

# Администрирование сетевых подсистем

## Лабораторная работа №4

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## Информация

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## Цель работы

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

# Выполнение лабораторной работы

```
[root@server ~]# LANG=C yum grouplist
Extra Packages for Enterprise Linux 9 - x86_6 20 kB/s | 33 kB  00:01
^[[Extra Packages for 98% [=====] 4.6 MB/s | 20 MB  00:00 E
Extra Packages for Enterprise Linux 9 - x86_6 5.3 MB/s | 20 MB  00:03
Rocky Linux 9 - BaseOS 2.6 kB/s | 4.3 kB  00:01
Rocky Linux 9 - BaseOS 4.1 kB/s | 3.8 MB  00:00
Rocky Linux 9 - AppStream 13 kB/s | 4.8 kB  00:00
Rocky Linux 9 - AppStream 4.2 kB/s | 9.4 MB  00:02
Rocky Linux 9 - Extras 8.3 kB/s | 3.1 kB  00:00
Rocky Linux 9 - Extras 34 kB/s | 16 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
    VideoLAN Client
    Xfce
```

Рис. 1: Установка требуемого программного обеспечения

# Выполнение лабораторной работы

```
[root@server ~]# dnf -y groupinstall "Basic Web Server"
Last metadata expiration check: 0:00:31 ago on Tue 02 Dec 2025 04:30:53 PM MSK
.
Dependencies resolved.
=====
 Package           Arch    Version       Repository   Size
=====
Installing group/module packages:
 httpd            x86_64  2.4.62-7.el9      appstream   44 k
 httpd-manual     noarch   2.4.62-7.el9      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    appstream   108 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      appstream   1.4 M
 httpd-filesystem noarch   2.4.62-7.el9      appstream   11 k
 httpd-tools      x86_64  2.4.62-7.el9      appstream   78 k
 rocky-logos-httpd noarch   90.16-1.el9      appstream   24 k
Installing weak dependencies:
 . . .
```

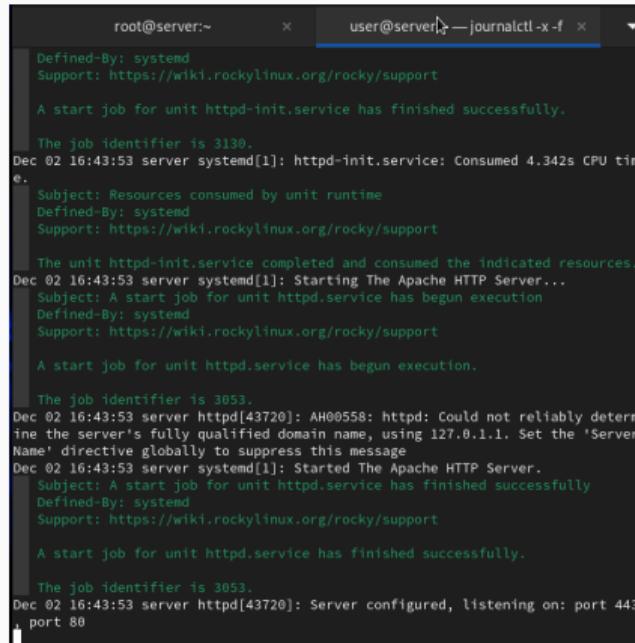
Рис. 2: Установка требуемого программного обеспечения

# Выполнение лабораторной работы

```
[root@server ~]# firewall-cmd --list-services
cockpit dhcp dhcpcd-client dns ssh
[root@server ~]# 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 bareos-director bareos-fi
ledaemon bareos-storage bb bgp bitcoin bitcoind-bitcoin-bitcoin-testnet bitcoin-test
tnt-redis bittorrent-lsd ceph ceph-exporter ceph-mon cfengine checkmk-agent coc
kpit collectd condor-collector cratedb ctdb dds dds-multicast dds-unicast dhcp
dhcpcv6 dhcpcv6-client distcc dns dns-over-tls docker-registry docker-swarm dro
pbox-lansync elasticsearch etcd-client etcd-server finger foreman foreman-prox
y freeipa-4 freeipa-ldap freeipa-ldaps freeipa-replication freeipa-trust ftp g
alera ganglia-client ganglia-master git gpd grafana gre high-availability htt
p http3 https ident imap imaps ipfip ipp ipp-client ippes irc ircs iscsi-target
isns jenkins kadmin kdeconnect kerberos kibana klogind kpasswd kprop kshell ku
be-api kube-apiserver kube-control-plane kube-control-plane-secure kube-contro
ller-manager kube-controller-manager-secure kube-nodeport-services kube-schedu
ler kube-scheduler-secure kube-worker kubelet kubelet-readonly kubelet-worker
ldap ldaps libvirt libvirt-tls lightning-network llmnr llmnr-client llmnr-tcp
llmnr-udp managesieve matrix mdns memcache minidlna mongodb mosh mountd mqtt m
qtt-tls ms-wbt mssql murmur mysql nbd nebula netbios-ns netdata-dashboard nfs
nfs3 nmea-0183 nrpe ntp nut openvpn ovirt-imageio ovirt-storageconsole ovirt-v
mconsole pmdc pmproxy pmwebapi pop3 pop3s postgresql privoxy pr
ometheus prometheus-node-exporter proxy-dhcp ps2link ps3netsrv ptp pulseaudio
puppetmaster quassel radius rdp redis redis-sentinel rpc-bind rqutod rsh rsyn
cd rtsp salt-master samba samba-client samba-dc sane sip sips slp smtp smtp-su
bmmission smtps snmp snmptrls snmptrap snmptrap spiderOak-lansync spotify-sy
nc squid ssdp ssh steam-streaming svrdrp svn syncthing syncthing-gui syncthing-
relay synergy syslog syslog-tls telnet tentacle tftp tile38 tor-socks tra
nsmission-client upnp-client vdsm vnc-server warpinator wbem-http wbem-https w
s-guard ws-discovery ws-discovery-client ws-discovery-tcp ws-discovery-udp ws
man wsmans xmpp xmpp-bosh xmpp-client xmpp-local xmpp-server zabbix-agent zab
bix-server zerotier
[root@server ~]# firewall-cmd --add-service=http
success
[root@server ~]# firewall-cmd --add-service=http --permanent
success
[root@server ~]#
```

Рис. 3: Внесение правок в настройки межсетевого экрана

# Выполнение лабораторной работы



The screenshot shows a terminal window with two tabs. The active tab is titled 'user@server: ~' and contains the command 'journalctl -x -f'. The output of this command is displayed in green text on a black background. It shows logs for the 'httpd-init.service' and 'httpd.service' units. The logs indicate the successful start of the Apache HTTP Server, including resource consumption and email notifications from 'systemd'. The logs also mention a warning about the server's fully qualified domain name being set to 127.0.1.1. The final log entry shows the server configured and listening on port 443.

```
root@server:~          user@server: ~ — journalctl -x -f
Defined-By: systemd
Support: https://wiki.rockylinux.org/rocky/support

A start job for unit httpd-init.service has finished successfully.

The job identifier is 3130.
Dec 02 16:43:53 server systemd[1]: httpd-init.service: Consumed 4.342s CPU time.
Subject: Resources consumed by unit runtime
Defined-By: systemd
Support: https://wiki.rockylinux.org/rocky/support

The unit httpd-init.service completed and consumed the indicated resources.
Dec 02 16:43:53 server systemd[1]: Starting The Apache HTTP Server...
Subject: A start job for unit httpd.service has begun execution
Defined-By: systemd
Support: https://wiki.rockylinux.org/rocky/support

A start job for unit httpd.service has begun execution.

The job identifier is 3053.
Dec 02 16:43:53 server httpd[43720]: AH00558: httpd: Could not reliably determine the server's fully qualified domain name, using 127.0.1.1. Set the 'ServerName' directive globally to suppress this message
Dec 02 16:43:53 server systemd[1]: Started The Apache HTTP Server.
Subject: A start job for unit httpd.service has finished successfully
Defined-By: systemd
Support: https://wiki.rockylinux.org/rocky/support

A start job for unit httpd.service has finished successfully.

The job identifier is 3053.
Dec 02 16:43:53 server httpd[43720]: Server configured, listening on: port 443
port 80
```

Рис. 4: Расширенный лог системных сообщений

# Выполнение лабораторной работы

```
[root@server ~]# tail -f /var/log/httpd/error_log
[Tue Dec 02 16:43:53.422751 2025] [core:notice] [pid 43720:tid 43720] SELinux
policy enabled; httpd running as context system_u:system_r:httpd_t:s0
[Tue Dec 02 16:43:53.423330 2025] [suexec:notice] [pid 43720:tid 43720] AH0123
2: suEXEC mechanism enabled (wrapper: /usr/sbin/suexec)
[Tue Dec 02 16:43:53.423338 2025] [ssl:warn] [pid 43720:tid 43720] AH01882: In
it: this version of mod_ssl was compiled against a newer library (OpenSSL 3.5.
1 1 Jul 2025 (OpenSSL 3.0.7 1 Nov 2022), version currently loaded is 0x3000007
0) - may result in undefined or erroneous behavior
AH00558: httpd: Could not reliably determine the server's fully qualified doma
in name, using 127.0.1.1. Set the 'ServerName' directive globally to suppress
this message
[Tue Dec 02 16:43:53.435985 2025] [ssl:warn] [pid 43720:tid 43720] AH01882: In
it: this version of mod_ssl was compiled against a newer library (OpenSSL 3.5.
1 1 Jul 2025 (OpenSSL 3.0.7 1 Nov 2022), version currently loaded is 0x3000007
0) - may result in undefined or erroneous behavior
[Tue Dec 02 16:43:53.437302 2025] [lbmethod_heartbeat:notice] [pid 43720:tid 4
3720] AH02282: No slotmem from mod_heartbeat
[Tue Dec 02 16:43:53.445118 2025] [mpm_event:notice] [pid 43720:tid 43720] AH0
0489: Apache/2.4.62 (Rocky Linux) OpenSSL/3.0.7 mod_fcgid/2.3.9 configured --
resuming normal operations
[Tue Dec 02 16:43:53.445159 2025] [core:notice] [pid 43720:tid 43720] AH00094:
Command line: '/usr/sbin/httpd -D FOREGROUND'
[Tue Dec 02 16:49:07.252943 2025] [autoindex:error] [pid 43726:tid 43825] [cli
ent 192.168.1.30:39842] AH01276: Cannot serve directory /var/www/html/: No mat
ching DirectoryIndex (index.html) found, and server-generated directory index
forbidden by Options directive
|
```

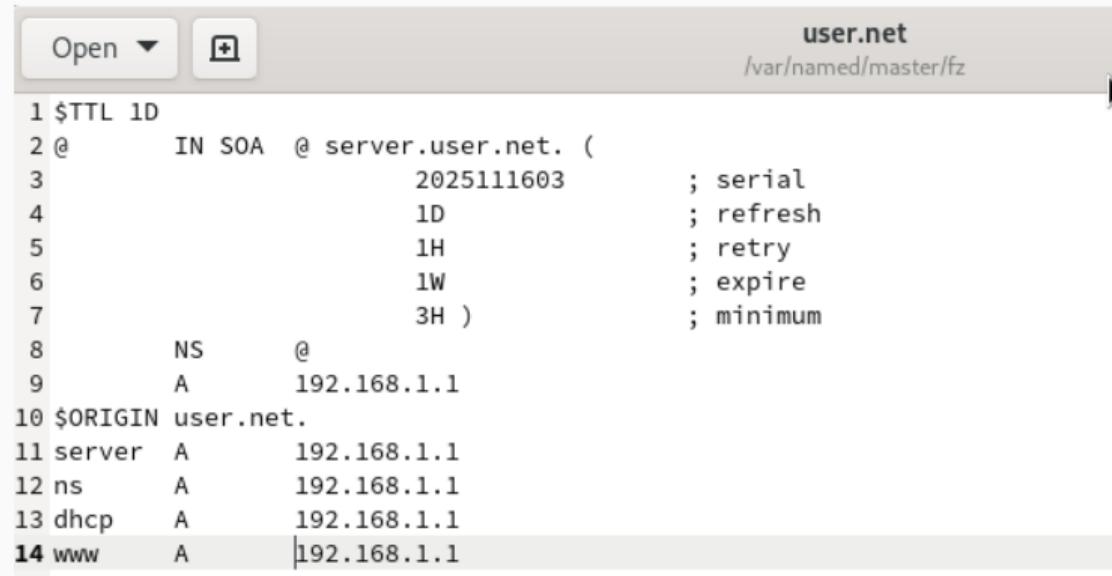
Рис. 5: Мониторинг ошибок

# Выполнение лабораторной работы

```
[root@server ~]# tail -f /var/log/httpd/access_log
192.168.1.30 - - [02/Dec/2025:16:49:07 +0300] "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 - - [02/Dec/2025:16:49:07 +0300] "GET /icons/poweredbypng 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 - - [02/Dec/2025:16:49:07 +0300] "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 - - [02/Dec/2025:16:49:07 +0300] "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. 6: Мониторинг доступа

## Выполнение лабораторной работы



The screenshot shows a Windows Notepad window with the title bar "user.net" and the path "/var/named/master/fz". The window contains a DNS zone configuration:

```
1 $TTL 1D
2 @      IN SOA  @ server.user.net. (
3                      2025111603      ; serial
4                      1D            ; refresh
5                      1H            ; retry
6                      1W            ; expire
7                      3H )          ; minimum
8      NS      @
9      A      192.168.1.1
10 $ORIGIN user.net.
11 server  A      192.168.1.1
12 ns      A      192.168.1.1
13 dhcp   A      192.168.1.1
14 www    A      |192.168.1.1
```

The line "14 www A |192.168.1.1" is highlighted with a gray background, indicating it is being edited.

Рис. 7: Внесение HTTP в файл прямой зоны

## Выполнение лабораторной работы

The screenshot shows a text editor window with the following details:

- Top right: IP address **\*192.168.1** and path **/var/named/master/rz**.
- Left side: "Open" dropdown and "+" icon.
- Content area:

```
1 $TTL 1D
2 @      IN SOA  @ server.user.net. (
3                               2025111603      ; serial
4                               1D            ; refresh
5                               1H            ; retry
6                               1W            ; expire
7                               3H )          ; minimum
8       NS      @
9       A       192.168.1.1
10      PTR     server.user.net.
11 $ORIGIN 1.168.192.in-addr.arpa.
12 1      PTR     server.user.net.
13 1      PTR     ns.user.net
14 1      PTR     dhcp.user.net
15 1      PTR     www.user.net|
```

Рис. 8: Внесение HTTP в файл обратной зоны

# Выполнение лабораторной работы

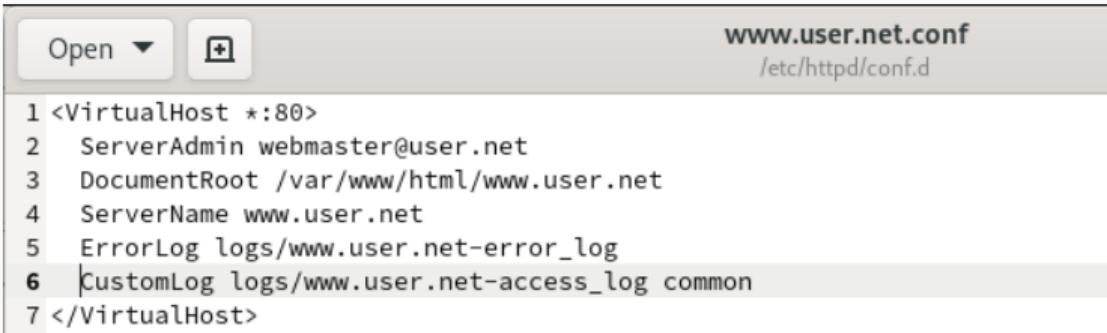


The screenshot shows a text editor window with the title bar "server.user.net.conf" and the path "/etc/httpd/conf.d". The editor has two buttons: "Open" with a dropdown arrow and a plus sign button. The main area contains the following configuration code:

```
1 <VirtualHost *:80>
2   ServerAdmin webmaster@user.net
3   DocumentRoot /var/www/html/server.user.net
4   ServerName server.user.net
5   ErrorLog logs/server.user.net-error_log
6   CustomLog logs/server.user.net-access_log common
7 </VirtualHost>
```

Рис. 9: server.user.net.conf

## Выполнение лабораторной работы

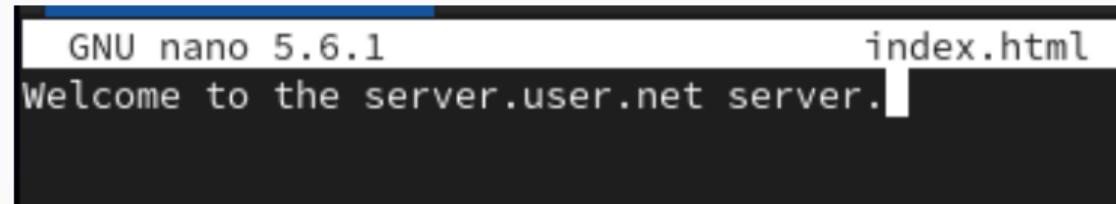


The screenshot shows a text editor window with the title bar "www.user.net.conf /etc/httpd/conf.d". The editor has two buttons: "Open" with a dropdown arrow and a "+" button. The main area contains the following configuration code:

```
1 <VirtualHost *:80>
2   ServerAdmin webmaster@user.net
3   DocumentRoot /var/www/html/www.user.net
4   ServerName www.user.net
5   ErrorLog logs/www.user.net-error_log
6   CustomLog logs/www.user.net-access_log common
7 </VirtualHost>
```

Рис. 10: www.user.net.conf

## Выполнение лабораторной работы



The screenshot shows a terminal window with a black background and white text. At the top, it displays "GNU nano 5.6.1" on the left and "index.html" on the right. The main area contains the text "Welcome to the server.user.net server." with a cursor at the end of the line.

Рис. 11: index.html для server.user.net

## Выполнение лабораторной работы

```
GNU nano 5.6.1          index.html
Welcome to the www.user.net server.
```

Рис. 12: index.html для www.user.net

## Выполнение лабораторной работы

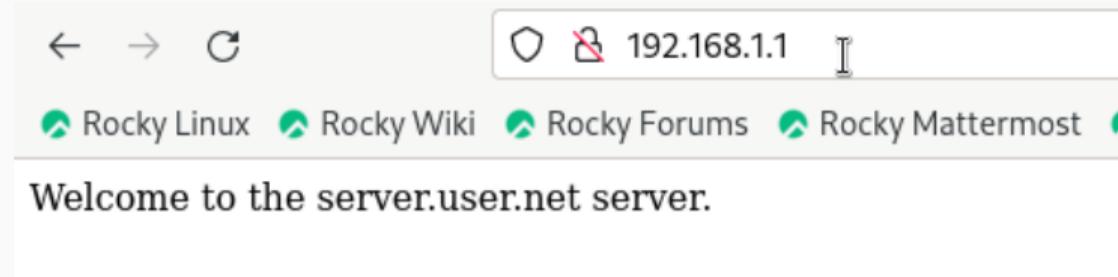


Рис. 13: Результат открытия адреса

## Выполнение лабораторной работы

```
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

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. 14: http.sh

## Выполнение лабораторной работы

```
path: "provision/server/dnsp.sh"

server.vm.provision "server http",
  type: "shell",
  preserve_order: true,
  path: "provision/server/http.sh"
```

Рис. 15: Изменения в Vagrantfile

## Выводы

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В процессе выполнения данной лабораторной работы я освоил установку и базовое конфигурирование HTTP-сервера Apache.