/rocky/support
I
A start job for unit UNIT has finished successfully.

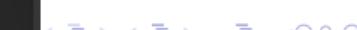
The job identifier is 589.
Feb 08 13:53:56 server.alkamal.net systemd[6928]: Started VTE child process 8323 launched by gnome-terminal-server process 7677.
Subject: A start job for unit UNIT has finished successfully
Defined-By: systemd
Support: https://wiki.rockylinux.org/rocky/support

A start job for unit UNIT has finished successfully.

The job identifier is 593.
Feb 08 13:54:00 server.alkamal.net PackageKit[7255]: daemon quit
Feb 08 13:54:01 server.alkamal.net systemd[1]: packagekit.service: Deactivated successfully.
Subject: Unit succeeded
Defined-By: systemd
Support: https://wiki.rockylinux.org/rocky/support

The unit packagekit.service has successfully entered the 'dead' state.
Feb 08 13:54:01 server.alkamal.net systemd[1]: packagekit.service: Consumed 1.728s CPU time.
Subject: Resources consumed by unit runtime
Defined-By: systemd
Support: https://wiki.rockylinux.org/rocky/support

The unit packagekit.service completed and consumed the indicated resources.
Feb 08 13:54:16 server.alkamal.net sudo[8357]: alkamal : TTY=tty1 : PWD=/root : USER=root : COMMAND=/h
```



- Выполнены `systemctl enable httpd` и `start httpd`
- Статус – active (running)
- Прослушивание портов 80 и 443

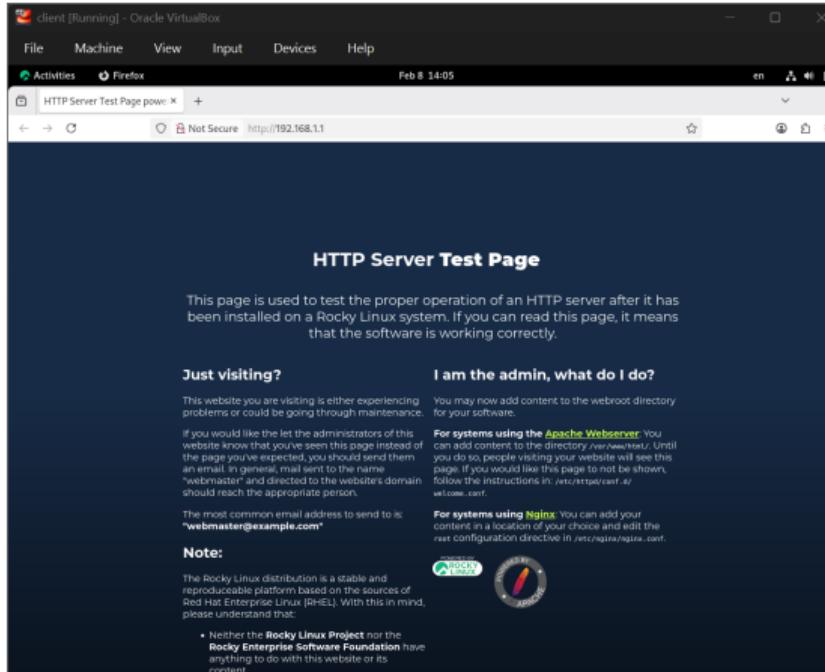
```
[root@server.alkamal.net ~]# systemctl enable httpd
Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service → /usr/lib/systemd/system/httpd.service.
[root@server.alkamal.net ~]# systemctl start httpd
[root@server.alkamal.net ~]# systemctl status httpd
● httpd.service - The Apache HTTP Server
    Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; preset: disabled)
    Active: active (running) since Sun 2026-02-08 13:56:08 UTC; 1min 13s ago
      Docs: man:httpd.service(8)
   Main PID: 8436 (httpd)
      Status: "Total requests: 0; Idle/Busy workers 100/0;Requests/sec: 0; Bytes served/sec: 0 B/sec"
        Tasks: 178 (limit: 4493)
       Memory: 21.9M (peak: 22.1M)
         CPU: 54ms
      CGroup: /system.slice/httpd.service
              └─8436 /usr/sbin/httpd -DFOREGROUND
                  ├─8437 /usr/sbin/httpd -DFOREGROUND
                  ├─8438 /usr/sbin/httpd -DFOREGROUND
                  ├─8439 /usr/sbin/httpd -DFOREGROUND
                  ├─8440 /usr/sbin/httpd -DFOREGROUND
                  └─8441 /usr/sbin/httpd -DFOREGROUND

Feb 08 13:56:08 server.alkamal.net systemd[1]: Starting The Apache HTTP Server...
Feb 08 13:56:08 server.alkamal.net systemd[1]: Started The Apache HTTP Server.
Feb 08 13:56:08 server.alkamal.net httpd[8436]: Server configured, listening on: port 443, port 80
[root@server.alkamal.net ~]# I
```

Рисунок 6: Состояние службы httpd после запуска

## 2.2 Анализ работы HTTP-сервера

- На клиенте открыт `http://192.168.1.1`
- Отображена страница HTTP Server Test Page
- Подтверждена работа Apache



- Выполнен мониторинг /var/log/httpd/access\_log
- Зафиксированы GET-запросы от 192.168.1.30
- Коды ответа 200 и 404

```
[root@server.alkamal.net ~]# tail -f /var/log/httpd/access_log
192.168.1.30 - - [08/Feb/2026:14:02:35 +0000] "GET / HTTP/1.1" 403 7620 "-" "Mozilla/5.0 (X11; Linux x86_64; rv:140.0) Gecko/20100101 Firefox/140.0"
192.168.1.30 - - [08/Feb/2026:14:02:36 +0000] "GET /icons/poweredbypng HTTP/1.1" 200 15443 "http://192.168.1.1/" "Mozilla/5.0 (X11; Linux x86_64; rv:140.0) Gecko/20100101 Firefox/140.0"
192.168.1.30 - - [08/Feb/2026:14:02:36 +0000] "GET /poweredby.png HTTP/1.1" 200 5714 "http://192.168.1.1/" "Mozilla/5.0 (X11; Linux x86_64; rv:140.0) Gecko/20100101 Firefox/140.0"
192.168.1.30 - - [08/Feb/2026:14:02:36 +0000] "GET /favicon.ico HTTP/1.1" 404 196 "http://192.168.1.1/" "Mozilla/5.0 (X11; Linux x86_64; rv:140.0) Gecko/20100101 Firefox/140.0"
```

Рисунок 8: Мониторинг access\_log веб-сервера

- Выполнен мониторинг /var/log/httpd/error\_log
- Сообщение об отсутствии index.html
- Код ответа 403

```
[root@server.alkamal.net ~]# tail -f /var/log/httpd/error_log
[Sun Feb 08 13:56:08.534092 2026] [core:notice] [pid 8436:tid 8436] SELinux policy enabled; httpd running as context system_u:system_r:httpd_t:s0
[Sun Feb 08 13:56:08.536261 2026] [suexec:notice] [pid 8436:tid 8436] AH01232: suEXEC mechanism enabled (wrapper: /usr/sbin/suexec)
[Sun Feb 08 13:56:08.547274 2026] [lbmethod_heartbeat:notice] [pid 8436:tid 8436] AH02282: No slotmem from mod_heartmonitor
[Sun Feb 08 13:56:08.551863 2026] [mpm_event:notice] [pid 8436:tid 8436] AH00489: Apache/2.4.62 (Rocky Linux) OpenSSL/3.5.1 mod_fcgid/2.3.9 configured -- resuming normal operations
[Sun Feb 08 13:56:08.551874 2026] [core:notice] [pid 8436:tid 8436] AH00094: Command line: '/usr/sbin/httpd -D FOREGROUND'
[Sun Feb 08 14:02:35.874632 2026] [autoindex:error] [pid 8440:tid 8591] [client 192.168.1.30:38780] AH01276: Cannot serve directory /var/www/html/: No matching DirectoryIndex (index.html) found, and server-generated directory index forbidden by Options directive
```

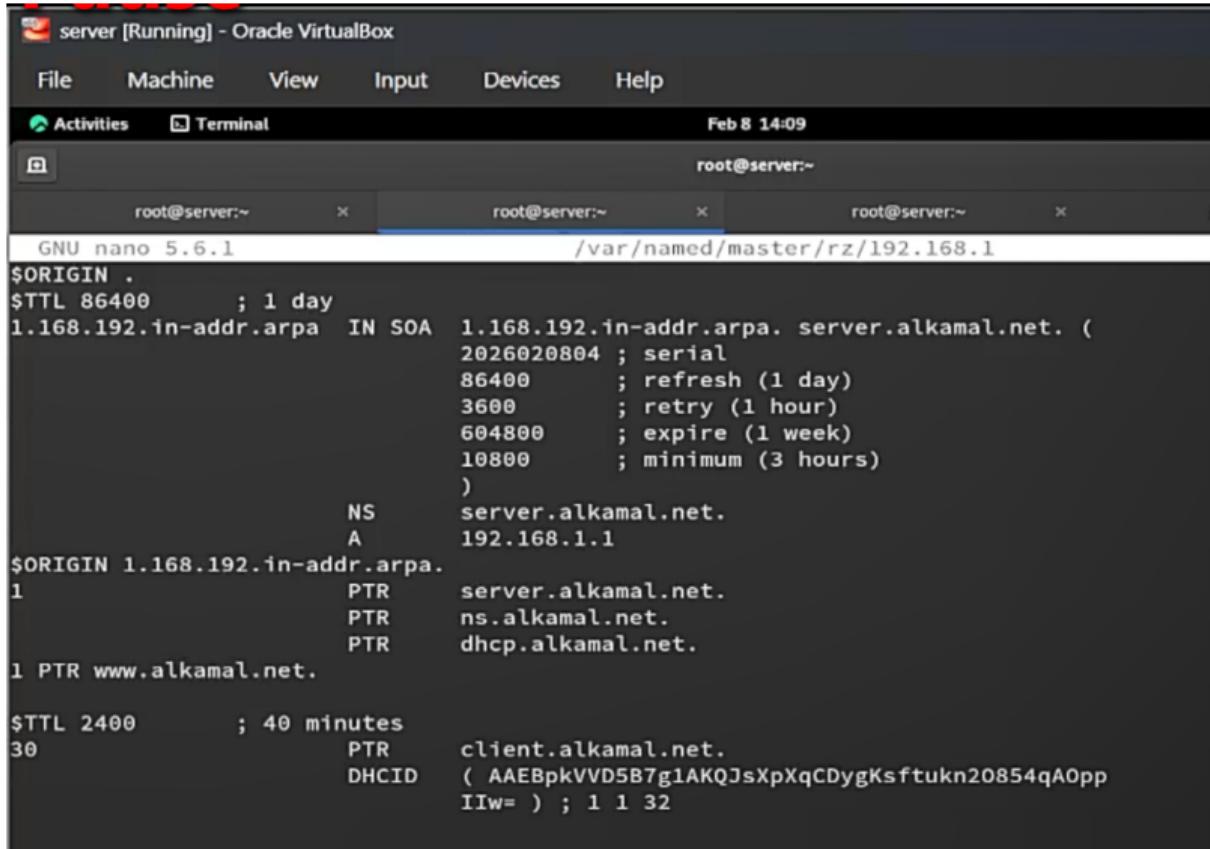
Рисунок 9: Мониторинг Error\_log веб-сервера

## 2.3 Настройка виртуального хостинга для HTTP-сервера

- В прямую зону добавлена запись www A 192.168.1.1
- Присутствует запись клиента с DHCID

```
GNU nano 5.6.1 /var/named/master/fz/alkamal.net
$ORIGIN .
$TTL 86400      ; 1 day
alkamal.net      IN SOA  alkamal.net. server.alkamal.net. (
                      2026020805 ; serial
                      86400       ; refresh (1 day)
                      3600        ; retry (1 hour)
                      604800     ; expire (1 week)
                      10800       ; minimum (3 hours)
)
                  NS  server.alkamal.net.
                  A   192.168.1.1
$ORIGIN alkamal.net.
$TTL 2400      ; 40 minutes
client          A   192.168.1.30
                DHCID ( AAEBpkVVD5B7g1AKQJsXpXqCDygKsftukn20854qA0pp
                           IIw= ) ; 1 1 32
$TTL 86400      ; 1 day
```

- В обратную зону добавлена PTR-запись
- 192.168.1.1 → www.alkamal.net.



The screenshot shows a terminal window titled "server [Running] - Oracle VirtualBox". The window has three tabs: "Activities", "Terminal", and "File". The "Terminal" tab is active, displaying the command "root@server:~". The content of the terminal window is a named configuration file:

```

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

$ORIGIN .
$TTL 86400      ; 1 day
1.168.192.in-addr.arpa  IN SOA 1.168.192.in-addr.arpa. server.alkamal.net. (
                            2026020804 ; serial
                            86400       ; refresh (1 day)
                            3600        ; retry (1 hour)
                            604800      ; expire (1 week)
                            10800       ; minimum (3 hours)
)
NS          server.alkamal.net.
A           192.168.1.1
$ORIGIN 1.168.192.in-addr.arpa.
1           PTR    server.alkamal.net.
                  PTR    ns.alkamal.net.
                  PTR    dhcp.alkamal.net.
1 PTR www.alkamal.net.

$TTL 2400      ; 40 minutes
30          PTR    client.alkamal.net.
DHCID      ( AAEBpkVVDSB7g1AKQJsXpXqCDygKsftukn20854qAOpp
IIw= ) ; 1 1 32

```

- Удалены файлы .jnl зон
- Обеспечено применение новых записей

```
[root@server.alkamal.net ~]# rm /var/named/master/fz/*.jnl
rm: remove regular file '/var/named/master/fz/alkamal.net.jnl'? y
[root@server.alkamal.net ~]# rm /var/named/master/rz/*.jnl
rm: remove regular file '/var/named/master/rz/192.168.1.jnl'? y
[root@server.alkamal.net ~]# █
```

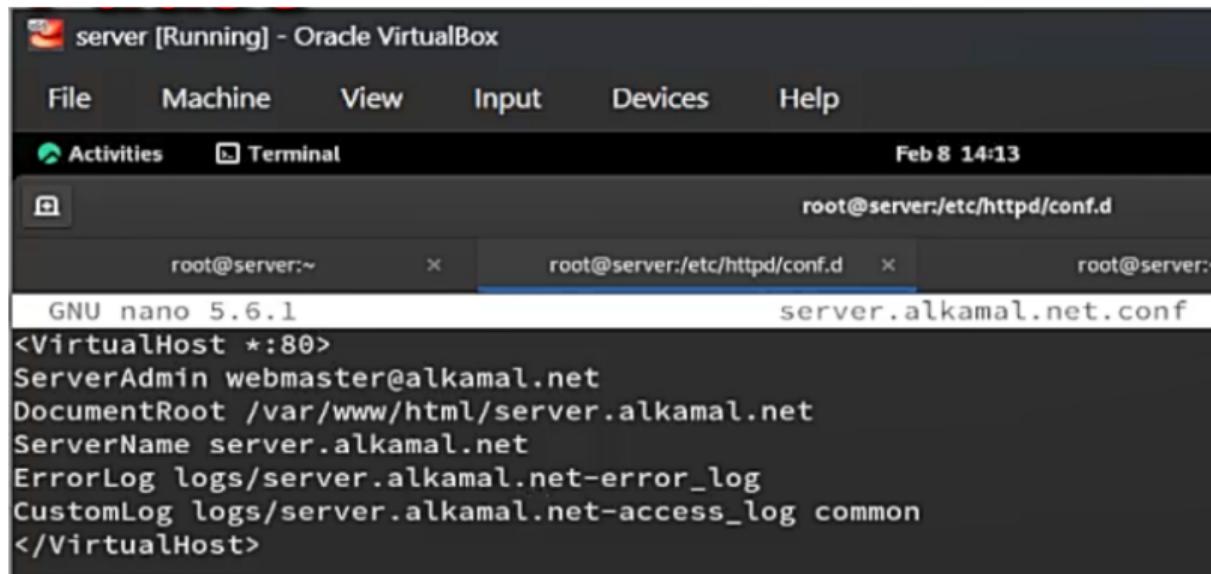
Рисунок 12: Удаление журналов DNS-зон (.jnl)

- Созданы файлы виртуальных хостов
- server.alkamal.net.conf
- www.alkamal.net.conf

```
[root@server.alkamal.net ~]# systemctl start named
[root@server.alkamal.net ~]# cd /etc/httpd/conf.d
[root@server.alkamal.net conf.d]# touch server.alkamal.net.conf
[root@server.alkamal.net conf.d]# touch www.alkamal.net.conf
[root@server.alkamal.net conf.d]# nano server.alkamal.net.conf
[root@server.alkamal.net conf.d]# nano www.alkamal.net.conf
```

Рисунок 13: Создание конфигурационных файлов виртуальных хостов

- В server.alkamal.net.conf задан <VirtualHost \* :80>
- Указаны ServerName, DocumentRoot
- Настроены отдельные лог-файлы



The screenshot shows a terminal window titled "server [Running] - Oracle VirtualBox". The window has tabs for "Activities" and "Terminal". The terminal title bar shows "root@server:/etc/httpd/conf.d". The terminal window contains three tabs: "root@server:~" (inactive), "root@server:/etc/httpd/conf.d" (active, showing the configuration file content), and "root@server:~" (inactive). The configuration file content is as follows:

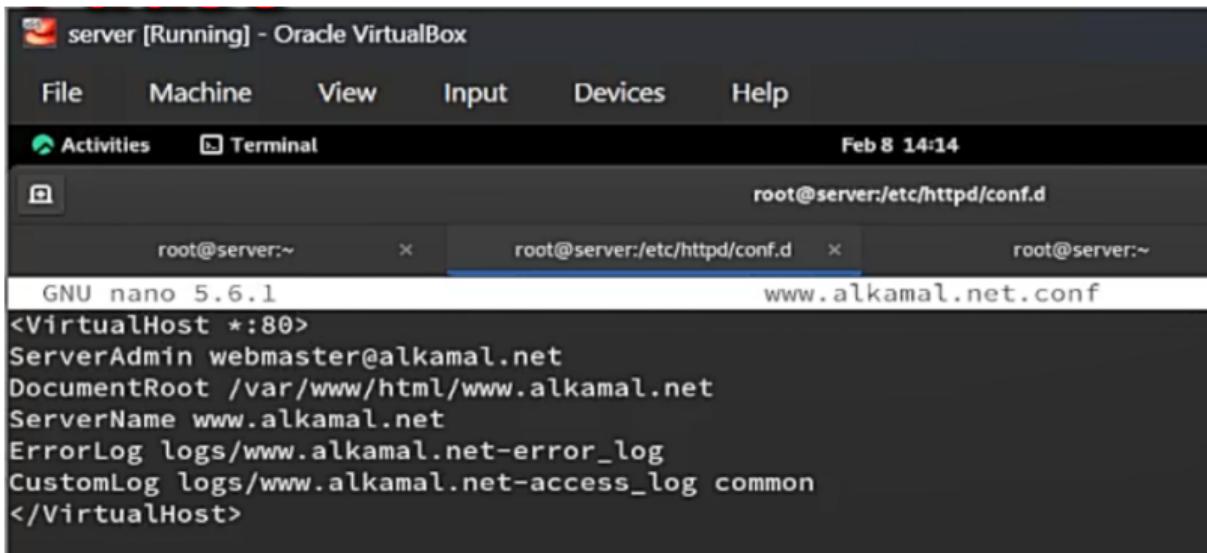
```

GNU nano 5.6.1
server.alkamal.net.conf
<VirtualHost *:80>
ServerAdmin webmaster@alkamal.net
DocumentRoot /var/www/html/server.alkamal.net
ServerName server.alkamal.net
ErrorLog logs/server.alkamal.net-error_log
CustomLog logs/server.alkamal.net-access_log common
</VirtualHost>

```

Рисунок 14: Конфигурация виртуального хоста server.alkamal.net

- В `www.alkamal.net.conf` настроен второй виртуальный хост
- Отдельный DocumentRoot
- Индивидуальные журналы



The screenshot shows a terminal window titled "server [Running] - Oracle VirtualBox". The window has a dark theme with white text. At the top, there's a menu bar with "File", "Machine", "View", "Input", "Devices", and "Help". Below the menu is a toolbar with "Activities" and "Terminal". The status bar at the top right shows the date and time: "Feb 8 14:14". The terminal window has three tabs: "root@server:~" (inactive), "root@server:/etc/httpd/conf.d" (active, highlighted in blue), and "root@server:~" (inactive). The active tab displays the configuration for the "www.alkamal.net.conf" file:

```

GNU nano 5.6.1
www.alkamal.net.conf
<VirtualHost *:80>
ServerAdmin webmaster@alkamal.net
DocumentRoot /var/www/html/www.alkamal.net
ServerName www.alkamal.net
ErrorLog logs/www.alkamal.net-error_log
CustomLog logs/www.alkamal.net-access_log common
</VirtualHost>

```

Рисунок 15: Конфигурация виртуального хоста `www.alkamal.net`

## 2.4 Создание контента виртуальных хостов

- Создан каталог /var/www/html/server.alkamal.net
- Создан файл index.html

```
[root@server.alkamal.net conf.d]# cd /var/www/html
[root@server.alkamal.net html]# mkdir server.alkamal.net
[root@server.alkamal.net html]# cd /var/www/html/server.alkamal.net
[root@server.alkamal.net server.alkamal.net]# touch index.html
[root@server.alkamal.net server.alkamal.net]# nano index.html
```

Рисунок 16: Создание каталога server.alkamal.net и файла index.html

- В index.html добавлено тестовое содержимое

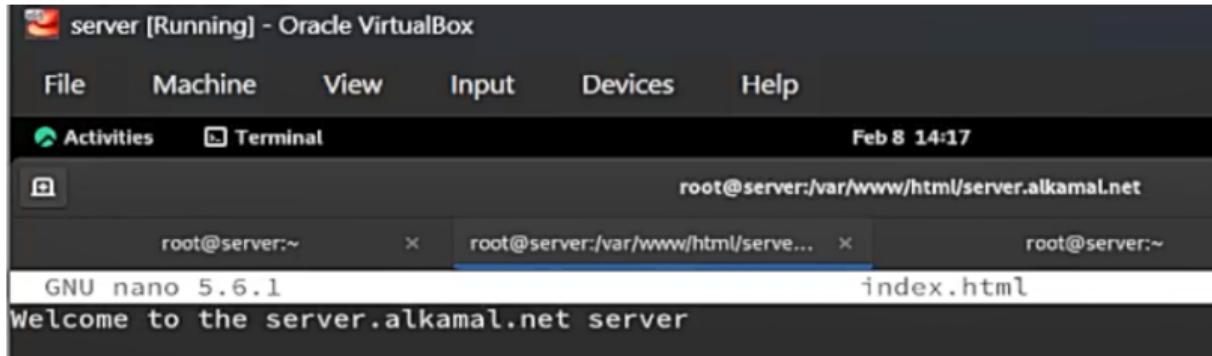


Рисунок 17: Содержимое index.html для server.alkamal.net

- Создан каталог /var/www/html/www.alkamal.net
- Создан файл index.html

```
[root@server.alkamal.net server.alkamal.net]# cd /var/www/html
[root@server.alkamal.net html]# mkdir www.alkamal.net
[root@server.alkamal.net html]# cd /var/www/html/www.alkamal.net
[root@server.alkamal.net www.alkamal.net]# touch index.html
[root@server.alkamal.net www.alkamal.net]# nano index.html
```

Рисунок 18: Создание каталога www.alkamal.net и файла index.html

- В index.html добавлено тестовое содержимое

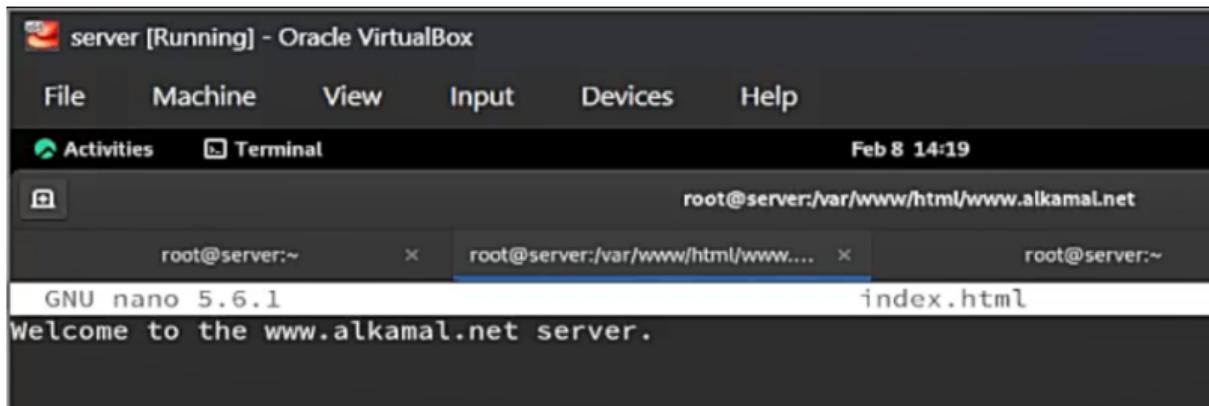


Рисунок 19: Содержимое index.html для www.alkamal.net

## 2.5 Настройка прав доступа и SELinux

- Выполнен chown -R apache:apache /var/www
- Восстановлены SELinux-контексты
- Перезапущен httpd

```
[root@server.alkamal.net www.alkamal.net]# chown -R apache:apache /var/www
[root@server.alkamal.net www.alkamal.net]# restorecon -vR /etc
Relabeled /etc/resolv.conf from unconfined_u:object_r:etc_t:s0 to unconfined_u:object_r:net_conf_t:s0
Relabeled /etc/sysconfig/network-scripts/ifcfg-eth1 from unconfined_u:object_r:user_tmp_t:s0 to unconfined_u:object_r:net_conf_t:s0
Relabeled /etc/resolv.conf.bak from unconfined_u:object_r:etc_t:s0 to unconfined_u:object_r:net_conf_t:s0
[root@server.alkamal.net www.alkamal.net]# restorecon -vR /var/named
[root@server.alkamal.net www.alkamal.net]# restorecon -vR /var/www
[root@server.alkamal.net www.alkamal.net]# systemctl restart httpd
[root@server.alkamal.net www.alkamal.net]# █
```

Рисунок 20: Корректировка прав доступа, восстановление контекста SELinux и перезапуск httpd

## 2.6 Проверка работы виртуальных хостов

- На клиенте открыт `http://server.alkamal.net`
- Отображена тестовая страница

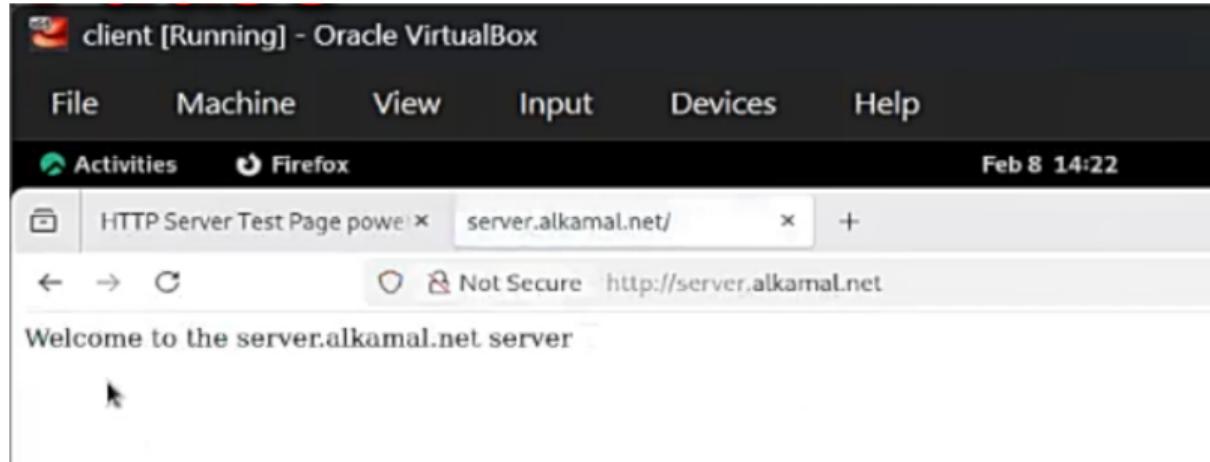


Рисунок 21: Доступ к виртуальному хосту `server.alkamal.net`

- Открыт <http://www.alkamal.net>
- Отображена вторая тестовая страница

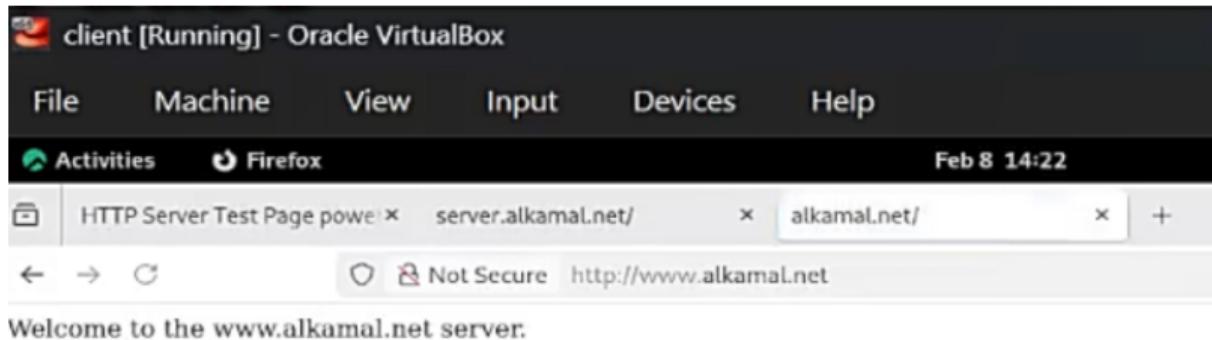


Рисунок 22: Доступ к виртуальному хосту [www.alkamal.net](http://www.alkamal.net)

## 2.7 Внесение изменений в настройки внутреннего окружения виртуальной машины

- Создана структура http/etc/httpd/conf.d
- Создана структура http/var/www/html
- Скопированы конфигурации и контент

```
[alkamal@server.alkamal.net ~]$ sudo -i
[sudo] password for alkamal:
[root@server.alkamal.net ~]# cd /vagrant/provision/server
[root@server.alkamal.net server]# mkdir -p /vagrant/provision/server/http/etc/httpd/conf.d
[root@server.alkamal.net server]# mkdir -p /vagrant/provision/server/http/var/www/html
[root@server.alkamal.net server]# cp -R /etc/httpd/conf.d/* /vagrant/provision/server/http/etc/httpd/conf.d/
[root@server.alkamal.net server]# cp -R /var/www/html/* /vagrant/provision/server/http/var/www/html
[root@server.alkamal.net server]# cd /vagrant/provision/server/dns/
[root@server.alkamal.net dns]# cp -R /var/named/* /vagrant/provision/server/dns/var/named/
cp: overwrite '/vagrant/provision/server/dns/var/named/data/named.run'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/dynamic/managed-keys.bind'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/dynamic/managed-keys.bind.jnl'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/master/fz/alkamal.net'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/master/rz/192.168.1'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/named.ca'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/named.empty'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/named.localhost'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/named.loopback'? y
[root@server.alkamal.net dns]# cd /vagrant/provision/server
[root@server alkamal net server]# touch http.sh
```



- Скопированы файлы DNS-зон в provision

```
[alkamal@server.alkamal.net ~]$ sudo -i
[sudo] password for alkamal:
[root@server.alkamal.net ~]# cd /vagrant/provision/server
[root@server.alkamal.net server]# mkdir -p /vagrant/provision/server/http/etc/httpd/conf.d
[root@server.alkamal.net server]# mkdir -p /vagrant/provision/server/http/var/www/html
[root@server.alkamal.net server]# cp -R /etc/httpd/conf.d/* /vagrant/provision/server/http/etc/httpd/conf.d/
[root@server.alkamal.net server]# cp -R /var/www/html/* /vagrant/provision/server/http/var/www/html
[root@server.alkamal.net server]# cd /vagrant/provision/server/dns/
[root@server.alkamal.net dns]# cp -R /var/named/* /vagrant/provision/server/dns/var/named/
cp: overwrite '/vagrant/provision/server/dns/var/named/data/named.run'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/dynamic/managed-keys.bind'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/dynamic/managed-keys.bind.jnl'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/master/fz/alkamal.net'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/master/rz/192.168.1'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/named.ca'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/named.empty'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/named.localhost'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/named.loopback'? y
[root@server.alkamal.net dns]# cd /vagrant/provision/server
[root@server.alkamal.net server]# touch http.sh
[root@server.alkamal.net server]# chmod +x http.sh
[root@server.alkamal.net server]# nano http.sh
```

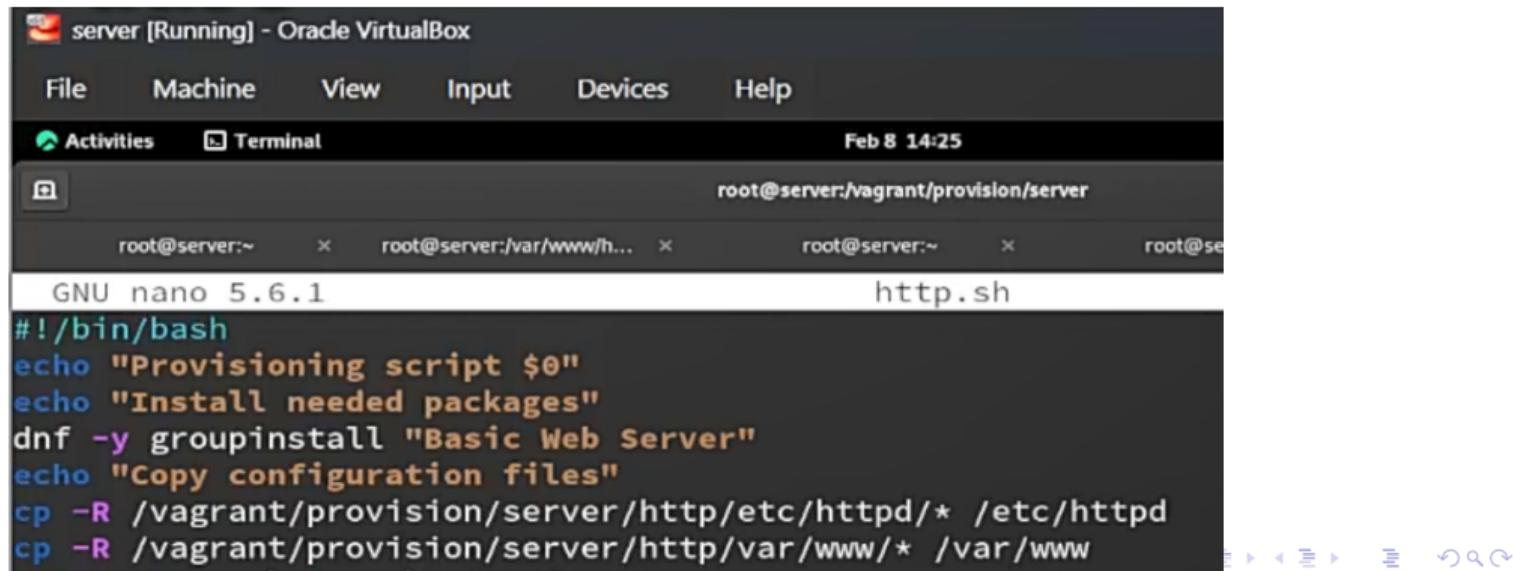
Рисунок 24: Копирование файлов DNS-зон в каталог provision

- Создан исполняемый файл http.sh

```
[alkamal@server.alkamal.net ~]$ sudo -i
[sudo] password for alkamal:
[root@server.alkamal.net ~]# cd /vagrant/provision/server
[root@server.alkamal.net server]# mkdir -p /vagrant/provision/server/http/etc/httpd/conf.d
[root@server.alkamal.net server]# mkdir -p /vagrant/provision/server/http/var/www/html
[root@server.alkamal.net server]# cp -R /etc/httpd/conf.d/* /vagrant/provision/server/http/etc/httpd/conf.d/
[root@server.alkamal.net server]# cp -R /var/www/html/* /vagrant/provision/server/http/var/www/html
[root@server.alkamal.net server]# cd /vagrant/provision/server/dns/
[root@server.alkamal.net dns]# cp -R /var/named/* /vagrant/provision/server/dns/var/named/
cp: overwrite '/vagrant/provision/server/dns/var/named/data/named.run'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/dynamic/managed-keys.bind'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/dynamic/managed-keys.bind.jnl'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/master/fz/alkamal.net'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/master/rz/192.168.1'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/named.ca'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/named.empty'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/named.localhost'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/named.loopback'? y
[root@server.alkamal.net dns]# cd /vagrant/provision/server
[root@server.alkamal.net server]# touch http.sh
[root@server.alkamal.net server]# chmod +x http.sh
[root@server.alkamal.net server]# nano http.sh
```

Рисунок 25: Создание и подготовка файла http.sh

- В `http.sh` реализованы:
- установка Basic Web Server
- копирование конфигураций
- назначение владельца apache
- восстановление SELinux
- настройка firewalld
- запуск httpd



```

server [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Activities Terminal Feb 8 14:25
root@server:/vagrant/provision/server
root@server:~      ×   root@server:/var/www/h...  ×   root@server:~      ×   root@se
GNU nano 5.6.1          http.sh
#!/bin/bash
echo "Provisioning script $0"
echo "Install needed packages"
dnf -y groupinstall "Basic Web Server"
echo "Copy configuration files"
cp -R /vagrant/provision/server/http/etc/httpd/* /etc/httpd
cp -R /vagrant/provision/server/http/var/www/* /var/www

```

- В Vagrantfile добавлен provisioner shell
- Указан путь provision/server/http.sh
- Установлен preserve\_order: true

```
C: > work > alkamal > vagrant > Vagrantfile
42   server.vm.provision "server http",
43     type: "shell",
44     preserve_order: true,
45     path: "provision/server/http.sh"
```

Рисунок 27: Добавление provisioner в Vagrantfile

## Раздел 3

### 3. Выводы

### 3.1 Выводы

- Установлен и настроен HTTP-сервер Apache
- Открыта служба `http` в firewall
- Подтверждён запуск `httpd`
- Настроен виртуальный хостинг для двух доменов
- Созданы отдельные DocumentRoot и лог-файлы
- Обновлены DNS-записи (A и PTR)
- Проверена доступность сайтов с клиента
- Реализована автоматизация через `http.sh` и `Vagrantfile`