

# Лабораторная работа № 13

## Настройка NFS

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## Вводная часть

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Приобретение практических навыков настройки сервера NFS для удалённого доступа к ресурсам.

1. Установите и настройте сервер NFSv4.
2. Подмонтируйте удалённый ресурс на клиенте.
3. Подключите каталог с контентом веб-сервера к дереву NFS.
4. Подключите каталог для удалённой работы вашего пользователя к дереву NFS.
5. Напишите скрипты для Vagrant, фиксирующие действия по установке и настройке сервера NFSv4 во внутреннем окружении виртуальных машин `server` и `client`.  
Соответствующим образом внесите изменения в `Vagrantfile`.

## Выполнение лабораторной работы

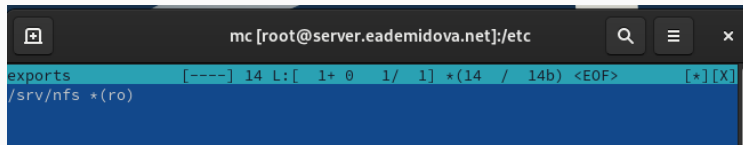
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На сервере установили необходимое программное обеспечение:

```
dnf -y install nfs-utils
```

Затем создали каталог, который предполагается сделать доступным всем пользователям сети(корень дерева NFS):

```
mkdir -p /srv/nfs
```



The screenshot shows a terminal window with a dark background. The title bar at the top reads "mc [root@server.eademidova.net]:/etc". Below the title bar, the command "cat /etc/exports" has been executed, and the output is displayed in a light blue background. The output shows the configuration for the /srv/nfs directory, which is exported to all hosts (\*) with read-only permissions (ro).

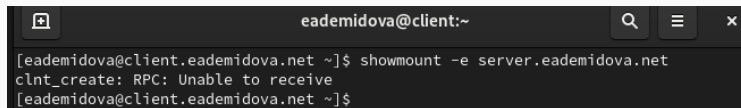
```
mc [root@server.eademidova.net]:/etc
cat /etc/exports
[----] 14 L:[ 1+ 0 1/ 1] *(14 / 14b) <EOF> [*] [X]
/srv/nfs *(ro)
```

Рис. 1: Подключение через NFS каталога только на чтение

```
[root@server.eademidova.net ~]# mkdir -p /srv/nfs
[root@server.eademidova.net ~]# cd /etc/
[root@server.eademidova.net etc]# mc
[root@server.eademidova.net etc]# semanage fcontext -a -t nfs_t "/srv/nfs(/.*)?"
[root@server.eademidova.net etc]# restorecon -vR /srv/nfs
Relabeled /srv/nfs from unconfined_u:object_r:var_t:s0 to unconfined_u:object_r:nfs_t:s0
[root@server.eademidova.net etc]# systemctl start nfs-server.service
[root@server.eademidova.net etc]# systemctl enable nfs-server.service
Created symlink /etc/systemd/system/multi-user.target.wants/nfs-server.service → /usr/lib/systemd/system/nfs-server.service.
[root@server.eademidova.net etc]# firewall-cmd --add-service=nfs
success
[root@server.eademidova.net etc]# firewall-cmd --add-service=nfs --permanent
success
[root@server.eademidova.net etc]# firewall-cmd --reload
success
[root@server.eademidova.net etc]#
```

Рис. 2: Запуск NFS-сервера

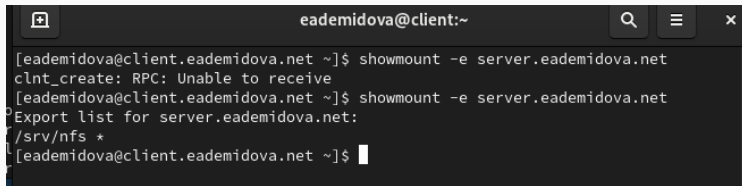




```
eademidova@client:~  
[eademidova@client.eademidova.net ~]$ showmount -e server.eademidova.net  
clnt_create: RPC: Unable to receive  
[eademidova@client.eademidova.net ~]$
```

Рис. 3: Просмотр подмонтированных удалённых ресурсов на клиенте

На сервере остановим сервис межсетевого экрана с помощью команды `systemctl stop firewalld.service`

A terminal window titled 'eademidova@client:~' with search, menu, and close icons. It shows the execution of 'showmount -e server.eademidova.net' twice. The first attempt fails with 'clnt\_create: RPC: Unable to receive'. The second attempt succeeds, displaying the export list for 'server.eademidova.net' as '/srv/nfs \*'.

```
[eademidova@client.eademidova.net ~]$ showmount -e server.eademidova.net
clnt_create: RPC: Unable to receive
[eademidova@client.eademidova.net ~]$ showmount -e server.eademidova.net
Export list for server.eademidova.net:
/srv/nfs *
[eademidova@client.eademidova.net ~]$
```

Рис. 4: Просмотр текущего системного времени на сервере

```
demidova.net:bootpc->_gateway:bootps
rpcbind 43438          rpc      5u      IPv4      38555      0t0      UDP *:sunrpc
rpcbind 43438          rpc      7u      IPv6      38573      0t0      UDP *:sunrpc
rpc.statd 43440        rpcuser  5u      IPv4      78806      0t0      UDP localhost
:792
rpc.statd 43440        rpcuser  8u      IPv4      78818      0t0      UDP *:55641
rpc.statd 43440        rpcuser 10u     IPv6      78828      0t0      UDP *:55868
rpc.mount 43444        root     4u      IPv4      79725      0t0      UDP *:mountd
rpc.mount 43444        root     6u      IPv6      79731      0t0      UDP *:mountd
[root@server.eademidova.net etc]#
```

Рис. 5: Просмотр задействованных при удалённом монтировании служб

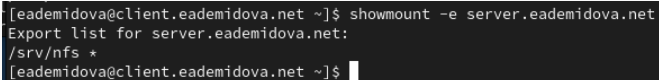
```
TCP
rpcbind 43438          rpc 4u IPv4 38546 0t0 TCP *:sunrpc
(LISTEN)
rpcbind 43438          rpc 6u IPv6 38564 0t0 TCP *:sunrpc
(LISTEN)
rpc.statd 43440        rpcuser 9u IPv4 78824 0t0 TCP *:53869 (
LISTEN)
rpc.statd 43440        rpcuser 11u IPv6 78832 0t0 TCP *:50533 (
LISTEN)
rpc.mount 43444        root 5u IPv4 79728 0t0 TCP *:mountd
(LISTEN)
rpc.mount 43444        root 7u IPv6 79734 0t0 TCP *:mountd
(LISTEN)
[root@server ~]# ss -tlns | grep -i nfs
```

Рис. 6: Просмотр задействованных при удалённом монтировании служб

## Настройка сервера NFSv4

```
[root@server.eademidova.net etc]# firewall-cmd --get-services
RH-Satellite-6 RH-Satellite-6-capsule afp amanda-client amanda-k5-client amqp amqps apcupsd audit ausweisapp2 b
acula bacula-client bb bgp bitcoin bitcoin-rpc bitcoin-testnet bitcoin-testnet-rpc bittorrent-lsd ceph ceph-mon
cfengine 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 for
eman-proxy freeipa-4 freeipa-ldap freeipa-ldaps freeipa-replication freeipa-trust ftp galera ganglia-client gan
glia-master git gpsd grafana gre high-availability http http3 https ident imap imaps ipfs ipp ipp-client ipsec
irc ircs iscsi-target isns jellyfin jenkins kadmin kdeconnect kerberos kibana klogin kpasswd kprop kshell kube-
api kube-apiserver kube-control-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 kubele
t-worker ldap ldaps libvirt libvirt-tls lightning-network llmnr llmnr-tcp llmnr-udp managesieve matrix mdns mem
cache minidlna mongodb mosh mountd mqtt mqtt-tls ms-wbt mssql murmur mysql nbd netbios-ns netdata-dashboard nfs
nfs3 nmea-0183 nrpe ntp nut openvpn ovirt-imageio ovirt-storageconsole ovirt-vmconsole plex pmcd pmpoxy pmweb
api pmwebapis pop3 pop3s postgresql privoxy prometheus prometheus-node-exporter proxy-dhcp ps3netsrv ptp pulsea
udio puppetmaster quassel radius rdp redis redis-sentinel rpc-bind rquotad rsh rsyncd rtsp salt-master samba sa
mba-client samba-dc sane sip sips slp smtp smtp-submission smtps snmp snmptls snmptls-trap snmptrap spideroak-l
ansync spotify-sync squid ssdp ssh ssh-custom steam-streaming svdrp svn syncthing syncthing-gui synergy syslog
syslog-tls telnet tentacle tftp tile38 tinc tor-socks transmission-client upnp-client vdsd vnc-server wbem-http
wbem-https wireguard ws-discovery ws-discovery-client ws-discovery-tcp ws-discovery-udp wsman wsmans xdmcp xmp
p-bosh xmpp-client xmpp-local xmpp-server zabbix-agent zabbix-server zerotier
[root@server.eademidova.net etc]# firewall-cmd --add-service=mountd --add-service=rpc-bind
success
[root@server.eademidova.net etc]# firewall-cmd --add-service=mountd --add-service=rpc-bind --permanent
success
[root@server.eademidova.net etc]# firewall-cmd --reload
success
[root@server.eademidova.net etc]#
```

Рис. 7: Добавление служб rpc-bind и mountd в настройки межсетевого экрана



```
[eademidova@client.eademidova.net ~]$ showmount -e server.eademidova.net
Export list for server.eademidova.net:
/srv/nfs *
```

The image shows a terminal window with a dark background. The prompt is [eademidova@client.eademidova.net ~]\$. The command showmount -e server.eademidova.net is entered. The output is Export list for server.eademidova.net: followed by a new line and /srv/nfs \*. The prompt returns to [eademidova@client.eademidova.net ~]\$. There is a white cursor at the end of the second prompt.

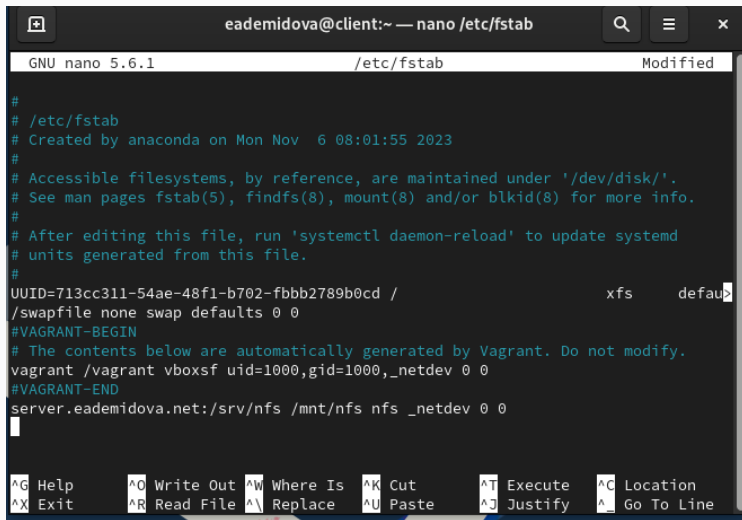
Рис. 8: Проверка подключения удалённого ресурса на клиенте

# Монтирование NFS на клиенте

```
[root@client.eademidova.net ~]# mkdir -p /mnt/nfs
[root@client.eademidova.net ~]# mount server.eademidova.net:/srv/nfs /mnt/nfs
[root@client.eademidova.net ~]# mount
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime,seclabel)
devtmpfs on /dev type devtmpfs (rw,nosuid,seclabel,size=4096k,nr_inodes=114493,mode=755,inode64)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,seclabel,inode64)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,seclabel,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,seclabel,size=194916k,nr_inodes=819200,mode=755,inode64)
cgroup2 on /sys/fs/cgroup type cgroup2 (rw,nosuid,nodev,noexec,relatime,seclabel,nsdelegate,memory_recursiveprot)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime,seclabel)
bpf on /sys/fs/bpf type bpf (rw,nosuid,nodev,noexec,relatime,mode=700)
/dev/sda1 on / type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,noquota)
selinuxfs on /sys/fs/selinux type selinuxfs (rw,nosuid,noexec,relatime)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=29,pgrp=1,timeout=0,minproto=5,maxproto=5,direct,
e_ino=17484)
debugfs on /sys/kernel/debug type debugfs (rw,nosuid,nodev,noexec,relatime,seclabel)
mqueue on /dev/mqueue type mqueue (rw,nosuid,nodev,noexec,relatime,seclabel)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,seclabel,pagesize=2M)
tracefs on /sys/kernel/tracing type tracefs (rw,nosuid,nodev,noexec,relatime,seclabel)
fusectl on /sys/fs/fuse/connections type fusectl (rw,nosuid,nodev,noexec,relatime)
configfs on /sys/kernel/config type configfs (rw,nosuid,nodev,noexec,relatime)
none on /run/credentials/systemd-sysctl.service type ramfs (ro,nosuid,nodev,noexec,relatime,seclabel,mode=700)
none on /run/credentials/systemd-tmpfiles-setup-dev.service type ramfs (ro,nosuid,nodev,noexec,relatime,seclabel,mode=
700)
none on /run/credentials/systemd-tmpfiles-setup.service type ramfs (ro,nosuid,nodev,noexec,relatime,seclabel,mode=700)
vagrant on /vagrant type vboxsf (rw,nodev,relatime,ioccharset=utf8,uid=1000,gid=1000)
vagrant on /vagrant type vboxsf (rw,nodev,relatime,ioccharset=utf8,uid=1000,gid=1000,_netdev)
tmpfs on /run/user/1001 type tmpfs (rw,nosuid,nodev,relatime,seclabel,size=97456k,nr_inodes=24364,mode=700,uid=1001,
d=1001,inode64)
gvfsd-fuse on /run/user/1001/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime,user_id=1001,group_id=1001)
sunrpc on /var/lib/nfs/rpc_pipefs type rpc_pipefs (rw,relatime)
server.eademidova.net:/srv/nfs on /mnt/nfs type nfs4 (rw,relatime,vers=4.2,rsize=131072,wsiz=131072,namlen=255,hard
roto=tcp,timeo=600,retrans=2,sec=sys,clientaddr=192.168.1.30,local_lock=none,addr=192.168.1.1)
[root@client.eademidova.net ~]#
```

Рис. 9: Проверка правильности подключения общего ресурса NFS

## Монтирование NFS на клиенте



The screenshot shows a terminal window with the title bar "eademidova@client:~ — nano /etc/fstab". The window contains the contents of the /etc/fstab file, which are as follows:

```
GNU nano 5.6.1 /etc/fstab Modified

#
# /etc/fstab
# Created by anaconda on Mon Nov  6 08:01:55 2023
#
# Accessible filesystems, by reference, are maintained under '/dev/disk/'.
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info.
#
# After editing this file, run 'systemctl daemon-reload' to update systemd
# units generated from this file.
#
UUID=713cc311-54ae-48f1-b702-fbbb2789b0cd / xfs defaults
/swapfile none swap defaults 0 0
#VAGRANT-BEGIN
# The contents below are automatically generated by Vagrant. Do not modify.
vagrant /vagrant vboxsf uid=1000,gid=1000,_netdev 0 0
#VAGRANT-END
server.eademidova.net:/srv/nfs /mnt/nfs nfs _netdev 0 0
```

At the bottom of the window, there is a status bar with the following keyboard shortcuts:

<b>^G</b> Help	<b>^O</b> Write Out	<b>^W</b> Where Is	<b>^K</b> Cut	<b>^T</b> Execute	<b>^C</b> Location
<b>^X</b> Exit	<b>^R</b> Read File	<b>^\</b> Replace	<b>^U</b> Paste	<b>^J</b> Justify	<b>^_</b> Go To Line

Рис. 10: Добавление записи в файл /etc/fstab на клиенте



```
[root@client.eademidova.net ~]# nano /etc/fstab
[root@client.eademidova.net ~]# systemctl status remote-fs.target
● remote-fs.target - Remote File Systems
   Loaded: loaded (/usr/lib/systemd/system/remote-fs.target; enabled; preset:
   Active: active since Sat 2023-12-16 12:08:01 UTC; 44min ago
   Until: Sat 2023-12-16 12:08:01 UTC; 44min ago
   Docs: man:systemd.special(7)

Dec 16 12:08:01 client.eademidova.net systemd[1]: Reached target Remote File Sy
...skipping...
● remote-fs.target - Remote File Systems
   Loaded: loaded (/usr/lib/systemd/system/remote-fs.target; enabled; preset:
   Active: active since Sat 2023-12-16 12:08:01 UTC; 44min ago
   Until: Sat 2023-12-16 12:08:01 UTC; 44min ago
   Docs: man:systemd.special(7)

Dec 16 12:08:01 client.eademidova.net systemd[1]: Reached target Remote File Sy
```

Рис. 11: Проверка наличия автоматического монтирования удалённых ресурсов при запуске ОС

## Монтирование NFS на клиенте

```
[eademidova@client.eademidova.net ~]$ mount
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime,seclabel)
devtmpfs on /dev type devtmpfs (rw,nosuid,seclabel,size=4896k,nr_inodes=114493,mode=755,inode64)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
tmpfs on /dev/shm type tmpfs (rw,nosuid,nodev,seclabel,inode64)
devpts on /dev/pts type devpts (rw,nosuid,noexec,relatime,seclabel,gid=5,mode=620,ptmxmode=000)
tmpfs on /run type tmpfs (rw,nosuid,nodev,seclabel,size=194916k,nr_inodes=819200,mode=755,inode64)
cgroup2 on /sys/fs/cgroup type cgroup2 (rw,nosuid,nodev,noexec,relatime,seclabel,nsdelegate,memory_recursiveprot)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime,seclabel)
bpf on /sys/fs/bpf type bpf (rw,nosuid,nodev,noexec,relatime,mode=700)
/dev/sda1 on / type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,noquota)
selinuxfs on /sys/fs/selinux type selinuxfs (rw,nosuid,noexec,relatime)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=29,pgrp=1,timeout=0,minproto=5,maxproto=5,direct,
e_ino=17486)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,seclabel,pagesize=2M)
mqueue on /dev/mqueue type mqueue (rw,nosuid,nodev,noexec,relatime,seclabel)
debugfs on /sys/kernel/debug type debugfs (rw,nosuid,nodev,noexec,relatime,seclabel)
tracefs on /sys/kernel/tracing type tracefs (rw,nosuid,nodev,noexec,relatime,seclabel)
fusectl on /sys/fs/fuse/connections type fusectl (rw,nosuid,nodev,noexec,relatime)
configfs on /sys/kernel/config type configfs (rw,nosuid,nodev,noexec,relatime)
none on /run/credentials/systemd-tmpfiles-setup-dev.service type ramfs (ro,nosuid,nodev,noexec,relatime,seclabel,mode=
700)
none on /run/credentials/systemd-sysctl.service type ramfs (ro,nosuid,nodev,noexec,relatime,seclabel,mode=700)
none on /run/credentials/systemd-tmpfiles-setup.service type ramfs (ro,nosuid,nodev,noexec,relatime,seclabel,mode=7
sunrpc on /var/lib/nfs/rpc_pipefs type rpc_pipefs (rw,relatime)
vagrant on /vagrant type vboxsf (rw,nodev,relatime,ioccharset=utf8,uid=1000,gid=1000)
server.eademidova.net:/srv/nfs on /mnt/nfs type nfs4 (rw,relatime,vers=4.2,rsize=131072,wsz=131072,namlen=255,hard=ro,
roto=tcp,timeo=600,retrans=2,sec=sys,clientaddr=192.168.1.30,local_lock=none,addr=192.168.1.1,_netdev)
vagrant on /vagrant type vboxsf (rw,nodev,relatime,ioccharset=utf8,uid=1000,gid=1000,_netdev)
tmpfs on /run/user/1001 type tmpfs (rw,nosuid,nodev,relatime,seclabel,size=97456k,nr_inodes=24364,mode=700,uid=1001,
d=1001,inode64)
gvfsd-fuse on /run/user/1001/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime,user_id=1001,group_id=1001)
[eademidova@client.eademidova.net ~]$
```

Рис. 12: Проверка автоматического подключения удалённого ресурса

## Подключение каталогов к дереву NFS

---

```
mkdir -p /srv/nfs/www  
mount -o bind /var/www/ /srv/nfs/www/
```

## Подключение каталогов к дереву NFS

---

## Подключение каталогов к дереву NFS

```
[sudo] password for eademidova:
[root@server.eademidova.net ~]# mkdir -p /srv/nfs/www
[root@server.eademidova.net ~]# mount -o bind /var/www/ /srv/nfs/www/
mount: (hint) your fstab has been modified, but systemd still uses
        the old version; use 'systemctl daemon-reload' to reload.
[root@server.eademidova.net ~]# cd /srv/nfs/
[root@server.eademidova.net nfs]# ls
www
[root@server.eademidova.net nfs]#
```

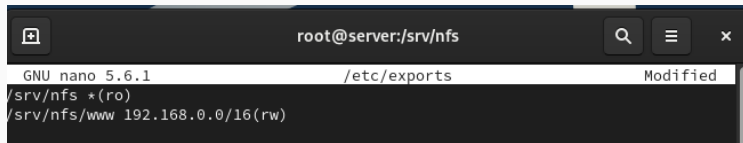
Рис. 13: Проверка содержимого /srv/nfs

```
gvfsd-fuse on /run/user/1001/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime,u
[eademidova@client.eademidova.net ~]$ cd /mnt/nfs/
[eademidova@client.eademidova.net nfs]$ ls
www
[eademidova@client.eademidova.net nfs]$
```

Рис. 14: Проверка содержимого /mnt/nfs

## Подключение каталогов к дереву NFS

---



```
root@server:/srv/nfs
GNU nano 5.6.1 /etc/exports Modified
/srv/nfs *(ro)
/srv/nfs/www 192.168.0.0/16(rw)
```

Рис. 15: Добавление в файл `/etc/exports` экспорт каталога веб-сервера



## Подключение каталогов к дереву NFS

---

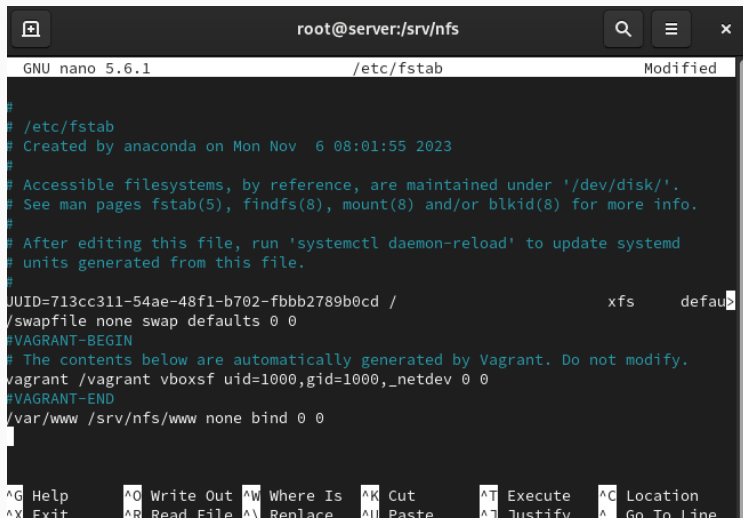
```
[eademidova@client.eademidova.net ~]$ cd /mnt/nfs/  
[eademidova@client.eademidova.net nfs]$ ls  
www  
[eademidova@client.eademidova.net nfs]$ ls  
www  
[eademidova@client.eademidova.net nfs]$
```

Рис. 16: Проверка содержимого /mnt/nfs

## Подключение каталогов к дереву NFS

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## Подключение каталогов к дереву NFS



The screenshot shows a terminal window with the title bar 'root@server:/srv/nfs'. The window contains the GNU nano 5.6.1 editor editing the file /etc/fstab. The file content includes comments about accessible filesystems, a Vagrant-generated entry for /var/www /srv/nfs/www, and a swapfile entry. The bottom of the window shows a status bar with various keyboard shortcuts like ^G Help, ^O Write Out, etc.

```
root@server:/srv/nfs
GNU nano 5.6.1 /etc/fstab Modified
#
# /etc/fstab
# Created by anaconda on Mon Nov  6 08:01:55 2023
#
# Accessible filesystems, by reference, are maintained under '/dev/disk/'.
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info.
#
# After editing this file, run 'systemctl daemon-reload' to update systemd
# units generated from this file.
#
UUID=713cc311-54ae-48f1-b702-fbbb2789b0cd / xfs defaults 0 0
/swapfile none swap defaults 0 0
#VAGRANT-BEGIN
# The contents below are automatically generated by Vagrant. Do not modify.
vagrant /vagrant vboxsf uid=1000,gid=1000,_netdev 0 0
#VAGRANT-END
/var/www /srv/nfs/www none bind 0 0
```

Рис. 17: Добавление записи в файл /etc/fstab

## Подключение каталогов к дереву NFS

---

```
www
[eademidova@client.eademidova.net nfs]$ cd /mnt/nfs/
[eademidova@client.eademidova.net nfs]$ ls
www
[eademidova@client.eademidova.net nfs]$ █
```

Рис. 18: Проверка содержимого /mnt/nfs

## Подключение каталогов для работы пользователей

---

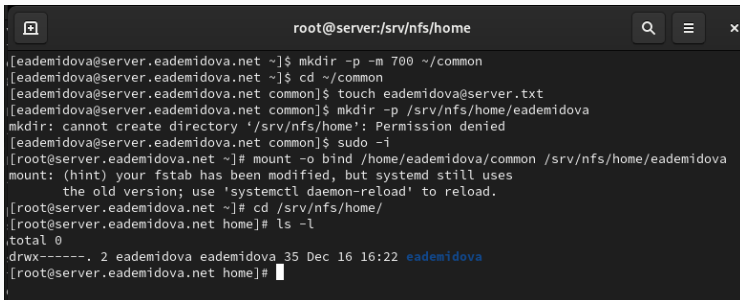
```
mkdir -p -m 700 ~/common  
cd ~/common  
touch eademidova@server.txt
```



## Подключение каталогов для работы пользователей

---

## Подключение каталогов для работы пользователей



```
root@server:/srv/nfs/home

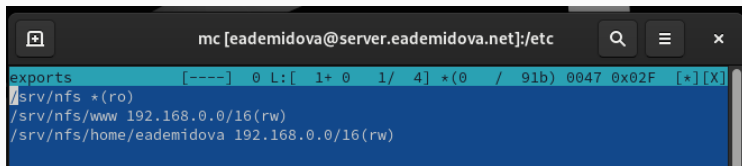
[eademidova@server.eademidova.net ~]$ mkdir -p -m 700 ~/common
[eademidova@server.eademidova.net ~]$ cd ~/common
[eademidova@server.eademidova.net common]$ touch eademidova@server.txt
[eademidova@server.eademidova.net common]$ mkdir -p /srv/nfs/home/eademidova
mkdir: cannot create directory '/srv/nfs/home': Permission denied
[eademidova@server.eademidova.net common]$ sudo -i
[root@server.eademidova.net ~]# mount -o bind /home/eademidova/common /srv/nfs/home/eademidova
mount: (hint) your fstab has been modified, but systemd still uses
the old version; use 'systemctl daemon-reload' to reload.
[root@server.eademidova.net ~]# cd /srv/nfs/home/
[root@server.eademidova.net home]# ls -l
total 0
drwx-----. 2 eademidova eademidova 35 Dec 16 16:22 eademidova
[root@server.eademidova.net home]#
```

Рис. 19: Проверка прав доступа на каталог

## Подключение каталогов для работы пользователей

---

## Подключение каталогов для работы пользователей



The image shows a terminal window with a dark theme. The title bar at the top reads "mc [eademidova@server.eademidova.net]:/etc". The terminal content shows the file `/etc/exports` with the following lines:

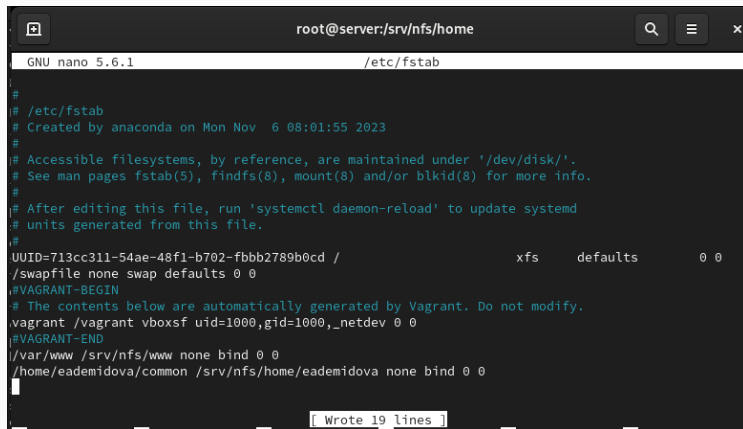
```
exports [----] 0 L:[ 1+ 0 1/ 4] *(0 / 91b) 0047 0x02F [*] [X]  
/srv/nfs *(ro)  
/srv/nfs/www 192.168.0.0/16(rw)  
/srv/nfs/home/eademidova 192.168.0.0/16(rw)
```

Рис. 20: Подключение каталога пользователя в файле `/etc/exports`

## Подключение каталогов для работы пользователей

---

# Подключение каталогов для работы пользователей



```
root@server:/srv/nfs/home
GNU nano 5.6.1 /etc/fstab

#
# /etc/fstab
# Created by anaconda on Mon Nov  6 08:01:55 2023
#
# Accessible filesystems, by reference, are maintained under '/dev/disk/'.
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info.
#
# After editing this file, run 'systemctl daemon-reload' to update systemd
# units generated from this file.
#
UUID=713cc311-54ae-48f1-b702-fbbb2789b0cd /                xfs     defaults        0 0
/swapfile none swap defaults 0 0
#VAGRANT-BEGIN
# The contents below are automatically generated by Vagrant. Do not modify.
vagrant /vagrant vboxsf uid=1000,gid=1000,_netdev 0 0
#VAGRANT-END
/ var/www /srv/nfs/www none bind 0 0
/ home/eademidova/common /srv/nfs/home/eademidova none bind 0 0

[ Wrote 19 lines ]
```

Рис. 21: Добавление записи в файл /etc/fstab

Подключение каталогов для работы  
пользователей

---

```
www
[eademidova@client.eademidova.net nfs]$ cd /mnt/nfs/
[eademidova@client.eademidova.net nfs]$ ls
www
[eademidova@client.eademidova.net nfs]$ ls
home  www
[eademidova@client.eademidova.net nfs]$
```

Рис. 22: Проверка содержимого /mnt/nfs



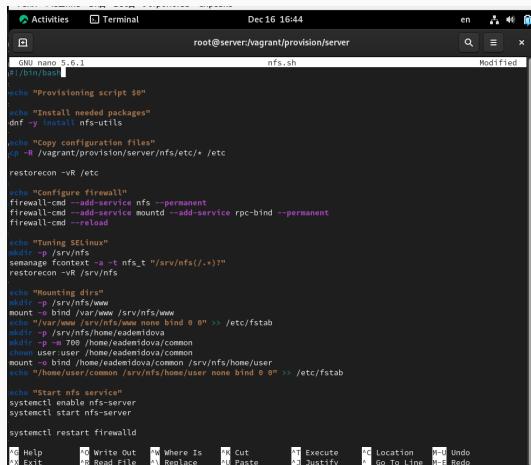
## Подключение каталогов для работы пользователей

---

```
[root@client.eademidova.net eademidova]# cd /mnt/nfs/
[root@client.eademidova.net nfs]# ls
home  www
[root@client.eademidova.net nfs]# cd home/eademidova/
[root@client.eademidova.net eademidova]# touch eademidova@client.txt
touch: cannot touch 'eademidova@client.txt': Read-only file system
[root@client.eademidova.net eademidova]# exit
logout
[eademidova@client.eademidova.net eademidova]$ touch eademidova@client.txt
touch: cannot touch 'eademidova@client.txt': Read-only file system
[eademidova@client.eademidova.net eademidova]$
```

Рис. 23: Проверка содержимого /mnt/nfs

# Внесение изменений в настройки внутреннего окружения виртуальной машины



```
root@server:/vagrant/provision/server
GNU nano 5.6.1 nfs.sh Modified
#!/bin/bash

echo "Provisioning script $@"

echo "Install needed packages"
dnf -y install nfs-utils

echo "Copy configuration files"
cp -R /vagrant/provision/server/nfs/etc/* /etc

restorecon -vR /etc

echo "Configure firewall"
firewall-cmd --add-service nfs --permanent
firewall-cmd --add-service mountd --add-service rpc-bind --permanent
firewall-cmd --reload

echo "Tuning SELinux"
mkdir -p /srv/nfs
semanage fcontext -a -t nfs_t "/srv/nfs(/.*)?"
restorecon -vR /srv/nfs

echo "Mounting dirs"
mkdir -p /srv/nfs/www
mount -o bind /var/www /srv/nfs/www
echo "/var/www /srv/nfs/www none bind 0 0" >> /etc/fstab
mkdir -p /srv/nfs/home/eademidova
mkdir -p -m 700 /home/eademidova/common
chown user:user /home/eademidova/common
mount -o bind /home/eademidova/common /srv/nfs/home/user
echo "/home/user/common /srv/nfs/home/user none bind 0 0" >> /etc/fstab

echo "Start nfs service"
systemctl enable nfs-server
systemctl start nfs-server

systemctl restart firewalld

^C Help      ^O Write Out ^M Where Is  ^K Cut      ^T Execute  ^G Location ^U Undo
^X Exit      ^R Read File ^J Replace   ^N Paste    ^I Justify  ^_ Go To Line ^D Redo
```

Рис. 24: Скрипта файла /vagrant/provision/server/nfs.sh

# Внесение изменений в настройки внутреннего окружения виртуальной машины



```
GNU nano 5.6.1                                nfs.sh
#!/bin/bash

echo "Provisioning script $0"

echo "Install needed packages"
dnf -y install nfs-utils

echo "Mounting dirs"
mkdir -p /mnt/nfs
mount server.eademidova.net:/srv/nfs /mnt/nfs
echo "server.eademidova.net:/srv/nfs /mnt/nfs nfs _netdev 0 0" >> /etc/fstab
restorecon -vR /etc
```

Рис. 25: Скрипта файла /vagrant/provision/client/nfs.sh

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

```
client.vm.provision "client nfs",  
  type: "shell",  
  preserve_order: true,  
  path: "provision/client/nfs.sh"
```

## Заключение

---

В результате выполнения данной работы были приобретены практические навыки настройки сервера NFS для удалённого доступа к ресурсам.