

# Лабораторная работа №4

## Базовая настройка HTTP-сервера Apache

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17 ноября 2023

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## Вводная часть

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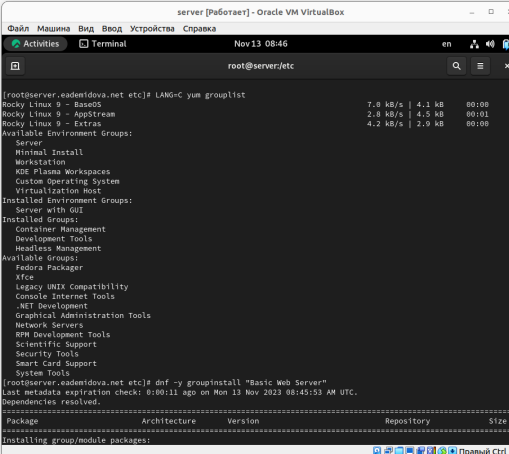
Приобретение практических навыков по установке и базовому конфигурированию HTTP-сервера Apache.

1. Установите необходимые для работы HTTP-сервера пакеты.
2. Запустите HTTP-сервер с базовой конфигурацией и проанализируйте его работу.
3. Настройте виртуальный хостинг.
4. Напишите скрипт для Vagrant, фиксирующий действия по установке и настройке HTTP-сервера во внутреннем окружении виртуальной машины `server`. Соответствующим образом внесите изменения в `Vagrantfile`

## Выполнение лабораторной работы

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# Установка HTTP-сервера

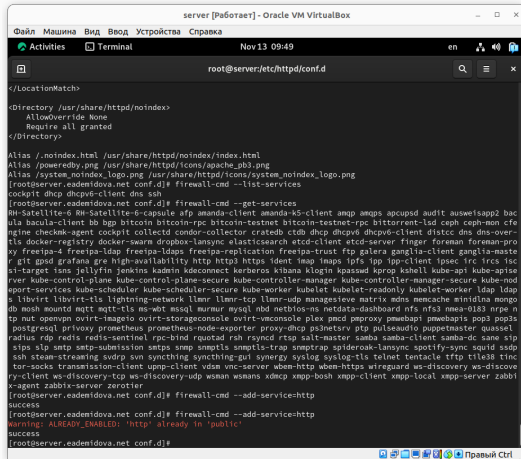


The screenshot shows a terminal window titled "server [Работает] - Oracle VM VirtualBox". The terminal is running as root on a server. The user has executed the command `LANG=C yum grouplist`, which displays a list of available environment groups. The user then executes `dnf -y groupinstall "Basic Web Server"`, which shows the progress of installing the selected group of packages. The terminal output includes the following text:

```
[root@server.eademidova.net etc]# LANG=C yum grouplist
Rocky Linux 9 - BaseOS                               7.8 kB/s | 4.1 kB  00:00
Rocky Linux 9 - AppStream                             2.8 kB/s | 4.5 kB  00:01
Rocky Linux 9 - Extras                               4.2 kB/s | 2.9 kB  00:00
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.eademidova.net etc]# dnf -y groupinstall "Basic Web Server"
Last metadata expiration check: 0:00:11 ago on Mon 13 Nov 2023 08:45:53 AM UTC.
Dependencies resolved.
=====
Package             Architecture Version           Repository      Size
=====
Installing group/module packages:
```

Рис. 1: Установка стандартного веб-сервера

# Базовое конфигурирование HTTP-сервера



```
server [Работает] - Oracle VM VirtualBox
Файл Машина Вид Ввод Устройства Справка
Activities Terminal Nov 13 09:49 en
root@server:/etc/httpd/conf.d

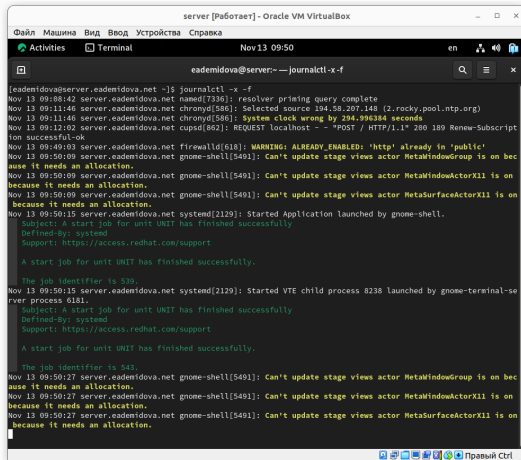
</LocationMatch>

<Directory /usr/share/httpd/noindex>
    AllowOverride None
    Require all granted
</Directory>

Alias /.noindex.html /usr/share/httpd/noindex/index.html
Alias /poweredby.png /usr/share/httpd/icons/apache_pb3.png
Alias /system_noindex_logo.png /usr/share/httpd/icons/system_noindex_logo.png
[root@server.eademidova.net conf.d]# firewall-cmd --list-services
cockpit dhcp dhcpv6-client dns ssh
[root@server.eademidova.net conf.d]# firewall-cmd --get-services
AW-Satellite-6 AW-Satellite-6-capsule sfp amanda-client amanda-k5-client amqp amqps apcupsd audit ausweisapp2 bac
ula bacula-client bb bqp bitcoin bitcoin-rpc bitcoin-testnet bitcoin-testnet-rpc bittorrent-lsd ceph ceph-mon cfe
ngine checkmk-agent cockpit collectd condor-collector cratedb ctdb dhcp dhcpv6 dhcpv6-client distcc dns dns-over-
tls docker-registry docker-swarm dropbox-lansync elasticsearch etcd-client etcd-server finger foreman foreman-pro
xy freeipa-4 freeipa-ldap freeipa-ltd freeipa-replication freeipa-trust ftp galera ganglia-client ganglia-maste
r git gssd grafana gre high-availability http http3 https ident imap imaps ipfs ipp ipp-client ipsec irc ircs isc
sis-target isns jellyfin jenkins kadmin kdeconnect kerberos kibana klogon kpasswd kprop kshell kube-api kube-apise
rver kube-control-plane kube-control-plane-secure kube-controller-manager kube-controller-manager-secure kube-nod
eport-services kube-scheduler kube-scheduler-secure kube-worker kubelet kubelet-readonly kubelet-worker ldap ldap
s libvirt libvirt-tls lightning-network llmr llmr-tcp llmr-udp managesieve matrix mdns memcache mindilna mongo
db mosh mountd nttt nttt-tls ns-wdt nssql murmur mysql nbd netbios-ns netdata-dashboard nfs nfs3 nmap-0183 nrpe n
tp nut openvpn ovirt-imageio ovirt-storageconsole ovirt-vmconsole plex pncd pppproxy pwebapi pwebapis pop3 pop3s
postgres privoxy prometheus prometheus-node-exporter proxy-dhcp ps3netmgr ptp pulseaudio puppetmaster quassel
radius rdp redis redis-sentinel rpc-bind rquodad rsh rsyncd rtsp salt-master samba samba-client samba-dc sane sip
sips slp smtp smtp-submission smtps snmp snmptls snmptls-trap snmptrap spideroak-lansync 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 unpn-client vdsim vnc-server wben-http wben-https wireguard ws-discovery ws-discove
ry-client ws-discovery-tcp ws-discovery-udp wsmann xdmcp xmpp-bosh xmpp-client xmpp-local xmpp-server zabbi
x-agent zabbix-server zerotier
[root@server.eademidova.net conf.d]# firewall-cmd --add-service=http
success
[root@server.eademidova.net conf.d]# firewall-cmd --add-service=http
Warning: ALREADY_ENABLED: 'http' already in 'public'
success
[root@server.eademidova.net conf.d]#
```

Рис. 2: Разрешение работы с http

# Базовое конфигурирование HTTP-сервера



The screenshot shows a terminal window titled "server [Работае] - Oracle VM VirtualBox". The terminal output displays system logs from the journalctl command. The logs include timestamps, hostnames, and process names, along with messages from the resolver, chronyd, cupsd, and systemd. The terminal window has a menu bar with "Файл", "Машина", "Вид", "Ввод", "Устройства", and "Справка". The terminal window also has a title bar with "server [Работае] - Oracle VM VirtualBox" and standard window controls. The terminal window is running on a Linux system, as indicated by the "Activities" and "Terminal" tabs.

```
server [Работае] - Oracle VM VirtualBox
Файл Машина Вид Ввод Устройства Справка
Activities Terminal Nov 13 09:50 en
eademidova@server:~ — journalctl -x -f

[eademidova@server.eademidova.net ~]$ journalctl -x -f
Nov 13 09:88:42 server.eademidova.net named[7336]: resolver priming query complete
Nov 13 09:11:46 server.eademidova.net chronyd[586]: Selected source 104.58.207.148 (2.rocky.pool.ntp.org)
Nov 13 09:11:46 server.eademidova.net chronyd[586]: System clock wrong by 294.994384 seconds
Nov 13 09:12:02 server.eademidova.net cupsd[862]: REQUEST localhost - - "POST / HTTP/1.1" 200 189 Renew-Subscript
ion successful-ok
Nov 13 09:49:03 server.eademidova.net firewallld[618]: WARNING: ALREADY_ENABLED: 'http' already in 'public'
Nov 13 09:50:09 server.eademidova.net gnome-shell[5491]: Can't update stage views actor MetaWindowGroup is on bec
ause it needs an allocation.
Nov 13 09:50:09 server.eademidova.net gnome-shell[5491]: Can't update stage views actor MetaWindowActorX11 is on
because it needs an allocation.
Nov 13 09:50:09 server.eademidova.net gnome-shell[5491]: Can't update stage views actor MetaSurfaceActorX11 is on
because it needs an allocation.
Nov 13 09:50:15 server.eademidova.net systemd[2129]: Started Application launched by gnome-shell.
Subject: A start job for unit UNIT has finished successfully
Defined-By: systemd
Support: https://access.redhat.com/support

A start job for unit UNIT has finished successfully.

The job identifier is 539.
Nov 13 09:50:15 server.eademidova.net systemd[2129]: Started VTE child process 8238 launched by gnome-terminal-se
rver process 6181.
Subject: A start job for unit UNIT has finished successfully
Defined-By: systemd
Support: https://access.redhat.com/support

A start job for unit UNIT has finished successfully.

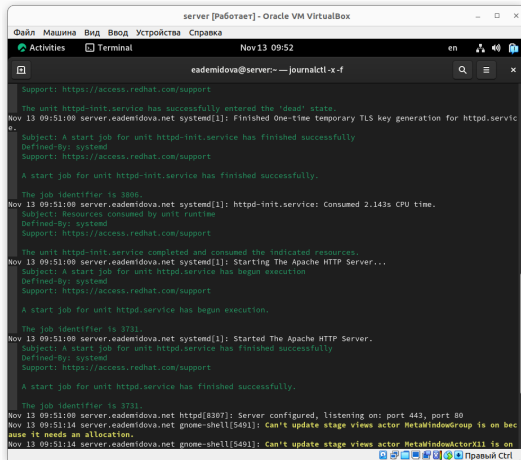
The job identifier is 543.
Nov 13 09:50:27 server.eademidova.net gnome-shell[5491]: Can't update stage views actor MetaWindowGroup is on bec
ause it needs an allocation.
Nov 13 09:50:27 server.eademidova.net gnome-shell[5491]: Can't update stage views actor MetaWindowActorX11 is on
because it needs an allocation.
Nov 13 09:50:27 server.eademidova.net gnome-shell[5491]: Can't update stage views actor MetaSurfaceActorX11 is on
because it needs an allocation.
```

Рис. 3: Запуск лога системных сообщений



```
systemctl enable httpd  
systemctl start httpd
```

# Базовое конфигурирование HTTP-сервера



```
server [Работаet] - Oracle VM VirtualBox
Файл Машина Вид Ввод Устройства Справка
Activities Terminal Nov 13 09:52 en
eademidova@server:~ — journalctl -x -f
Support: https://access.redhat.com/support
The unit httpd-init.service has successfully entered the 'dead' state.
Nov 13 09:51:00 server.eademidova.net systemd[1]: Finished One-time temporary TLS key generation for httpd.servic
e.
Subject: A start job for unit httpd-init.service has finished successfully
Defined-By: systemd
Support: https://access.redhat.com/support
A start job for unit httpd-init.service has finished successfully.
The job identifier is 3806.
Nov 13 09:51:00 server.eademidova.net systemd[1]: httpd-init.service: Consumed 2.143s CPU time.
Subject: Resources consumed by unit runtime
Defined-By: systemd
Support: https://access.redhat.com/support
The unit httpd-init.service completed and consumed the indicated resources.
Nov 13 09:51:00 server.eademidova.net systemd[1]: Starting The Apache HTTP Server...
Subject: A start job for unit httpd.service has begun execution
Defined-By: systemd
Support: https://access.redhat.com/support
A start job for unit httpd.service has begun execution.
The job identifier is 3731.
Nov 13 09:51:00 server.eademidova.net systemd[1]: Started The Apache HTTP Server.
Subject: A start job for unit httpd.service has finished successfully
Defined-By: systemd
Support: https://access.redhat.com/support
A start job for unit httpd.service has finished successfully.
The job identifier is 3731.
Nov 13 09:51:00 server.eademidova.net httpd[8307]: Server configured, listening on: port 443, port 80
Nov 13 09:51:14 server.eademidova.net gnome-shell[5491]: Can't update stage views actor MetaWindowGroup is on bec
ause it needs an allocation.
Nov 13 09:51:14 server.eademidova.net gnome-shell[5491]: Can't update stage views actor MetaWindowActorX11 is on
Правый Ctrl
```

Рис. 4: Проверка запуска веб-сервера

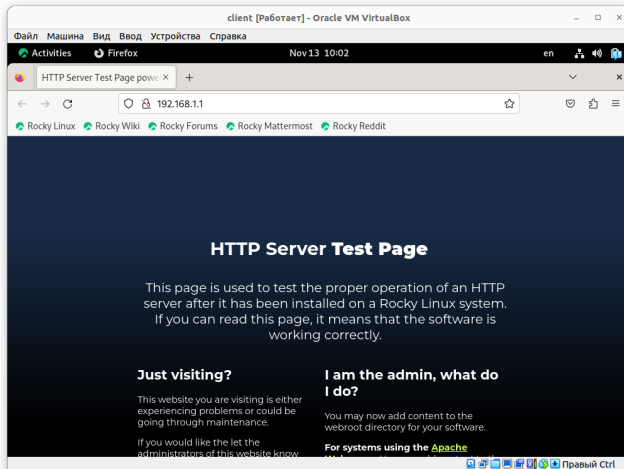
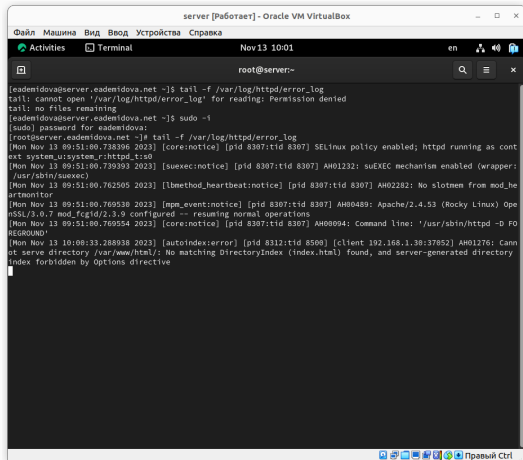


Рис. 5: Тестовая страница веб-сервера

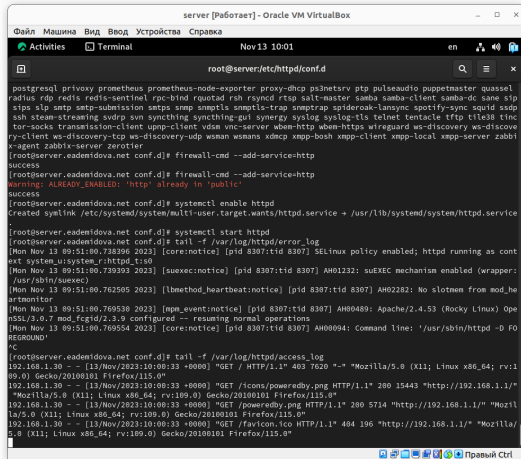


```
server [Работает] - Oracle VM VirtualBox
Файл Машина Вид Ввод Устройства Справка
Activities Terminal Nov 13 10:01 en
root@server:~

[eademidova@server.eademidova.net ~]$ tail -f /var/log/httpd/error_log
tail: cannot open '/var/log/httpd/error_log' for reading: Permission denied
tail: no files remaining
[eademidova@server.eademidova.net ~]$ sudo -i
[sudo] password for eademidova:
[root@server.eademidova.net ~]# tail -f /var/log/httpd/error_log
[Mon Nov 13 09:51:00.738396 2023] [core:notice] [pid 8307:tid 8307] SELinux policy enabled; httpd running as cont
ext system_u:system_r:httpd_t:s0
[Mon Nov 13 09:51:00.739393 2023] [suexec:notice] [pid 8307:tid 8307] AH01232: suEXEC mechanism enabled (wrapper:
/usr/sbin/suexec)
[Mon Nov 13 09:51:00.762505 2023] [lbmethod_heartbeat:notice] [pid 8307:tid 8307] AH02282: No slotmem from mod_he
artmonitor
[Mon Nov 13 09:51:00.769538 2023] [mpm_event:notice] [pid 8307:tid 8307] AH00489: Apache/2.4.53 (Rocky Linux) Ope
nSSL/3.0.7 mod_fcgid/2.3.9 configured -- resuming normal operations
[Mon Nov 13 09:51:00.769554 2023] [core:notice] [pid 8307:tid 8307] AH00994: Command line: '/usr/sbin/httpd -D FO
REGROUND'
[Mon Nov 13 10:00:33.288938 2023] [autoindex:error] [pid 8312:tid 8508] [client 192.168.1.30:37852] AH01276: Cann
ot serve directory /var/www/html/: No matching DirectoryIndex (index.html) found, and server-generated directory
index forbidden by Options directive
```

Рис. 6: Лог ошибок

# Анализ работы HTTP-сервера



```
server [Работает] - Oracle VM VirtualBox
Файл Машина Вид Ввод Устройства Справка
Activities Terminal Nov 13 10:01 en
root@server:/etc/httpd/conf.d

postgresql privoxy prometheus prometheus-node-exporter proxy-dhcp ps3netrvr ptp pulseaudio puppetmaster quassel
radius rdp redis redis-sentinel rpc-bind rquodad rsh rsyncd rtsp salt-master samba samba-client samba-dc sane sip
sips slp snmp snmp-submission snmpd snmpd-mibs snmpd-trap snmptrap spiderOak-lansync spotify-sync squid squid
ssh steam-streaming svdrp svn syncthing syncthing-gui synergy syslog syslog-tls telnet tentacle tftp tftpd tinc
tor-socks transmission-client upnp-client vdsu vnc-server wban-http wban-https wireguard ws-discovery ws-discovery
ry-client ws-discovery-tcp ws-discovery-udp wsman wsman xdmcp xmpp-bosh xmpp-client xmpp-local xmpp-server zabbi
x-agent zabbix-server zerotier
[root@server.eademidova.net conf.d]# firewall-cmd --add-service=http
success
[root@server.eademidova.net conf.d]# firewall-cmd --add-service=http
warning: ALREADY_ENABLED: 'http' already in 'public'
success
[root@server.eademidova.net conf.d]# systemctl enable httpd
Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service → /usr/lib/systemd/system/httpd.service
.
[root@server.eademidova.net conf.d]# systemctl start httpd
[root@server.eademidova.net conf.d]# tail -f /var/log/httpd/error_log
[Mon Nov 13 09:51:00.738396 2023] [core:notice] [pid 8307:tid 8307] SELinux policy enabled; httpd running as cont
ext system_u:system_r:httpd_t:s0
[Mon Nov 13 09:51:00.739393 2023] [suexec:notice] [pid 8307:tid 8307] AH01232: suEXEC mechanism enabled (wrapper:
/usr/sbin/suexec)
[Mon Nov 13 09:51:00.762505 2023] [lbmethod_heartbeat:notice] [pid 8307:tid 8307] AH02282: No slotmem from mod_he
artmonitor
[Mon Nov 13 09:51:00.769536 2023] [mpm_event:notice] [pid 8307:tid 8307] AH00489: Apache/2.4.53 (Rocky Linux) Ope
nSSL/3.0.7 mod_fcgid/2.3.9 configured -- resuming normal operations
[Mon Nov 13 09:51:00.769554 2023] [core:notice] [pid 8307:tid 8307] AH00094: Command Line: '/usr/sbin/httpd -D FO
REGROUND'
^C
[root@server.eademidova.net conf.d]# tail -f /var/log/httpd/access_log
192.168.1.30 - - [13/Nov/2023:10:00:33 +0000] "GET / HTTP/1.1" 403 7620 "-" "Mozilla/5.0 (X11; Linux x86_64; rv:1
09.0) Gecko/20100101 Firefox/115.0"
192.168.1.30 - - [13/Nov/2023:10:00:33 +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 - - [13/Nov/2023:10:00:33 +0000] "GET /poweredby.png HTTP/1.1" 200 5714 "http://192.168.1.1/" "Mozill
a/5.0 (X11; Linux x86_64; rv:109.0) Gecko/20100101 Firefox/115.0"
192.168.1.30 - - [13/Nov/2023:10:00:33 +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. 7: Информация мониторинга

Запись для HTTP-сервера в конце файла прямой DNS-зоны  
/var/named/master/fz/eademidova.net:

```
server A 192.168.1.1
```

```
www A 192.168.1.1
```

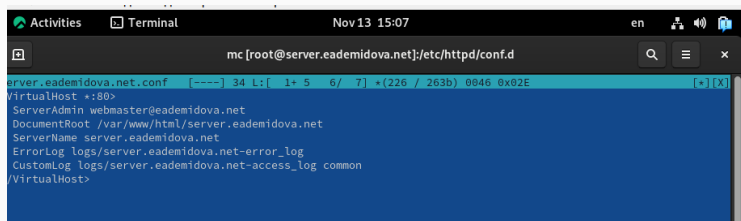
Конец файла обратной зоны /var/named/master/rz/192.168.1:

```
1 PTR server.eademidova.net.
```

```
1 PTR www.eademidova.net.
```

```
cd /etc/httpd/conf.d  
touch server.eademidova.net.conf  
touch www.eademidova.net.conf
```

# Настройка виртуального хостинга для HTTP-сервера



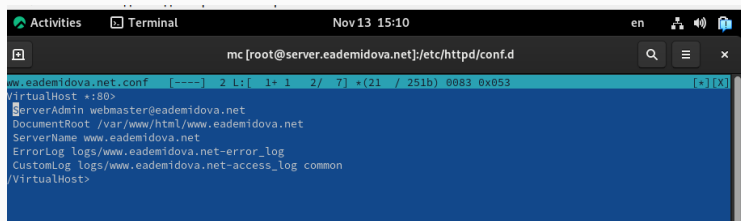
The screenshot shows a terminal window titled "Terminal" with the date and time "Nov 13 15:07". The prompt is "mc [root@server.eademidova.net]:/etc/httpd/conf.d". The terminal displays the contents of the file "server.eademidova.net.conf" using the "cat" command. The output shows the configuration for a VirtualHost \*:80, including the ServerAdmin, DocumentRoot, ServerName, ErrorLog, and CustomLog directives.

```
server.eademidova.net.conf [----] 34 L:[ 1+ 5 6/ 7] *(226 / 263b) 0046 0x02E [*] [X]  
VirtualHost *:80>  
ServerAdmin webmaster@eademidova.net  
DocumentRoot /var/www/html/server.eademidova.net  
ServerName server.eademidova.net  
ErrorLog logs/server.eademidova.net-error_log  
CustomLog logs/server.eademidova.net-access_log common  
/VirtualHost>
```

Рис. 8: Внесение содержания файла server.eademidova.net.conf



# Настройка виртуального хостинга для HTTP-сервера



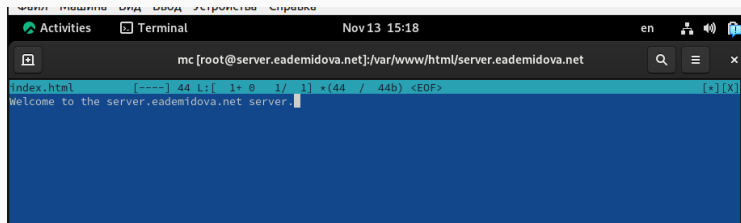
The screenshot shows a terminal window titled "Terminal" with the date and time "Nov 13 15:10". The prompt is "mc [root@server.eademidova.net]:/etc/httpd/conf.d". The terminal displays the configuration for the virtual host "www.eademidova.net.conf". The configuration includes the following lines:

```
VirtualHost *:80>  
ServerAdmin webmaster@eademidova.net  
DocumentRoot /var/www/html/www.eademidova.net  
ServerName www.eademidova.net  
ErrorLog logs/www.eademidova.net-error_log  
CustomLog logs/www.eademidova.net-access_log common  
/VirtualHost>
```

Рис. 9: Внесение содержания файла `www.eademidova.net.conf`

```
cd /var/www/html  
mkdir server.eademidova.net  
cd /var/www/html/server.eademidova.net  
touch index.htm
```

# Настройка виртуального хостинга для HTTP-сервера



The screenshot shows a terminal window with a dark theme. The title bar at the top includes 'Activities', 'Terminal', and the date 'Nov 13 15:18'. The terminal prompt is 'mc [root@server.eademidova.net]:/var/www/html/server.eademidova.net'. The output of a command is displayed on a light blue background, showing the file 'index.html' with a size of 44 bytes and its content: 'Welcome to the server.eademidova.net server.'.

```
mc [root@server.eademidova.net]:/var/www/html/server.eademidova.net
index.html  [----] 44 L:[ 1+ 0 1/ 1] *(44 / 44b) <EOF>
Welcome to the server.eademidova.net server.
```

Рис. 10: Внесение содержания файла index.html для server.eademidova.net

```
cd /var/www/html  
mkdir www.eademidova.net  
cd /var/www/html/www.eademidova.net  
touch index.htm
```

# Настройка виртуального хостинга для HTTP-сервера

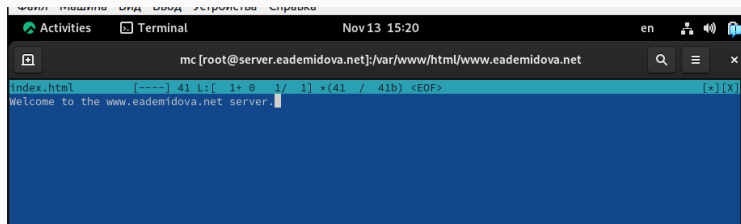


Рис. 11: Внесение содержания файла index.html для www.eademidova.net

Копирование права доступа в каталог с веб-контентом командой:

```
chown -R apache:apache /var/www
```

Затем восстановим контекст безопасности:

```
restorecon -vR /etc
```

```
restorecon -vR /var/named
```

```
restorecon -vR /var/www
```

Перезапуск HTTP-сервера: `systemctl restart httpd`

# Настройка виртуального хостинга для HTTP-сервера

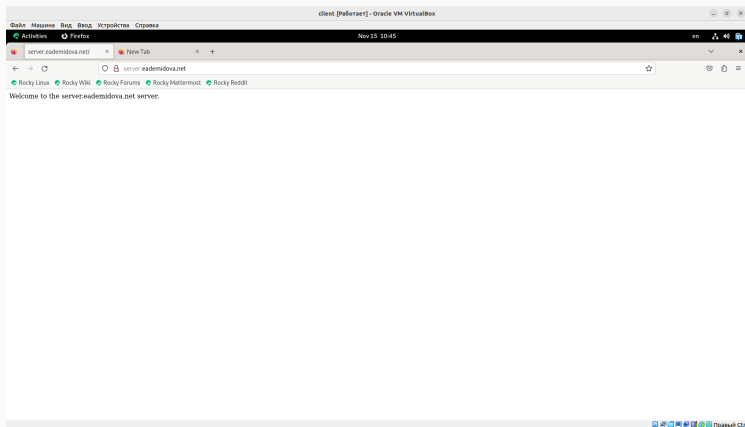


Рис. 12: server.eademidova.net

# Настройка виртуального хостинга для HTTP-сервера

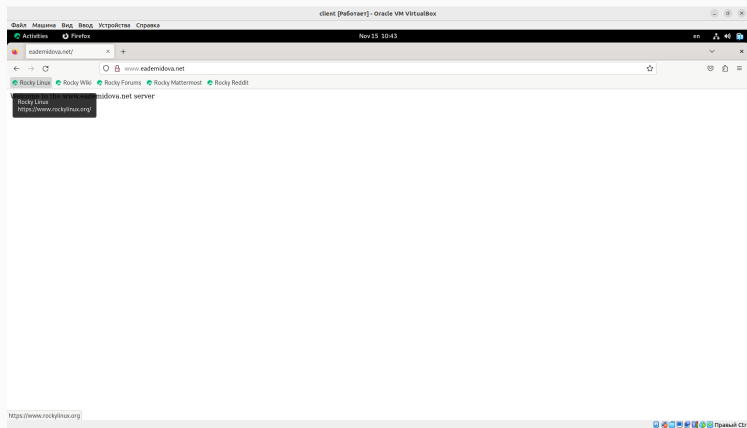
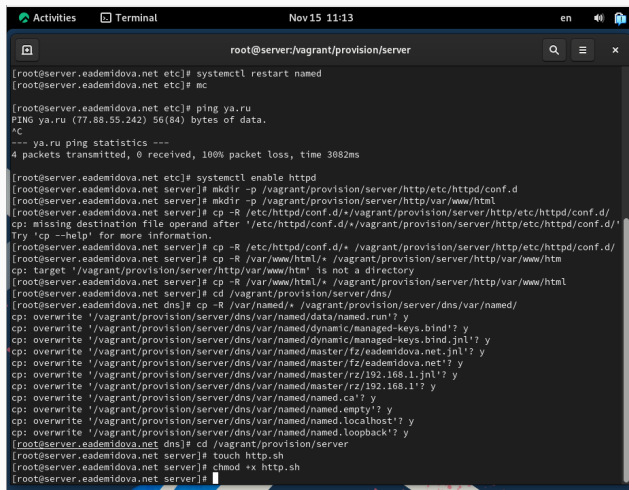


Рис. 13: www.eademidova.net



# Внесение изменений в настройки внутреннего окружения виртуальной машины



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

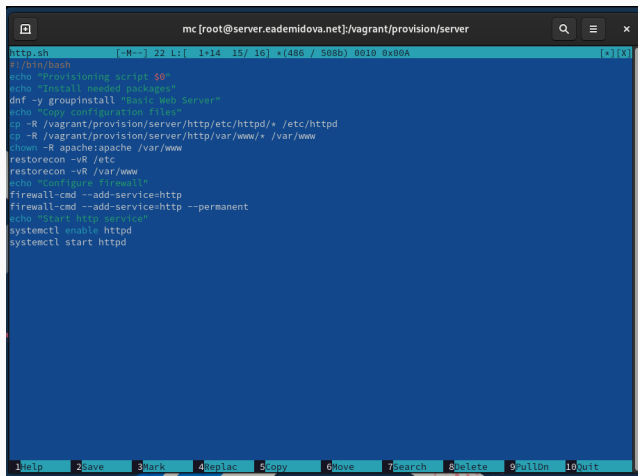
[root@server.eademidova.net etc]# systemctl restart named
[root@server.eademidova.net etc]# mc

[root@server.eademidova.net etc]# ping ya.ru
PING ya.ru (77.88.55.242) 56(84) bytes of data.
^C
--- ya.ru ping statistics ---
4 packets transmitted, 0 received, 100% packet loss, time 3082ms

[root@server.eademidova.net etc]# systemctl enable httpd
[root@server.eademidova.net server]# mkdir -p /vagrant/provision/server/http/etc/httpd/conf.d
[root@server.eademidova.net server]# mkdir -p /vagrant/provision/server/http/var/www/html
[root@server.eademidova.net server]# cp -R /etc/httpd/conf.d/* /vagrant/provision/server/http/etc/httpd/conf.d/
cp: missing destination file operand after '/etc/httpd/conf.d/* /vagrant/provision/server/http/etc/httpd/conf.d/'
Try 'cp --help' for more information.
[root@server.eademidova.net server]# cp -R /etc/httpd/conf.d/* /vagrant/provision/server/http/etc/httpd/conf.d/
[root@server.eademidova.net server]# cp -R /var/www/html/* /vagrant/provision/server/http/var/www/html
cp: target '/vagrant/provision/server/http/var/www/html' is not a directory
[root@server.eademidova.net server]# cp -R /var/www/html/* /vagrant/provision/server/http/var/www/html
[root@server.eademidova.net server]# cd /vagrant/provision/server/dns/
[root@server.eademidova.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/eademidova.net.jnl'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/master/fz/eademidova.net'? y
cp: overwrite '/vagrant/provision/server/dns/var/named/master/rz/192.168.1.jnl'? 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.eademidova.net dns]# cd /vagrant/provision/server
[root@server.eademidova.net server]# touch http.sh
[root@server.eademidova.net server]# chmod +x http.sh
[root@server.eademidova.net server]#
```

Рис. 14: Создание окружения для внесения изменений в настройки окружающей среды

# Внесение изменений в настройки внутреннего окружения виртуальной машины

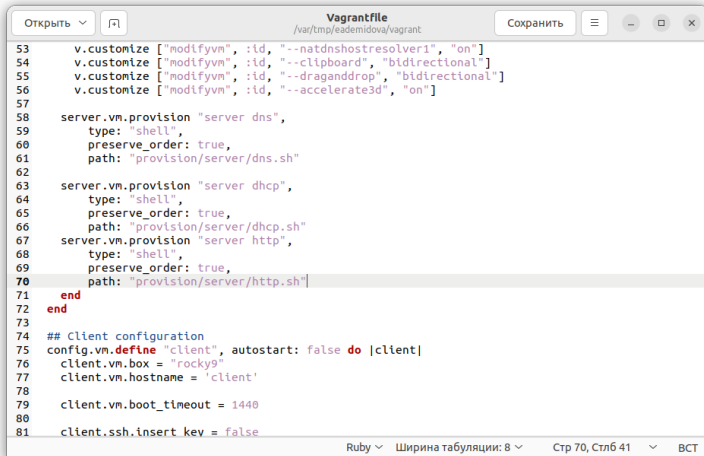


The image shows a terminal window titled "mc [root@server.eadimidova.net]:/vagrant/provision/server". The terminal displays the content of a file named "http.sh". The script includes commands for installing packages, copying configuration files, setting permissions, restoring SELinux contexts, configuring the firewall, and starting the httpd service. At the bottom of the terminal window, there is a navigation bar with buttons: 1 Help, 2 Save, 3 Mark, 4 Replac, 5 Copy, 6 Move, 7 Search, 8 Delete, 9 PullDn, and 10 Quit.

```
http.sh [-M--] 22 L: [ 1+14 15/ 16] *(486 / 508b) 0010 0x00A [*][X]
#!/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
chown -R apache:apache /var/www
restorecon -vR /etc
restorecon -vR /var/www
echo "Configure firewall"
firewall-cmd --add-service=http
firewall-cmd --add-service=http --permanent
echo "Start http service"
systemctl enable httpd
systemctl start httpd
```

Рис. 15: Содержание http.sh

# Внесение изменений в настройки внутреннего окружения виртуальной машины



The image shows a code editor window titled "Vagrantfile" with the path `/var/tmp/eademidova/vagrant`. The editor contains a Vagrantfile configuration. Lines 53-56 show four `v.customize` calls for modifying VM settings: `--natdnshostresolver1`, `--clipboard`, `--draganddrop`, and `--accelerate3d`. Lines 58-61 show a `server.vm.provision` block for "server dns" using a shell script at `provision/server/dns.sh`. Lines 63-66 show another `server.vm.provision` block for "server dhcp". Lines 67-69 show a `server.vm.provision` block for "server http". Line 70, which is highlighted, shows the `path` attribute for the "server http" provisioner set to `"provision/server/http.sh"`. Lines 71-72 show the `end` statements for the provisioners. Lines 74-78 show the start of a "client" configuration block with `config.vm.define`. Lines 79-81 show the `client` configuration with `box = "rocky9"`, `hostname = 'client'`, `boot_timeout = 1440`, and `ssh.insert_key = false`. The status bar at the bottom indicates "Ruby", "Ширина табуляции: 8", "Стр 70, Стлб 41", and "ВСТ".

```
53 v.customize ["modifyvm", :id, "--natdnshostresolver1", "on"]
54 v.customize ["modifyvm", :id, "--clipboard", "bidirectional"]
55 v.customize ["modifyvm", :id, "--draganddrop", "bidirectional"]
56 v.customize ["modifyvm", :id, "--accelerate3d", "on"]
57
58 server.vm.provision "server dns",
59   type: "shell",
60   preserve_order: true,
61   path: "provision/server/dns.sh"
62
63 server.vm.provision "server dhcp",
64   type: "shell",
65   preserve_order: true,
66   path: "provision/server/dhcp.sh"
67 server.vm.provision "server http",
68   type: "shell",
69   preserve_order: true,
70   path: "provision/server/http.sh"
71 end
72 end
73
74 ## Client configuration
75 config.vm.define "client", autostart: false do |client|
76   client.vm.box = "rocky9"
77   client.vm.hostname = 'client'
78
79   client.vm.boot_timeout = 1440
80
81   client.ssh.insert_key = false
```

Рис. 16: Изменение файла Vagrantfile

## Заключение

---

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