

# Лабораторная работа №4

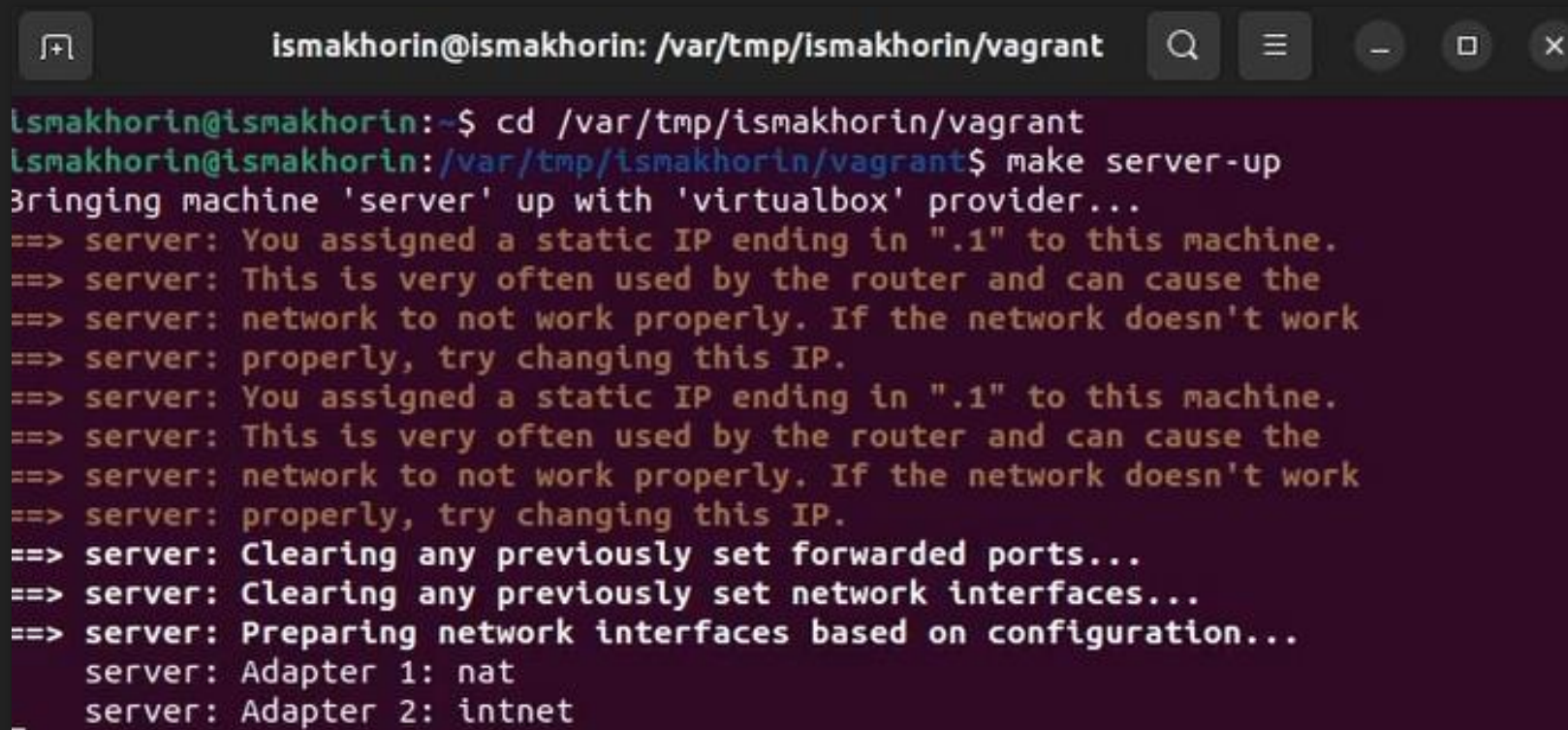
Базовая настройка HTTP-сервера Apache

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НПИБД-02-21

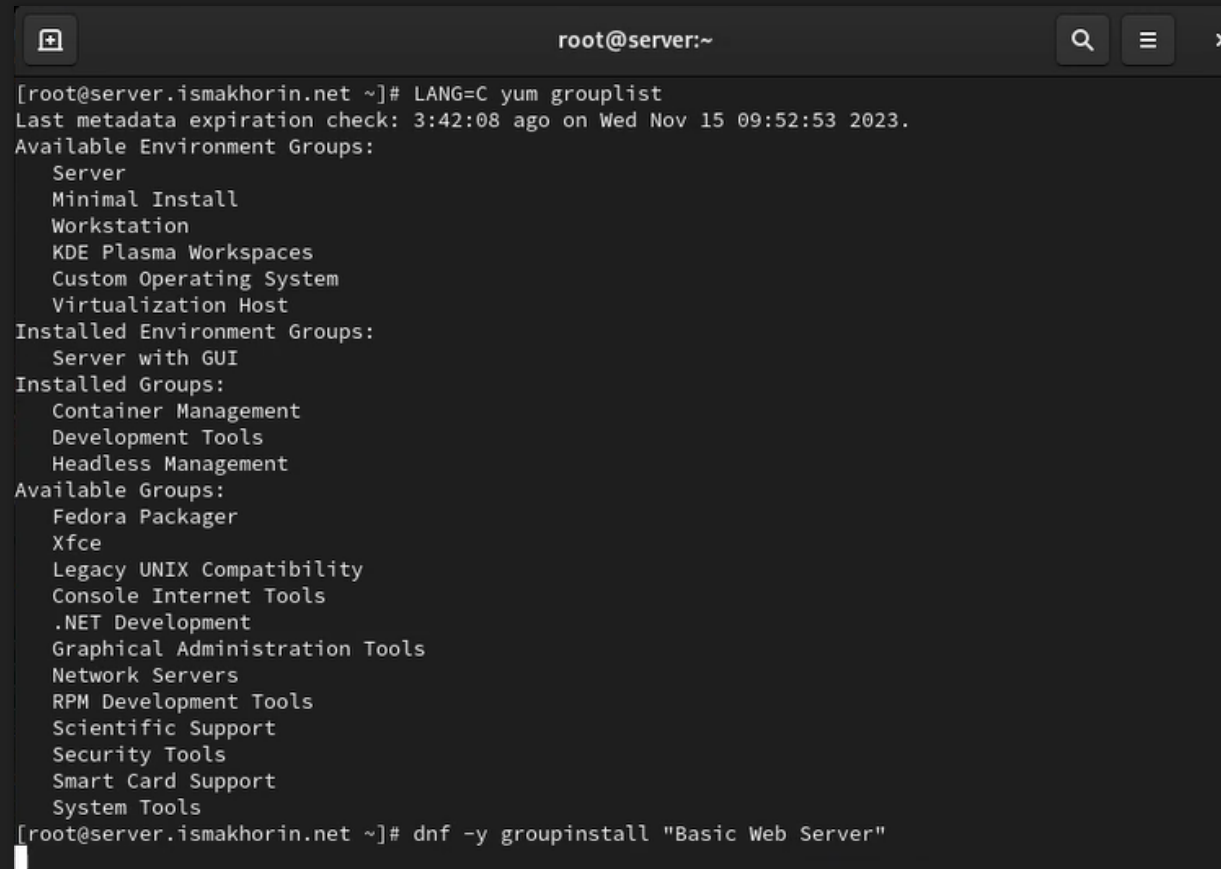
# Установка HTTP-сервера



```
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...
==> server: Clearing any previously set network interfaces...
==> server: Preparing network interfaces based on configuration...
server: Adapter 1: nat
server: Adapter 2: intnet
```

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

# Установка HTTP-сервера

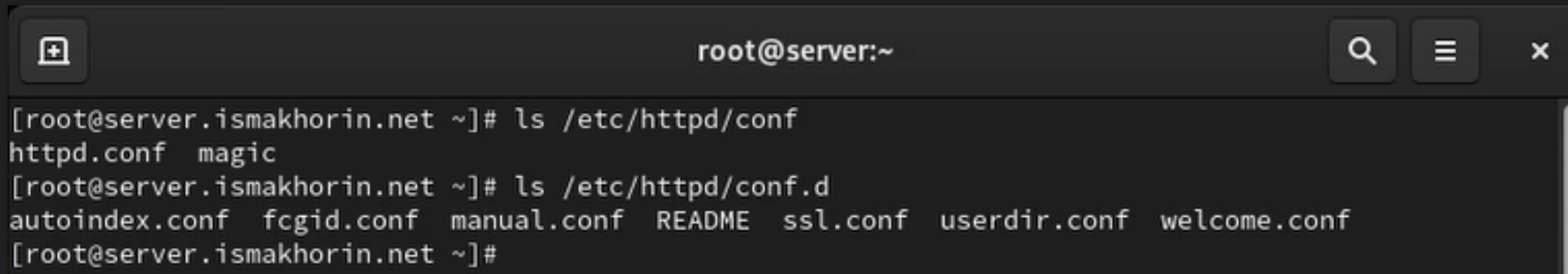


A terminal window titled 'root@server:~' with search, menu, and close buttons in the title bar. The terminal shows the execution of 'yum grouplist' and 'dnf -y groupinstall "Basic Web Server"' commands. The output lists available and installed environment groups, and a list of available groups including 'Basic Web Server'.

```
root@server:~  
[root@server.ismakhorin.net ~]# LANG=C yum grouplist  
Last metadata expiration check: 3:42:08 ago on Wed Nov 15 09:52:53 2023.  
Available Environment Groups:  
  Server  
  Minimal Install  
  Workstation  
  KDE Plasma Workspaces  
  Custom Operating System  
  Virtualization Host  
Installed Environment Groups:  
  Server with GUI  
Installed Groups:  
  Container Management  
  Development Tools  
  Headless Management  
Available Groups:  
  Fedora Packager  
  Xfce  
  Legacy UNIX Compatibility  
  Console Internet Tools  
  .NET Development  
  Graphical Administration Tools  
  Network Servers  
  RPM Development Tools  
  Scientific Support  
  Security Tools  
  Smart Card Support  
  System Tools  
[root@server.ismakhorin.net ~]# dnf -y groupinstall "Basic Web Server"
```

Рис. 1.2. Переход в режим суперпользователя и установка из репозитория стандартного веб-сервера.

# Базовое конфигурирование HTTP-сервера

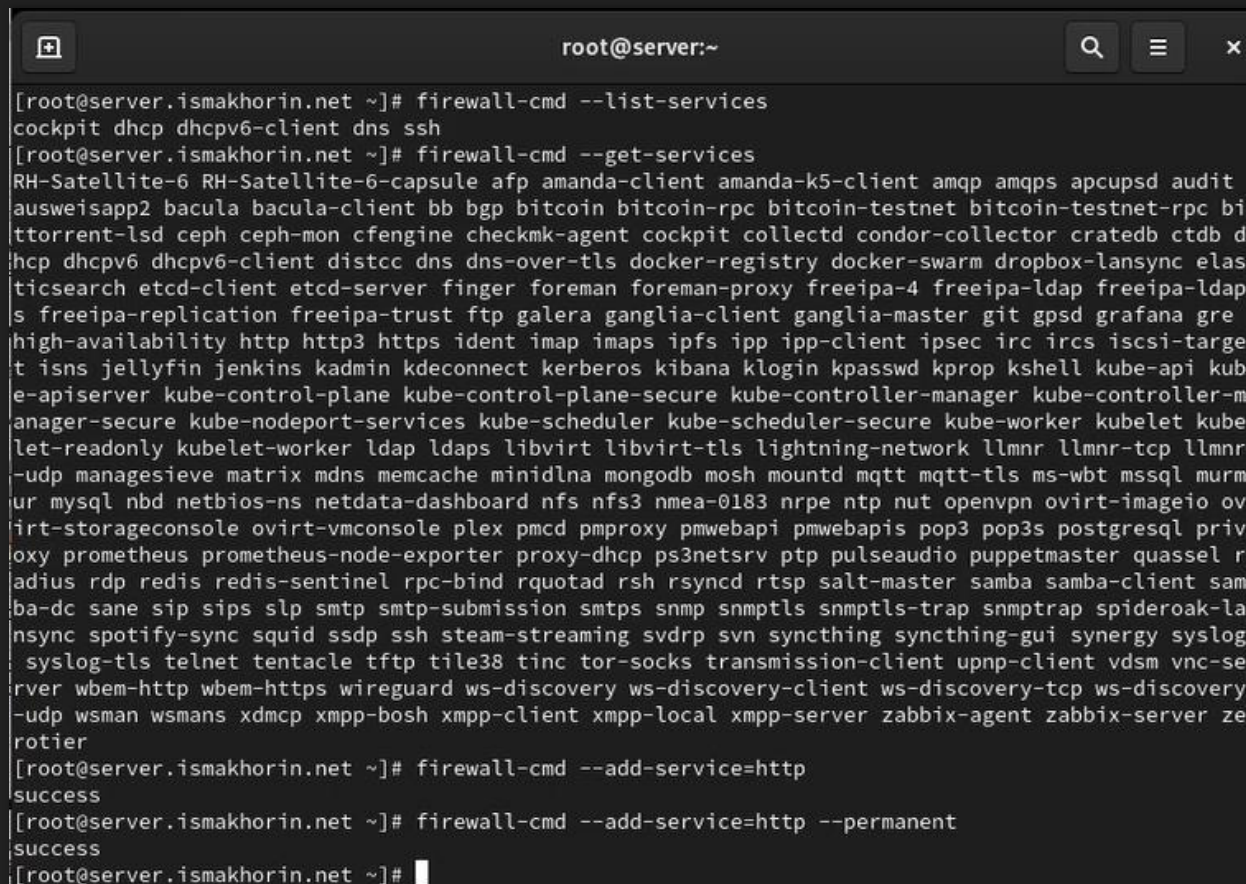


```
root@server:~  
[root@server.ismakhorin.net ~]# ls /etc/httpd/conf  
httpd.conf  magic  
[root@server.ismakhorin.net ~]# ls /etc/httpd/conf.d  
autoindex.conf  fcgid.conf  manual.conf  README  ssl.conf  userdir.conf  welcome.conf  
[root@server.ismakhorin.net ~]#
```

**Рис. 2.1.** Просмотр конфигурационных файлов в каталогах `/etc/httpd/conf` и `/etc/httpd/conf.d`.



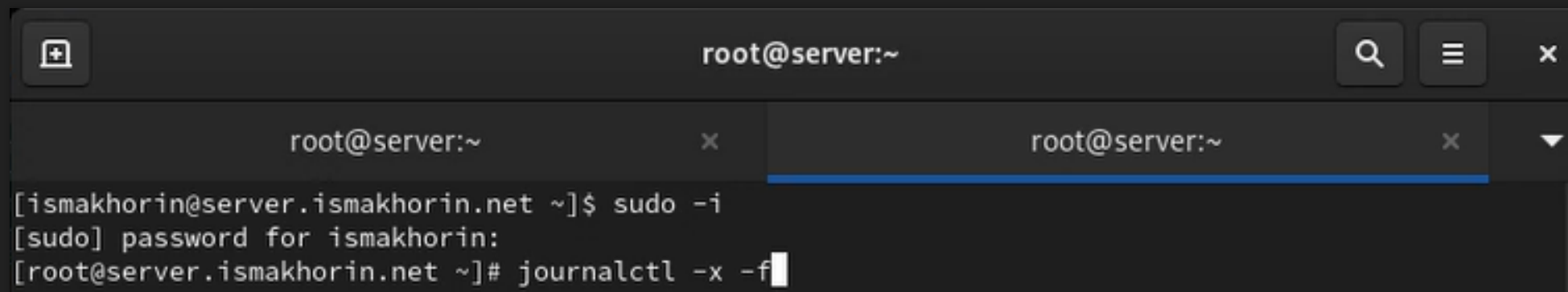
# Базовое конфигурирование HTTP-сервера



```
root@server:~  
[root@server.ismakhorin.net ~]# firewall-cmd --list-services  
cockpit dhcp dhcpv6-client dns ssh  
[root@server.ismakhorin.net ~]# 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 nmea-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 vdsms 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 ~]# firewall-cmd --add-service=http  
success  
[root@server.ismakhorin.net ~]# firewall-cmd --add-service=http --permanent  
success  
[root@server.ismakhorin.net ~]#
```

Рис. 2.2. Внесение изменений в настройки межсетевого экрана узла server, разрешив работу с http.

# Базовое конфигурирование HTTP-сервера

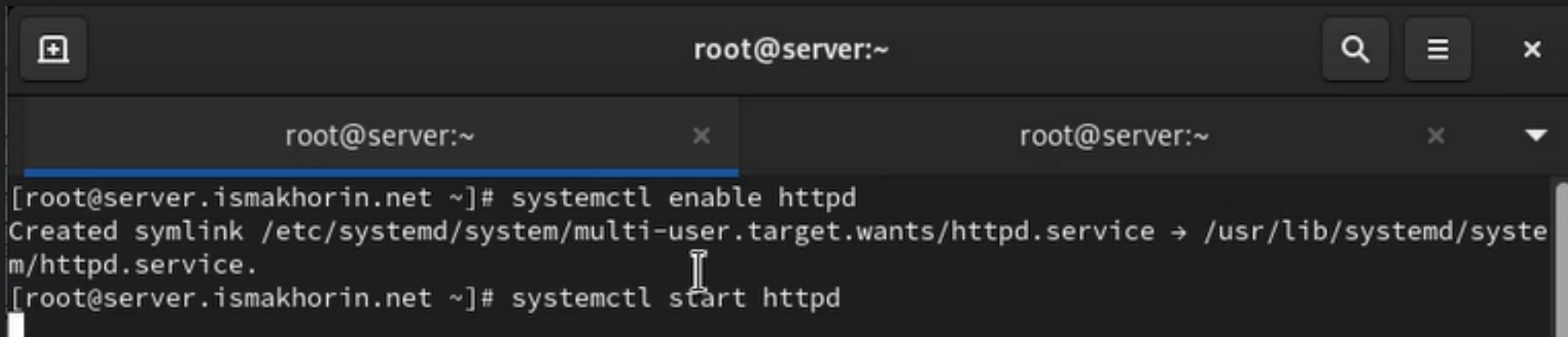


The image shows a terminal window with a dark background. At the top, the prompt is 'root@server:~'. Below this, there are two tabs, both labeled 'root@server:~'. The active tab shows the following commands and output:

```
[ismakhorin@server.ismakhorin.net ~]$ sudo -i  
[sudo] password for ismakhorin:  
[root@server.ismakhorin.net ~]# journalctl -x -f
```

**Рис. 2.3.** Запуск в дополнительном терминале в режиме реального времени расширенного лога системных сообщений для проверки корректности работы системы.

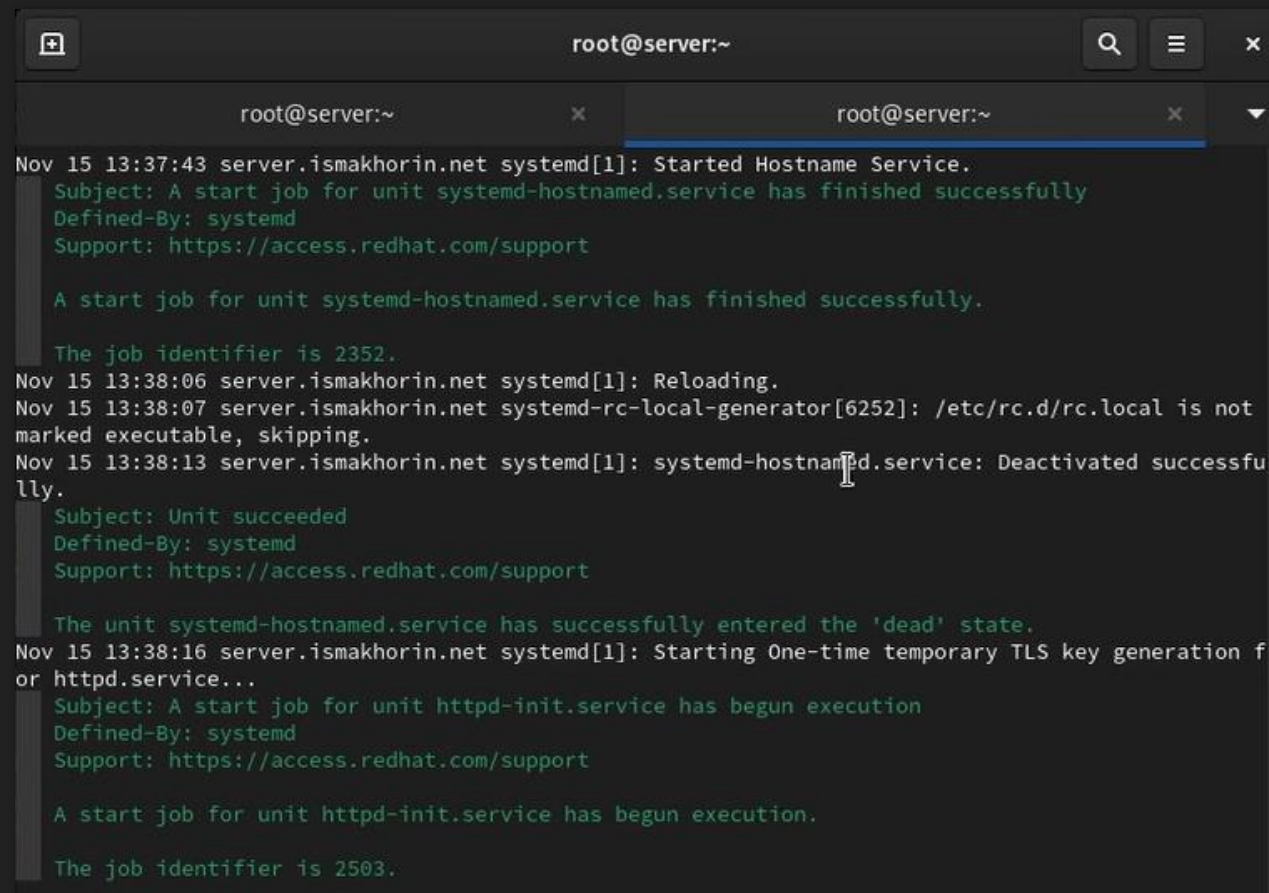
# Базовое конфигурирование HTTP-сервера



```
root@server:~  
[root@server.ismakhorin.net ~]# systemctl enable httpd  
Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service → /usr/lib/systemd/system/httpd.service.  
[root@server.ismakhorin.net ~]# systemctl start httpd
```

Рис. 2.4. Активация и запуск HTTP-сервера.

# Базовое конфигурирование HTTP-сервера

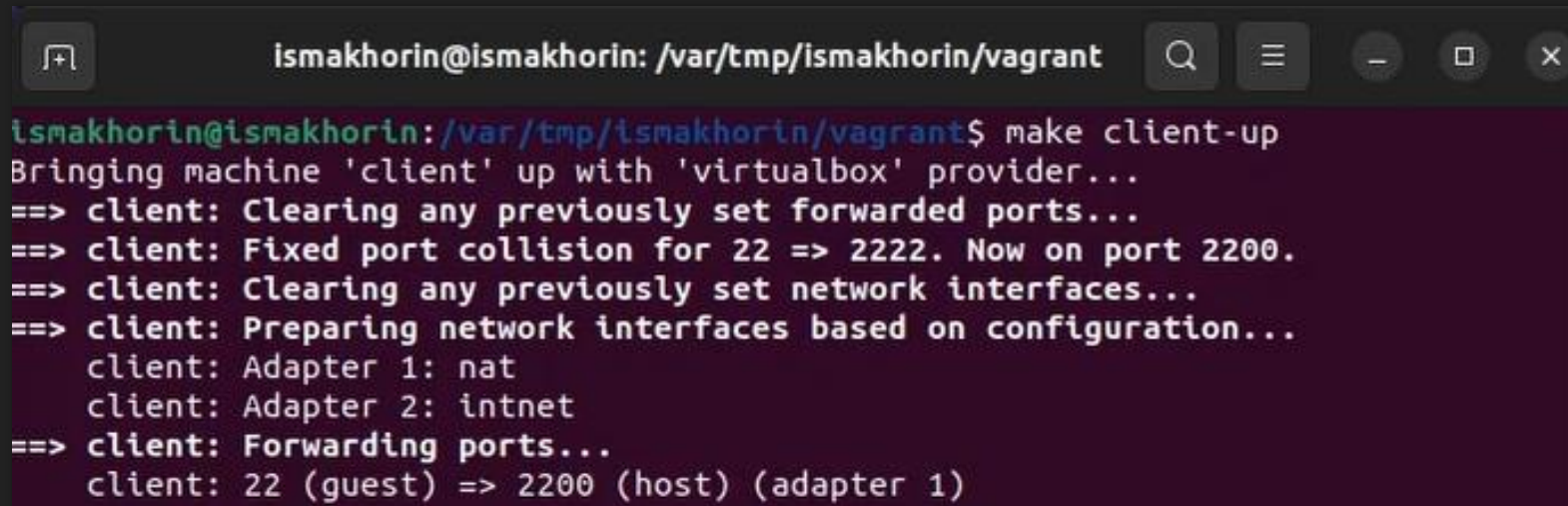


```
Nov 15 13:37:43 server.ismakhorin.net systemd[1]: Started Hostname Service.  
Subject: A start job for unit systemd-hostnamed.service has finished successfully  
Defined-By: systemd  
Support: https://access.redhat.com/support  
  
A start job for unit systemd-hostnamed.service has finished successfully.  
  
The job identifier is 2352.  
Nov 15 13:38:06 server.ismakhorin.net systemd[1]: Reloading.  
Nov 15 13:38:07 server.ismakhorin.net systemd-rc-local-generator[6252]: /etc/rc.d/rc.local is not  
marked executable, skipping.  
Nov 15 13:38:13 server.ismakhorin.net systemd[1]: systemd-hostnamed.service: Deactivated successfully.  
Subject: Unit succeeded  
Defined-By: systemd  
Support: https://access.redhat.com/support  
  
The unit systemd-hostnamed.service has successfully entered the 'dead' state.  
Nov 15 13:38:16 server.ismakhorin.net systemd[1]: Starting One-time temporary TLS key generation for httpd.service...  
Subject: A start job for unit httpd-init.service has begun execution  
Defined-By: systemd  
Support: https://access.redhat.com/support  
  
A start job for unit httpd-init.service has begun execution.  
  
The job identifier is 2503.
```

Рис. 2.5. Просмотр расширенного лога системных сообщений.



# Анализ работы HTTP-сервера

A terminal window with a dark background and light-colored text. The window title bar shows the user 'ismakhorin' and the current directory '/var/tmp/ismakhorin/vagrant'. The terminal output shows the command 'make client-up' being executed, which triggers a series of actions: bringing up the 'client' machine with the 'virtualbox' provider, clearing previously set forwarded ports, fixing a port collision for port 22 to 2200, clearing previously set network interfaces, and preparing network interfaces based on configuration. The output also shows the network adapters being set to 'nat' and 'intnet', and finally, forwarding port 22 from the guest to port 2200 on the host via adapter 1.

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

Рис. 3.1. Запуск виртуальной машины client.

# Анализ работы HTTP-сервера

```
[root@server.ismakhorin.net ~]# tail -f /var/log/httpd/access_log
192.168.1.30 - - [15/Nov/2023:13:50:44 +0000] "GET / HTTP/1.1" 403 7620 "-" "Mozilla/5.0 (X11; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/115.0"
192.168.1.30 - - [15/Nov/2023:13:50:45 +0000] "GET /icons/poweredby.png HTTP/1.1" 200 15443 "http://192.168.1.1/" "Mozilla/5.0 (X11; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/115.0"
192.168.1.30 - - [15/Nov/2023:13:50:45 +0000] "GET /poweredby.png HTTP/1.1" 200 5714 "http://192.168.1.1/" "Mozilla/5.0 (X11; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/115.0"
192.168.1.30 - - [15/Nov/2023:13:50:46 +0000] "GET /favicon.ico HTTP/1.1" 404 196 "http://192.168.1.1/" "Mozilla/5.0 (X11; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/115.0"
```

**Рис. 3.2.** Запуск мониторинга доступа к веб-серверу на виртуальной машине server.

# Анализ работы HTTP-сервера

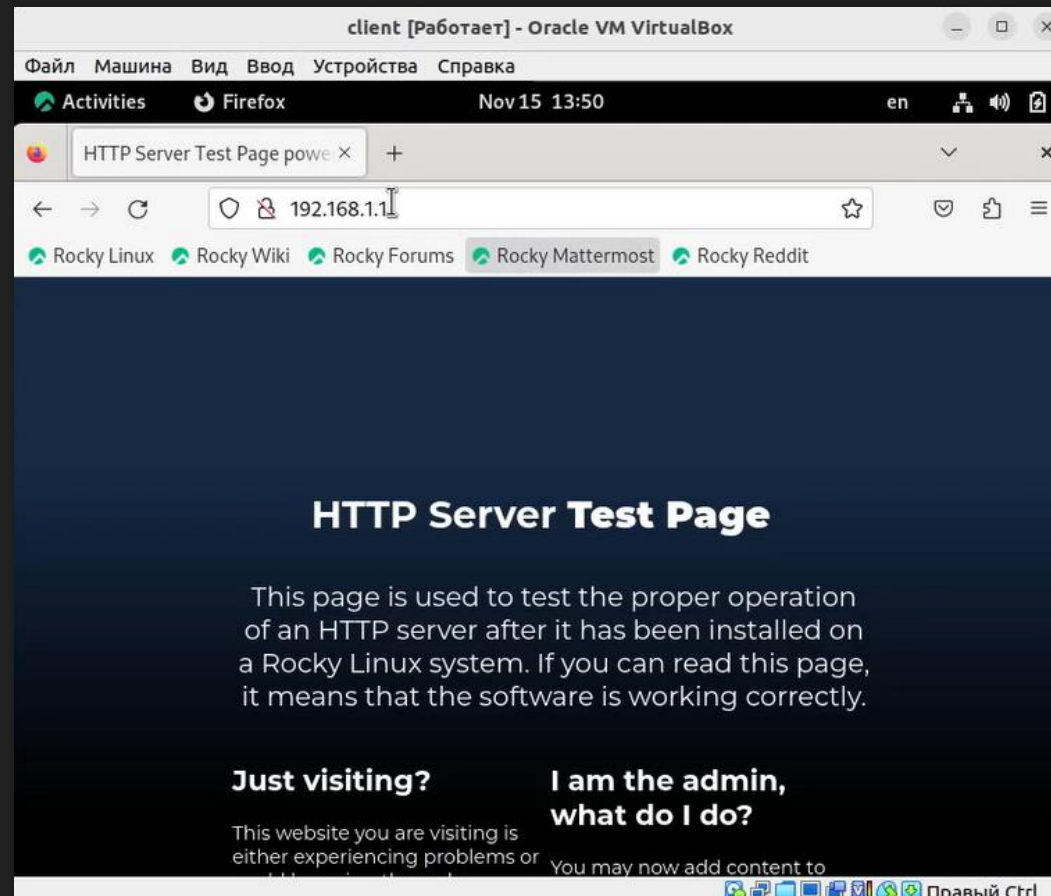


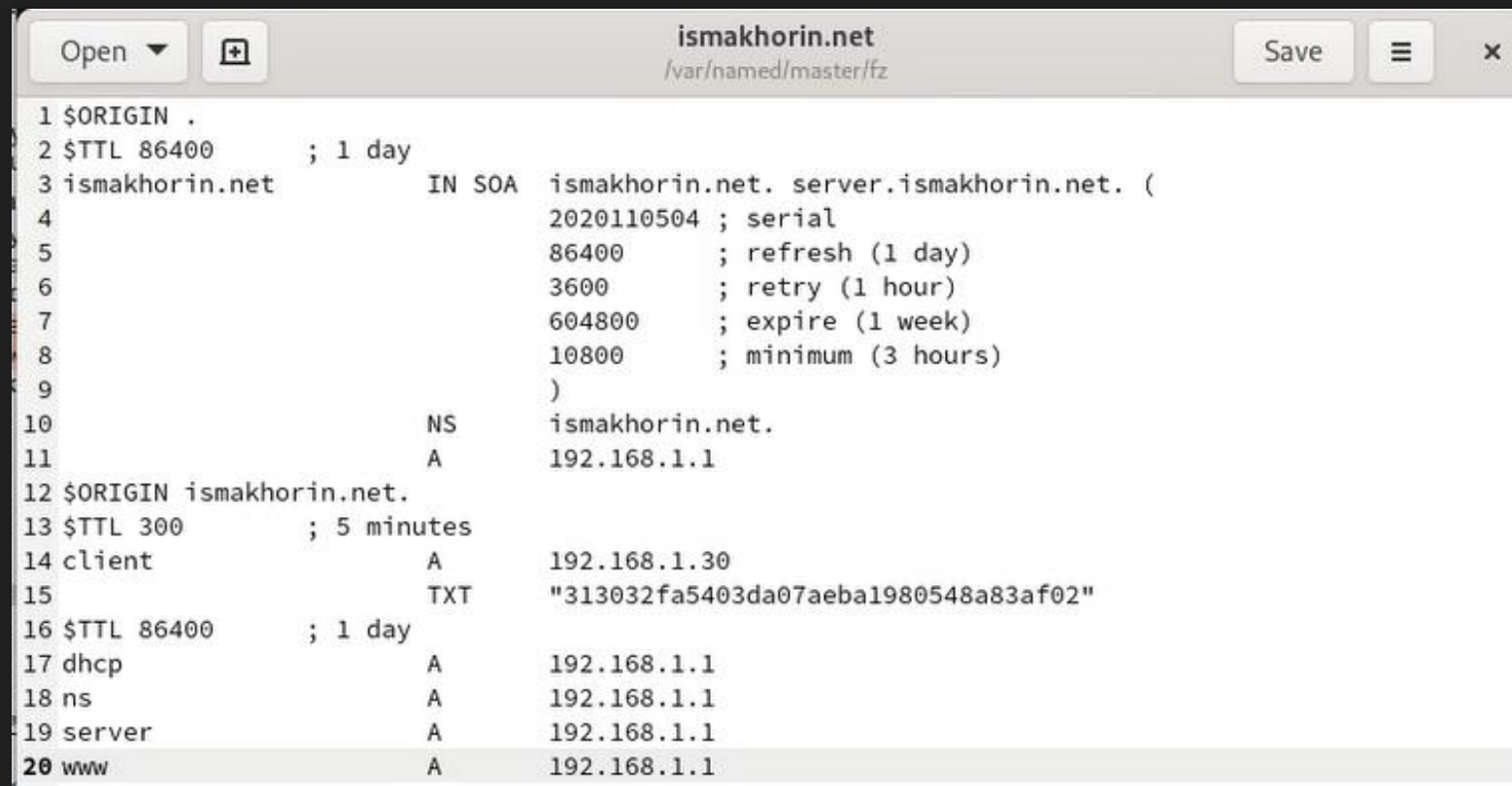
Рис. 3.3. Запуск браузера на виртуальной машине client и ввод в адресной строке 192.168.1.1.

# Настройка виртуального хостинга для HTTP-сервера

```
[root@server.ismakhorin.net ~]# systemctl stop named  
[root@server.ismakhorin.net ~]# █
```

**Рис. 4.1.** Остановка работы DNS-сервера для внесения изменений в файлы описания DNS-зон.

# Настройка виртуального хостинга для HTTP-сервера



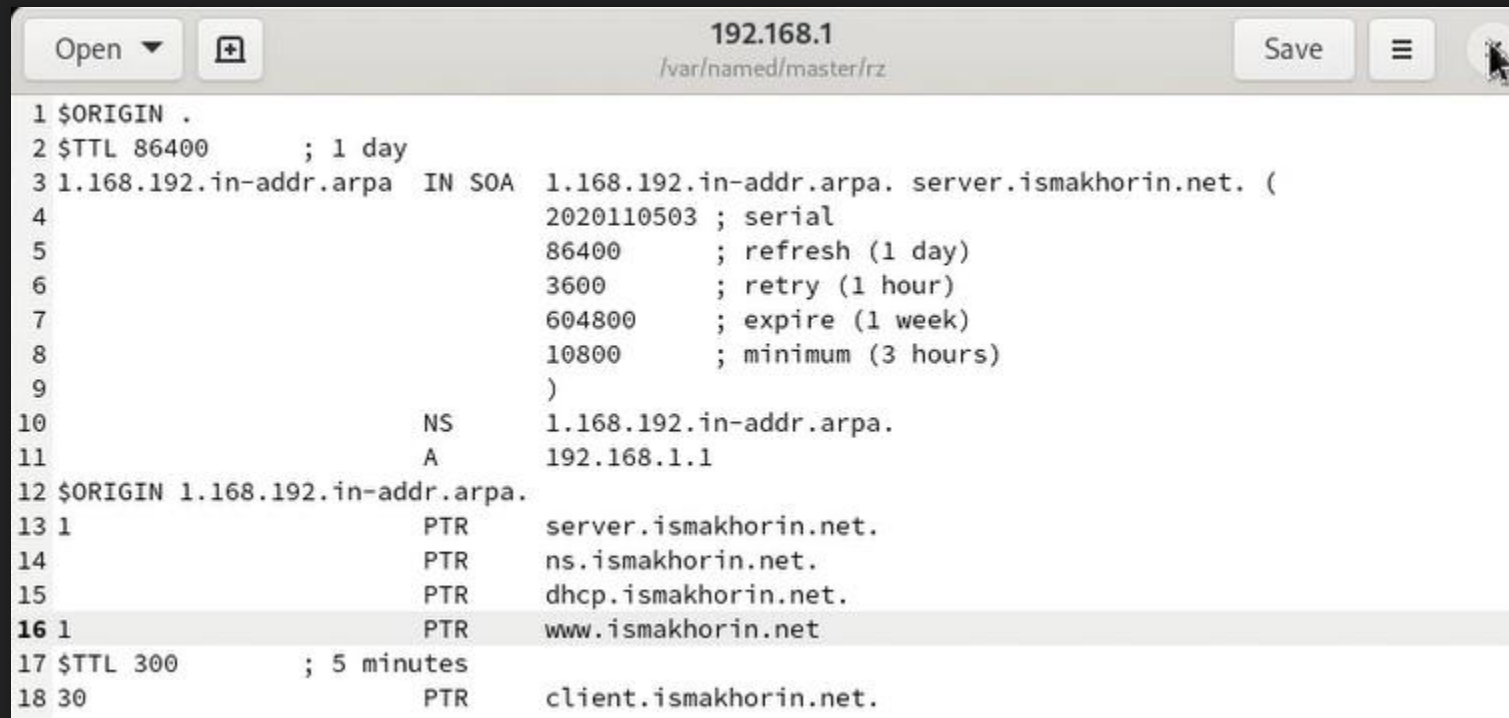
The screenshot shows a text editor window titled 'ismakhorin.net' with the file path '/var/named/master/fz'. The editor contains a DNS zone file for 'ismakhorin.net'. The file is divided into two sections by '\$ORIGIN'. The first section is for the root domain, and the second section is for the 'ismakhorin.net' subdomain. The second section includes records for 'client', 'dhcp', 'ns', 'server', and 'www'. The 'www' record is added at the end of the file, pointing to the IP address 192.168.1.1.

```
1 $ORIGIN .
2 $TTL 86400      ; 1 day
3 ismakhorin.net  IN SOA  ismakhorin.net. server.ismakhorin.net. (
4                  2020110504 ; serial
5                  86400      ; refresh (1 day)
6                  3600       ; retry (1 hour)
7                  604800     ; expire (1 week)
8                  10800      ; minimum (3 hours)
9                  )
10                 NS      ismakhorin.net.
11                 A       192.168.1.1
12 $ORIGIN ismakhorin.net.
13 $TTL 300       ; 5 minutes
14 client         A       192.168.1.30
15                TXT      "313032fa5403da07aeba1980548a83af02"
16 $TTL 86400     ; 1 day
17 dhcp           A       192.168.1.1
18 ns             A       192.168.1.1
19 server         A       192.168.1.1
20 www            A       192.168.1.1
```

Рис. 4.2. Добавление записи для HTTP-сервера в конце файла прямой DNS-зоны /var/named/master/fz/ismakhorin.net.



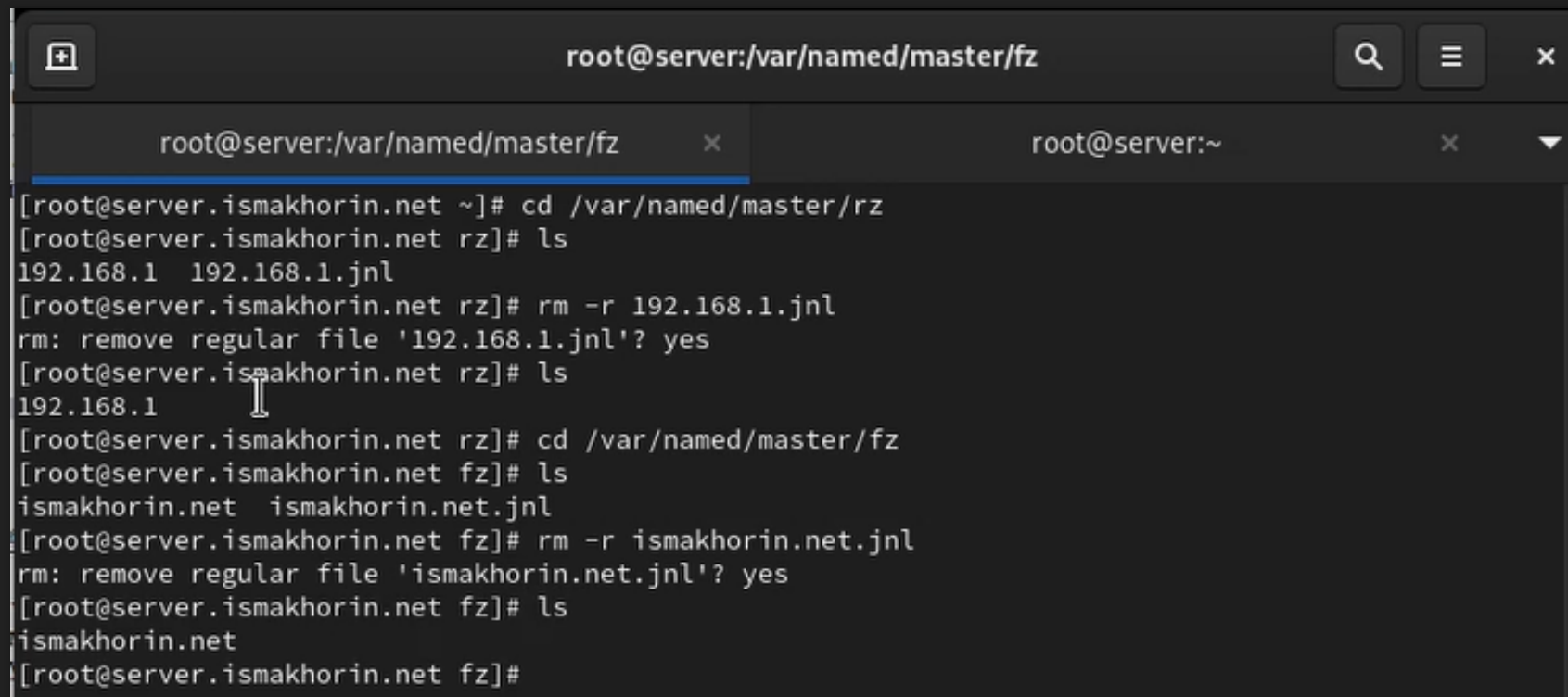
# Настройка виртуального хостинга для HTTP-сервера



```
1 $ORIGIN .
2 $TTL 86400      ; 1 day
3 1.168.192.in-addr.arpa  IN SOA  1.168.192.in-addr.arpa. server.ismakhorin.net. (
4                                2020110503 ; serial
5                                86400      ; refresh (1 day)
6                                3600       ; retry (1 hour)
7                                604800     ; expire (1 week)
8                                10800      ; minimum (3 hours)
9                                )
10                             NS    1.168.192.in-addr.arpa.
11                             A     192.168.1.1
12 $ORIGIN 1.168.192.in-addr.arpa.
13 1                             PTR  server.ismakhorin.net.
14                             PTR  ns.ismakhorin.net.
15                             PTR  dhcp.ismakhorin.net.
16 1                             PTR  www.ismakhorin.net
17 $TTL 300        ; 5 minutes
18 30               PTR  client.ismakhorin.net.
```

**Рис. 4.3.** Добавление записи для HTTP-сервера в конце файла обратной DNS-зоны /var/named/master/rz/192.168.1.

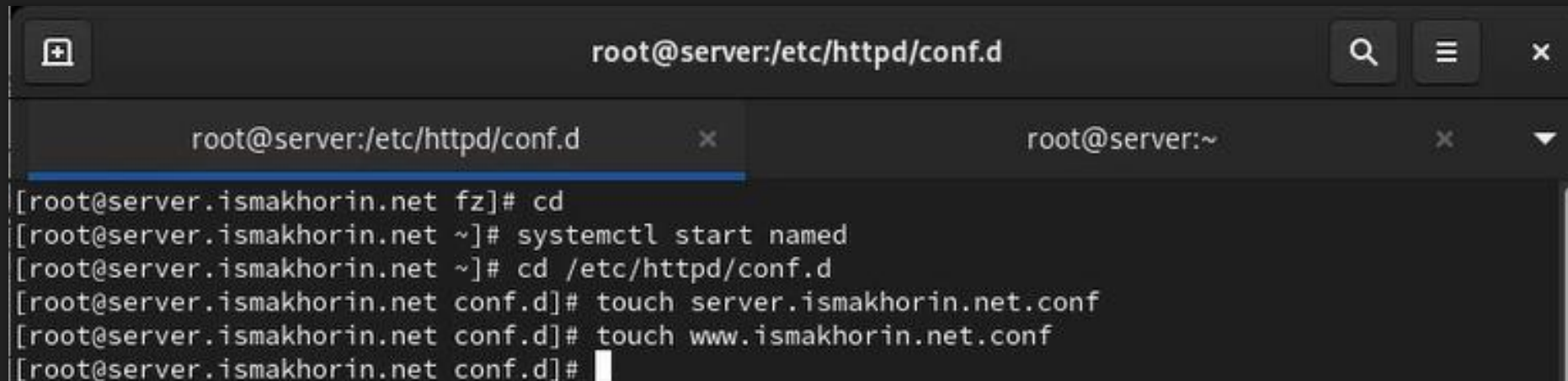
# Настройка виртуального хостинга для HTTP-сервера



```
root@server:/var/named/master/fz
root@server:/var/named/master/fz x root@server:~ x
[root@server.ismakhorin.net ~]# cd /var/named/master/rz
[root@server.ismakhorin.net rz]# ls
192.168.1  192.168.1.jnl
[root@server.ismakhorin.net rz]# rm -r 192.168.1.jnl
rm: remove regular file '192.168.1.jnl'? yes
[root@server.ismakhorin.net rz]# ls
192.168.1
[root@server.ismakhorin.net rz]# cd /var/named/master/fz
[root@server.ismakhorin.net fz]# ls
ismakhorin.net  ismakhorin.net.jnl
[root@server.ismakhorin.net fz]# rm -r ismakhorin.net.jnl
rm: remove regular file 'ismakhorin.net.jnl'? yes
[root@server.ismakhorin.net fz]# ls
ismakhorin.net
[root@server.ismakhorin.net fz]#
```

Рис. 4.4. Удаление файлов журналов DNS.

# Настройка виртуального хостинга для HTTP-сервера



A terminal window with a dark background and light text. The title bar shows 'root@server:/etc/httpd/conf.d'. Below the title bar, there are two tabs: 'root@server:/etc/httpd/conf.d' (active) and 'root@server:~'. The terminal content shows a series of commands and their outputs:

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

**Рис. 4.5.** Перезапуск DNS-сервера и создание в каталоге /etc/httpd/conf.d файлов server.ismakhorin.net.conf и www.ismakhorin.net.conf.

# Настройка виртуального хостинга для HTTP-сервера



**Рис. 4.6.** Открытие на редактирование файла `server.ismakhorin.net.conf` и добавление содержания из лабораторной работы.

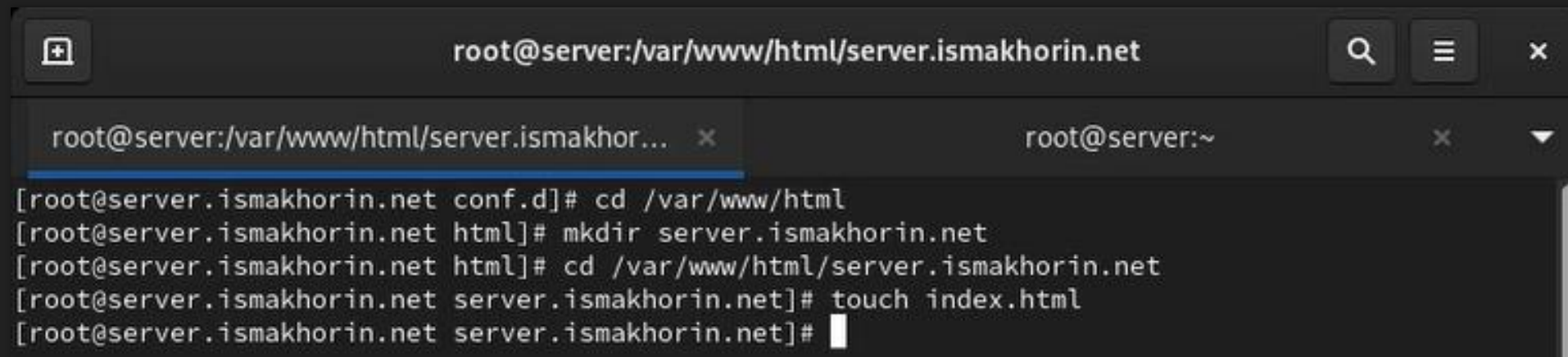
# Настройка виртуального хостинга для HTTP-сервера



**Рис. 4.7.** Открытие на редактирование файла `www.ismakhorin.net.conf` и добавление содержания из лабораторной работы.



# Настройка виртуального хостинга для HTTP-сервера



The image shows a terminal window with a dark background. The title bar at the top reads "root@server:/var/www/html/server.ismakhorin.net". Below the title bar, there are two tabs: "root@server:/var/www/html/server.ismakhor..." and "root@server:~". The main content of the terminal shows a series of commands being executed in a shell:

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

**Рис. 4.8.** Открытие каталога `/var/www/html` и создание тестовой страницы для виртуального веб-сервера `server.ismakhorin.net`.

# Настройка виртуального хостинга для HTTP-сервера

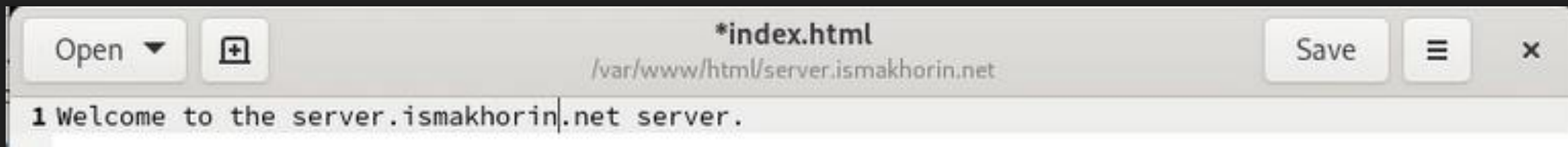
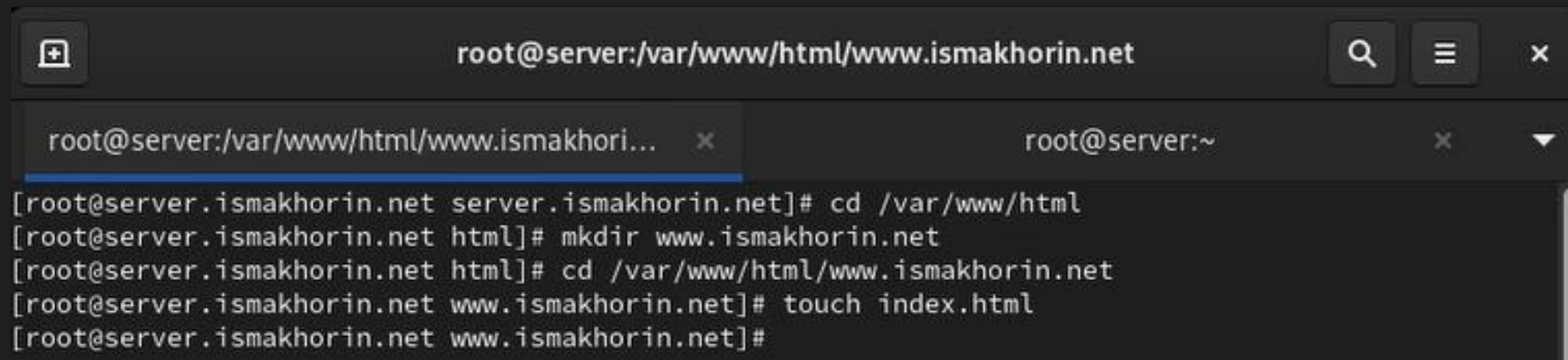


Рис. 4.9. Открытие на редактирование файла index.html и внесение содержания.

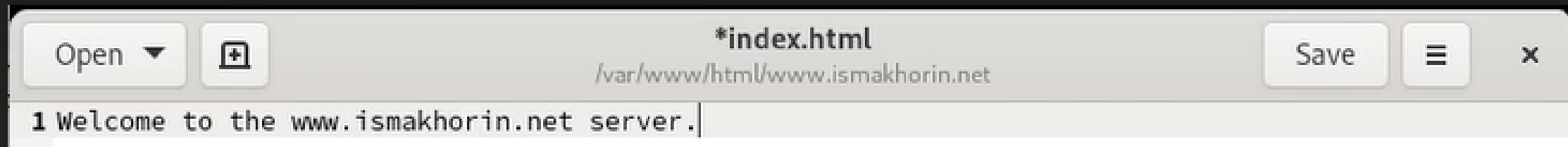
# Настройка виртуального хостинга для HTTP-сервера



```
root@server:/var/www/html/www.ismakhorin.net
root@server:/var/www/html/www.ismakhori... x root@server:~ x
[root@server.ismakhorin.net server.ismakhorin.net]# cd /var/www/html
[root@server.ismakhorin.net html]# mkdir www.ismakhorin.net
[root@server.ismakhorin.net html]# cd /var/www/html/www.ismakhorin.net
[root@server.ismakhorin.net www.ismakhorin.net]# touch index.html
[root@server.ismakhorin.net www.ismakhorin.net]#
```

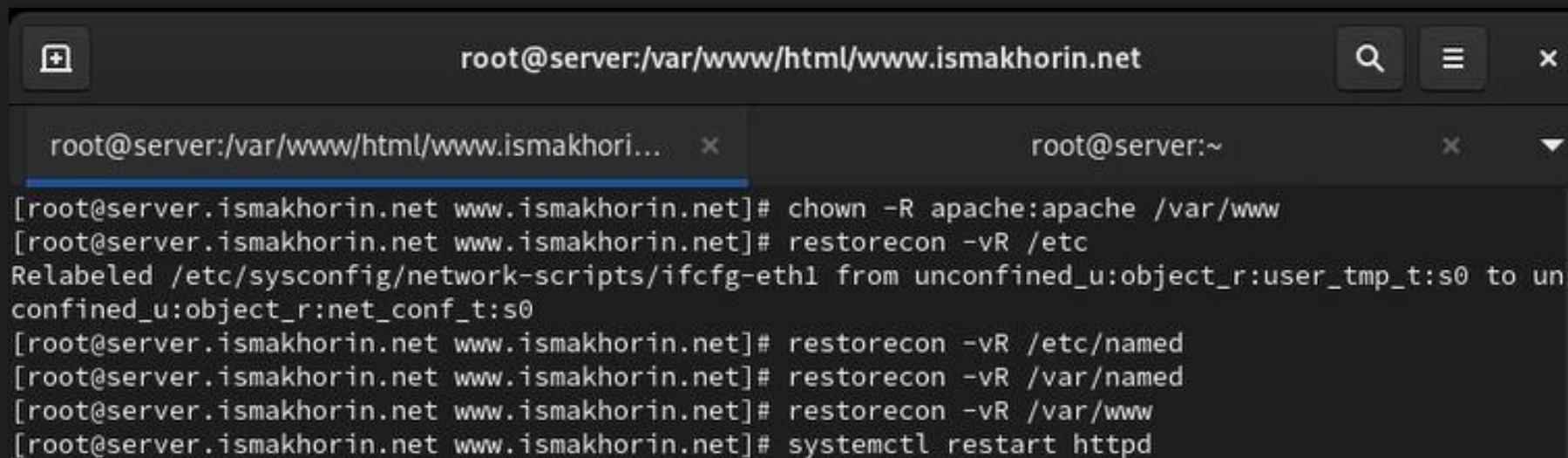
**Рис. 4.10.** Открытие каталога `/var/www/html` и создание тестовой страницы для виртуального веб-сервера `www.ismakhorin.net`.

# Настройка виртуального хостинга для HTTP-сервера



**Рис. 4.11.** Открытие на редактирование файла index.html и внесение содержания.

# Настройка виртуального хостинга для HTTP-сервера

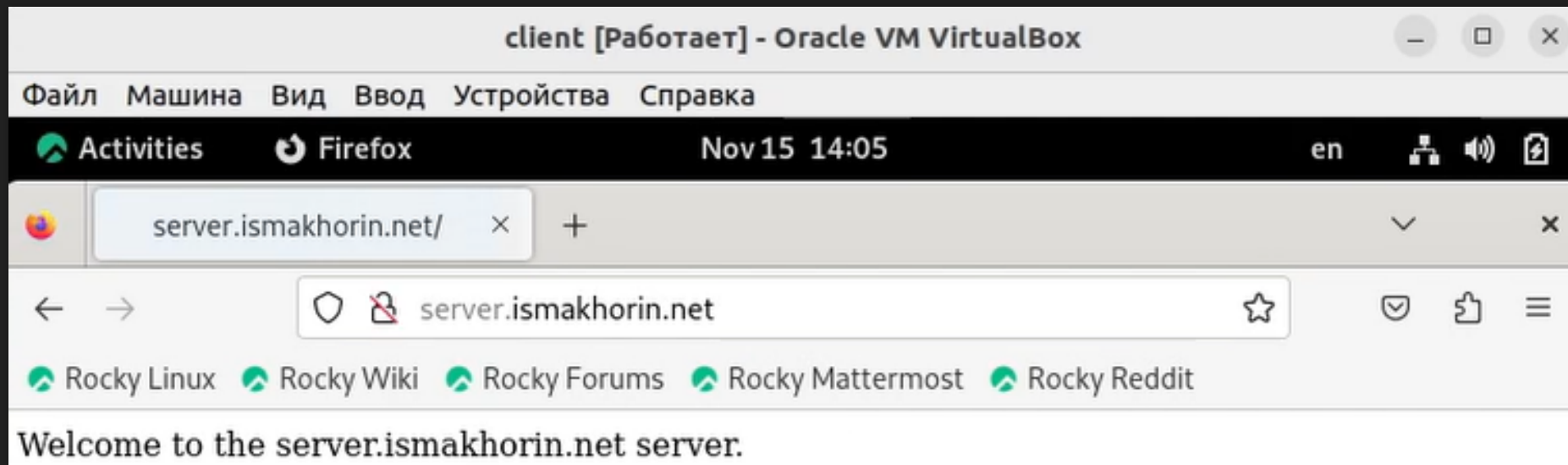


```
root@server:/var/www/html/www.ismakhorin.net
root@server:/var/www/html/www.ismakhori... x root@server:~ x
[root@server.ismakhorin.net www.ismakhorin.net]# chown -R apache:apache /var/www
[root@server.ismakhorin.net www.ismakhorin.net]# restorecon -vR /etc
Relabeled /etc/sysconfig/network-scripts/ifcfg-eth1 from unconfined_u:object_r:user_tmp_t:s0 to unconfined_u:object_r:net_conf_t:s0
[root@server.ismakhorin.net www.ismakhorin.net]# restorecon -vR /etc/named
[root@server.ismakhorin.net www.ismakhorin.net]# restorecon -vR /var/named
[root@server.ismakhorin.net www.ismakhorin.net]# restorecon -vR /var/www
[root@server.ismakhorin.net www.ismakhorin.net]# systemctl restart httpd
```

**Рис. 4.12.** Исправление прав доступа в каталог с веб-контентом, восстановление контекста безопасности в SELinux и перезапуск HTTP-сервера.

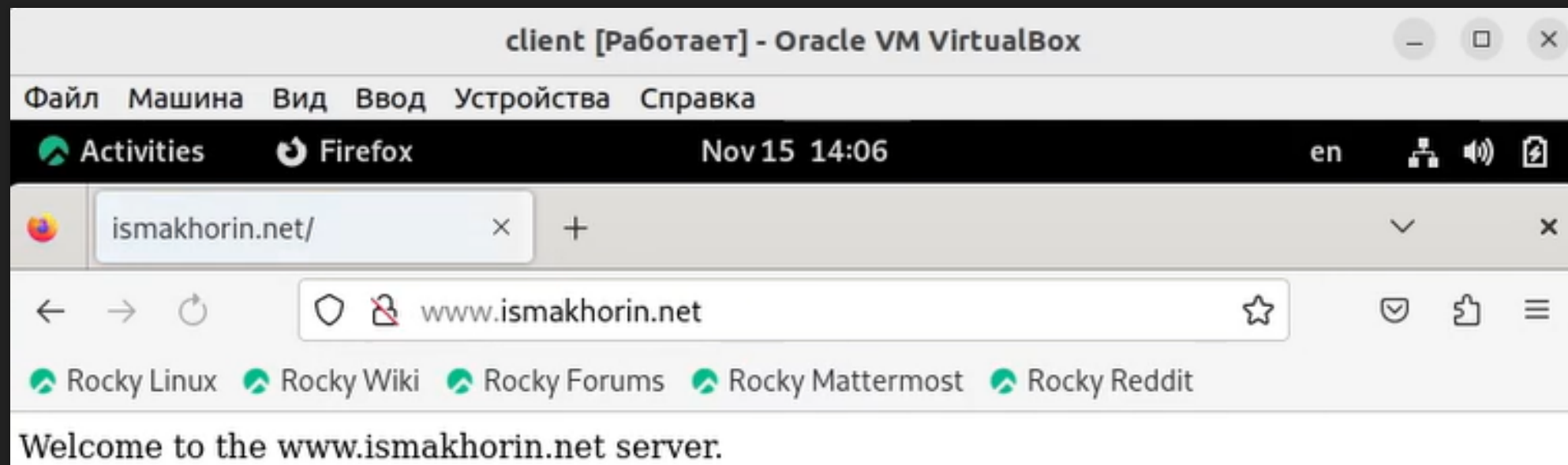


# Настройка виртуального хостинга для HTTP-сервера



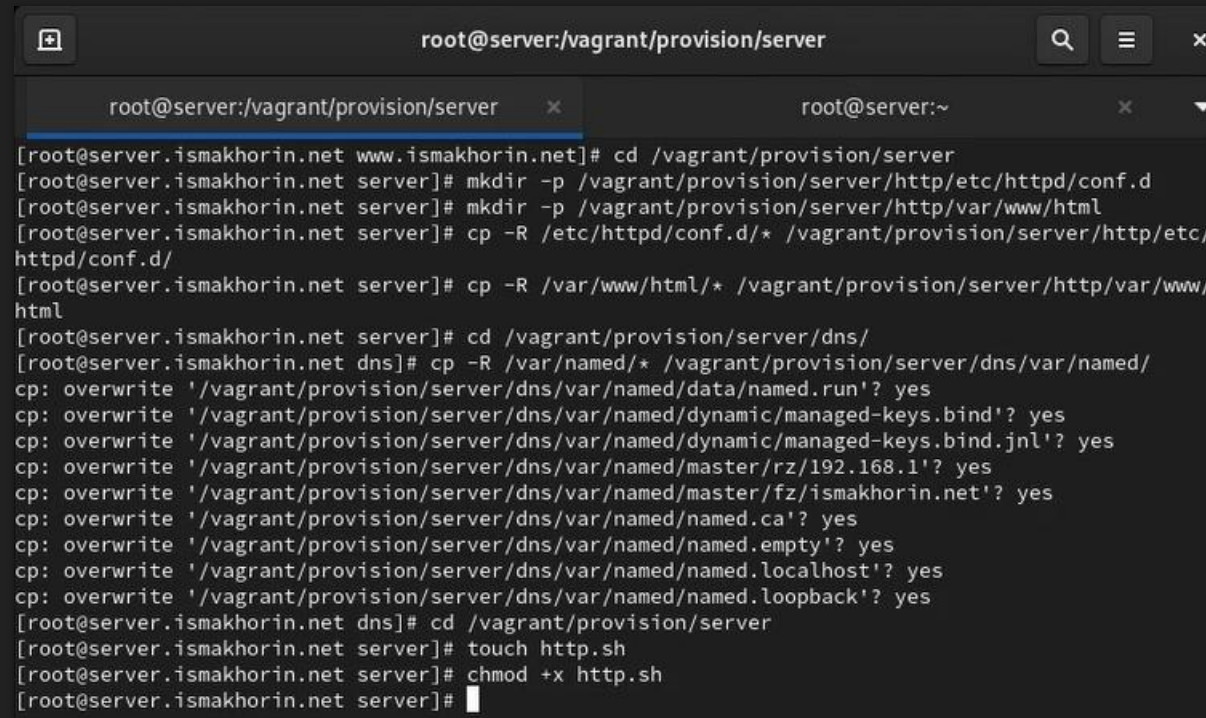
**Рис. 4.13.** Проверка корректного доступа на виртуальной машине client к веб-серверу по адресу server.ismakhorin.net.

# Настройка виртуального хостинга для HTTP-сервера



**Рис. 4.14.** Проверка корректного доступа на виртуальной машине client к веб-серверу по адресу [www.ismakhorin.net](http://www.ismakhorin.net).

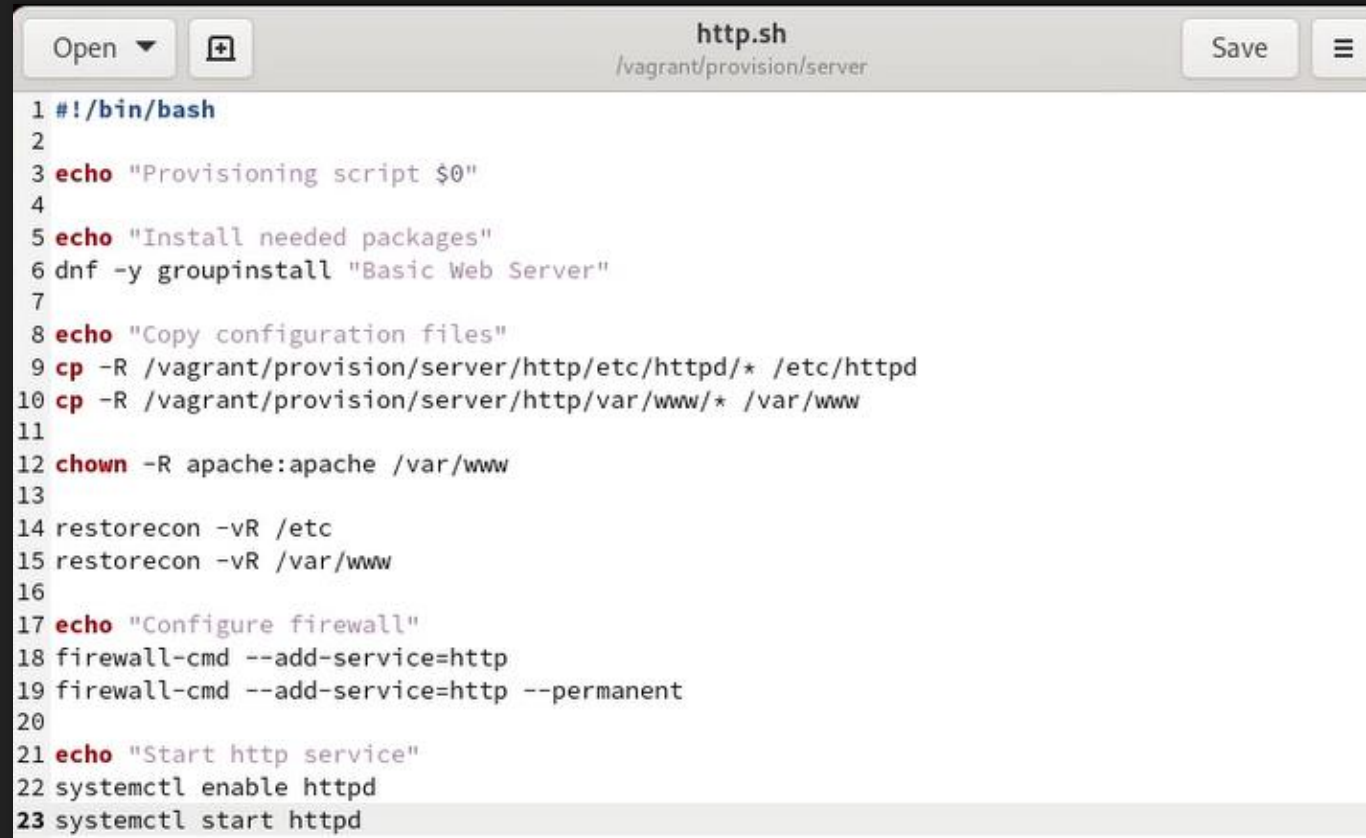
# Внесение изменений в настройки внутреннего окружения виртуальной машины



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

**Рис. 5.1.** Открытие на виртуальной машине server каталога для внесения изменений в настройки внутреннего окружения, создание в нём каталога http. Замена конфигурационных файлов DNS-сервера и создание исполняемого файла http.sh.

# Внесение изменений в настройки внутреннего окружения виртуальной машины



```
1 #!/bin/bash
2
3 echo "Provisioning script $0"
4
5 echo "Install needed packages"
6 dnf -y groupinstall "Basic Web Server"
7
8 echo "Copy configuration files"
9 cp -R /vagrant/provision/server/http/etc/httpd/* /etc/httpd
10 cp -R /vagrant/provision/server/http/var/www/* /var/www
11
12 chown -R apache:apache /var/www
13
14 restorecon -vR /etc
15 restorecon -vR /var/www
16
17 echo "Configure firewall"
18 firewall-cmd --add-service=http
19 firewall-cmd --add-service=http --permanent
20
21 echo "Start http service"
22 systemctl enable httpd
23 systemctl start httpd
```

Рис. 5.2. Открытие созданного файла на редактирование и прописывание скрипта.



# Внесение изменений в настройки внутреннего окружения виртуальной машины

```
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
53     server.vm.provision "server http",
54         type: "shell",
55         preserve_order: true,
56         path: "provision/server/http.sh"
57
58     server.vm.provider :virtualbox do |v|
59         v.linked_clone = true
60         # Customize the amount of memory on the VM
61         v.memory = 1024
```

Рис. 5.3. Добавление записи для отработки созданного скрипта во время загрузки виртуальных машин.



# ВЫВОД

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

Спасибо за внимание!