

Лабораторная работа

Номер 13

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Информация

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Цель работы

Приобретение навыков настройки сервера NFS для удалённого доступа к ресурсам

Установка пакета nfs-utils на сервере

```
[root@server.dmmosharov.net ~]# dnf -y install nfs-utils
Rocky Linux 10 - BaseOS          722 B/s | 4.3 kB   00:06
Rocky Linux 10 - BaseOS          22 MB/s | 9.9 MB   00:00
Rocky Linux 10 - AppStream       400 B/s | 4.3 kB   00:11
Rocky Linux 10 - AppStream       6.3 MB/s | 2.1 MB   00:00
Rocky Linux 10 - CRB             826 B/s | 4.3 kB   00:05
Rocky Linux 10 - CRB             1.6 MB/s | 499 kB   00:00
Rocky Linux 10 - Extras          6.6 kB/s | 3.1 kB   00:00
Rocky Linux 10 - Extras          21 kB/s | 5.9 kB   00:00
Dependencies resolved.

=====
Package           Arch    Version      Repository  Size
=====
Installing:
nfs-utils         x86_64  1:2.8.3-0.el10  baseos     475 k
Upgrading:
libipa_hbac       x86_64  2.11.1-2.el10_1.1  baseos     34 k
libldb            x86_64  4.22.4-106.el10  baseos    181 k
libsmbclient      x86_64  4.22.4-106.el10  baseos     75 k
libsssd_certmap   x86_64  2.11.1-2.el10_1.1  baseos     81 k
libsssd_idmap     x86_64  2.11.1-2.el10_1.1  baseos     41 k
libsssd_ns_idmap  x86_64  2.11.1-2.el10_1.1  baseos     44 k
libsssd_sudo      x86_64  2.11.1-2.el10_1.1  baseos     33 k
libtalloc          x86_64  2.4.3-100.el10  baseos     33 k
libtdb             x86_64  1.4.13-100.el10  baseos     55 k
libtevent          x86_64  0.16.2-100.el10  baseos     50 k
libwbclient        x86_64  4.22.4-106.el10  baseos     43 k
samba-client-libs  x86_64  4.22.4-106.el10  baseos     5.3 M
samba-common       noarch   4.22.4-106.el10  baseos    174 k
samba-common-libs  x86_64  4.22.4-106.el10  baseos     104 k
sssd               x86_64  2.11.1-2.el10_1.1  baseos     25 k
sssd-ad            x86_64  2.11.1-2.el10_1.1  baseos     195 k
sssd-client        x86_64  2.11.1-2.el10_1.1  baseos     152 k
sssd-common        x86_64  2.11.1-2.el10_1.1  baseos     1.5 M
sssd-common-pac   x86_64  2.11.1-2.el10_1.1  baseos     89 k
sssd-ipa           x86_64  2.11.1-2.el10_1.1  baseos    274 k
```

Рис. 1: Установка пакета nfs-utils на сервере

Создание каталога и открытие файла конфигурации

```
[root@server.dmmosharov.net ~]# mkdir -p /srv/nfs  
[root@server.dmmosharov.net ~]# nano /etc/exports
```

Рис. 2: Создание каталога и открытие файла конфигурации

Настройка экспорта каталога



The screenshot shows a terminal window with a dark background and a light gray header bar. The header bar contains the text "GNU nano 8.1" on the left and "/etc/exports" on the right. The main area of the terminal shows the command "/srv/nfs *(ro)" being typed. The cursor is visible at the end of the line.

Рис. 3: Настройка экспорта каталога

Настройка SELinux, запуск служб и настройка firewall

```
[root@server.dmmosharov.net ~]# semanage fcontext -a -t nfs_t "/srv/nfs(/.*)?"
[root@server.dmmosharov.net ~]# 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.dmmosharov.net ~]# systemctl start nfs-server.service
[root@server.dmmosharov.net ~]# 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.dmmosharov.net ~]# firewall-cmd --add-service=nfs
success
[root@server.dmmosharov.net ~]# firewall-cmd --add-service=nfs --permanent
success
[root@server.dmmosharov.net ~]# firewall-cmd --reload
success
[root@server.dmmosharov.net ~]#
```

Рис. 4: Настройка SELinux, запуск служб и настройка firewall

Установка nfs-utils на клиенте

```
[root@client.dmmosharov.net ~]# dnf -y install nfs-utils
Extra Packages for Enterprise Linux 10 - x86_64
Extra Packages for Enterprise Linux 10 - x86_64
Rocky Linux 10 - BaseOS
Rocky Linux 10 - BaseOS
Rocky Linux 10 - AppStream
Rocky Linux 10 - CRB
Rocky Linux 10 - Extras
Dependencies resolved.

=====
Package           Architecture      Version       Repository     Size
=====
Installing:
nfs-utils          x86_64          1:2.8.3-0.el10   baseos        475 k
Upgrading:
libipa_hbac        x86_64          2.11.1-2.el10_1.1  baseos        34 k
libldb             x86_64          4.22.4-106.el10   baseos       181 k
libismbcclient     x86_64          4.22.4-106.el10   baseos        75 k
libssss_certmap    x86_64          2.11.1-2.el10_1.1  baseos        81 k
libssss_idmap      x86_64          2.11.1-2.el10_1.1  baseos        41 k
libssss_nss_idmap  x86_64          2.11.1-2.el10_1.1  baseos        44 k
libssss_sudo       x86_64          2.11.1-2.el10_1.1  baseos        33 k
libtalloc           x86_64          2.4.3-100.el10    baseos       33 k
libtdb              x86_64          1.4.13-100.el10   baseos        55 k
libtevent           x86_64          0.16.2-100.el10   baseos        50 k
libwbclient         x86_64          4.22.4-106.el10   baseos       43 k
samba-client-libs   x86_64          4.22.4-106.el10   baseos        5.3 M
samba-common        noarch          4.22.4-106.el10   baseos       174 k
samba-common-libs   x86_64          4.22.4-106.el10   baseos        104 k
sssd               x86_64          2.11.1-2.el10_1.1  baseos        25 k
sssd-ad            x86_64          2.11.1-2.el10_1.1  baseos       195 k
```

Рис. 5: Установка nfs-utils на клиенте

Ошибка подключения RPC при просмотре ресурсов на клиенте

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

Рис. 6: Ошибка подключения RPC при просмотре ресурсов на клиенте

Остановка межсетевого экрана на сервере

```
[dmmosharov@server.dmmosharov.net ~]$ systemctl stop firewalld.service  
[dmmosharov@server.dmmosharov.net ~]$ █
```

Рис. 7: Остановка межсетевого экрана на сервере

Успешный просмотр списка экспорта при отключенном фаерволе

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

Рис. 8: Успешный просмотр списка экспорта при отключенном фаерволе

Запуск firewalld и просмотр открытых портов

```
[dmmosharov@server.dmmosharov.net ~]$ lsof | grep TCP
firefox    9490                      dmmosharov  102u      IPv4
        49366      0t0      TCP server.dmmosharov.net:59120->34.107.243.9
3:https (ESTABLISHED)
firefox    9490  9510 AsyncSi~l      dmmosharov  102u      IPv4
        49366      0t0      TCP server.dmmosharov.net:59120->34.107.243.9
3:https (ESTABLISHED)
firefox    9490  9511 pool-spaw     dmmosharov  102u      IPv4
        49366      0t0      TCP server.dmmosharov.net:59120->34.107.243.9
3:https (ESTABLISHED)
firefox    9490  9512 gmain       dmmosharov  102u      IPv4
        49366      0t0      TCP server.dmmosharov.net:59120->34.107.243.9
3:https (ESTABLISHED)
```

Рис. 9: Запуск firewalld и просмотр открытых портов

Службы rpcbind и mountd в выводе lsof

System	Port	User	Type	State	Process	Flags
systemd	1	root	89u	IPv6	9794	0t0
rpcbind	883	rpc	5u	IPv4	5864	0t0
rpcbind	883	rpc	7u	IPv6	5870	0t0
cupsd	1335	root	7u	IPv6	9184	0t0
cupsd	1335	root	8u	IPv4	9185	0t0
sshd	1248	root	7u	IPv4	11115	0t0

Рис. 10: Службы rpcbind и mountd в выводе lsof

Просмотр UDP-соединений с помощью lsof (начало вывода)

```
[dmmosharov@server.dmmosharov.net ~]$ sudo lsof | grep UDP
[sudo] password for dmmosharov:
lsof: WARNING: can't stat() fuse.gvfsd-fuse file system /run/user/1001/gvfs
      Output information may be incomplete.
lsof: WARNING: can't stat() fuse.portal file system /run/user/1001/doc
      Output information may be incomplete.
systemd      1                      root    43u     IPv4          6247    0t0      UDP  *:sunrpc
systemd      1                      root    45u     IPv6          6253    0t0      UDP  *:sunrpc
rpcbind    883                     rpc     6u     IPv4          6247    0t0      UDP  *:sunrpc
rpcbind    883                     rpc     8u     IPv6          6253    0t0      UDP  *:sunrpc
avahi-dae  937                     avahi   12u     IPv4          9975    0t0      UDP  *:mdns
avahi-dae  937                     avahi   13u     IPv6          9976    0t0      UDP  *:mdns
chronyd    986                     chrony  5u     IPv4          8041    0t0      UDP  localhost:323
chronyd    986                     chrony  6u     IPv6          8042    0t0      UDP  localhost:323
chronyd    986                     chrony  7u     IPv4          8043    0t0      UDP  *:ntp
named      1414                    named   41u     IPv4          11536   0t0      UDP  localhost:domain
named      1414                    named   42u     IPv4          11537   0t0      UDP  localhost:domain
named      1414                    named   43u     IPv4          11538   0t0      UDP  localhost:domain
named      1414                    named   44u     IPv4          11539   0t0      UDP  localhost:domain
named      1414                    named   53u     IPv4          11544   0t0      UDP  server.dmmosharov.n
named      1414                    named   54u     IPv4          11545   0t0      UDP  server.dmmosharov.n
named      1414                    named   55u     IPv4          11546   0t0      UDP  server.dmmosharov.n
```

Рис. 11: Просмотр UDP соединений с помощью lsof (начало вывода)

Просмотр UDP-соединений с помощью lsof (окончание вывода)

rpc.statd	1658		rpcuser	5u	IPv4
	14376	0t0	UDP localhost:986		
rpc.statd	1658		rpcuser	8u	IPv4
	14381	0t0	UDP *:58507		
rpc.statd	1658		rpcuser	10u	IPv6
	13843	0t0	UDP *:34024		
rpc.mount	1659		root	4u	IPv4
	14340	0t0	UDP *:mountd		
rpc.mount	1659		root	6u	IPv6
	14346	0t0	UDP *:mountd		
NetworkMa	5101		root	27u	IPv4
	22874	0t0	UDP server.dmmosharov.net:bootpc->_gateway		
:bootps					
NetworkMa	5101	5105 gmain	root	27u	IPv4
	22874	0t0	UDP server.dmmosharov.net:bootpc->_gateway		
:bootps					

Рис. 12: Просмотр UDP-соединений с помощью lsof (окончание вывода)

Настройка firewalld для работы службы mountd и rpc-bind

Рис. 13: Настройка firewalld для работы службы mountd и rpc-bind

Проверка экспорта NFS-ресурса командой showmount

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

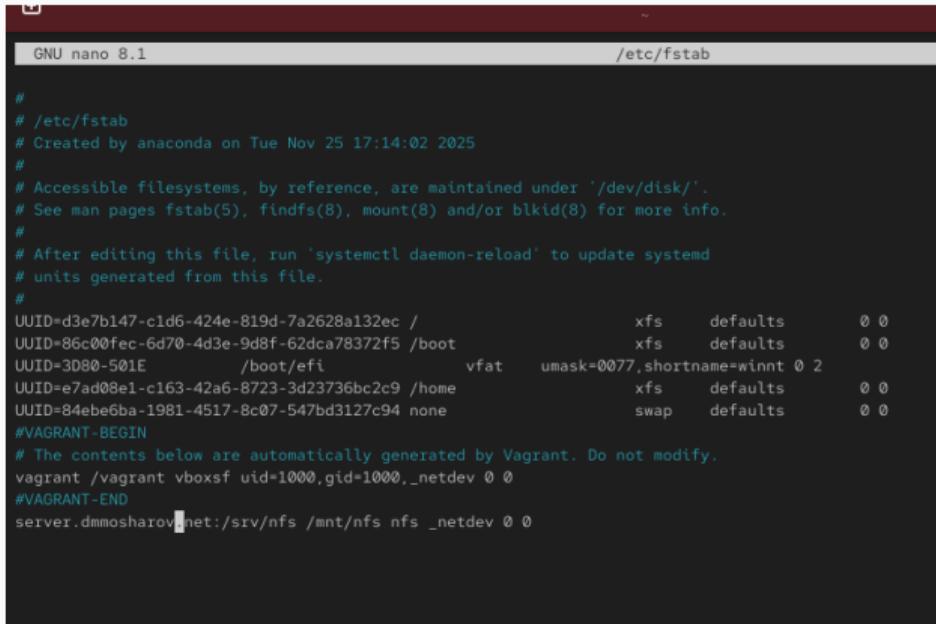
Рис. 14: Проверка экспорта NFS-ресурса командой showmount

Монтирование каталога NFS на клиенте и проверка через mount

```
[root@client.dmosharov.net ~]# mkdir -p /mnt/nfs
[root@client.dmosharov.net ~]# mount server.dmosharov.net:/srv/nfs /mnt/nfs
mount: (hint) your fstab has been modified, but systemd still uses
      the old version; use 'systemctl daemon-reload' to reload.
[root@client.dmosharov.net ~]# mount
[dev]mapper/zl_10-root on / type xfs (rw,relatime,seclabel,attr2,inode64,logbsize=8,logbufs=8,noquota)
devtmpfs on /dev type devtmpfs (rw,nosuid,seclabel,size=4096k,nr_inodes=460474,mode=755,inode64)
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)
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime,seclabel)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
cgroup2 on /sys/fs/cgroup type cgroup2 (rw,nosuid,nodev,noexec,relatime,seclabel,nodelegate,memory_recursiveprot)
pstore on /sys/fs/pstore type pstore (rw,nosuid,nodev,noexec,relatime,seclabel)
efivarfs on /sys/firmware/efi/efivars type efivarfs (rw,nosuid,nodev,noexec,relatime)
bpf on /sys/fs/bpf type bpf (rw,nosuid,nodev,noexec,relatime,mode=700)
configfs on /sys/kernel/config type configfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
tmpfs on /run type tmpfs (rw,nosuid,nodev,seclabel,size=744280k,nr_inodes=819200,mode=755,inode64)
selinuxfs on /sys/fs/selinux type selinuxfs (rw,nosuid,noexec,relatime)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=36,prgrp=1,timeout=0,minproto=5,maxproto=5,direct_pipe_ino=3978)
hugepages on /dev/hugepages type hugepages (rw,nosuid,nodev,relatime,seclabel,pagesize=2M)
mqqueue on /dev/mqueue type mqqueue (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)
tmpfs on /run/credentials/systemd/journal.service type tmpfs (ro,nosuid,nodev,noexec,relatime,nosymfollow,seclabel,size=1024k,nr_inodes=1024,mode=700,inode64,noswap)
fusectl on /sys/fs/fuse/connections type fusectl (rw,nosuid,nodev,noexec,relatime)
/dev/sda2 on /boot type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,noquota)
/dev/sdal on /boot/efi type vfat (rw,relatime,fmask=0x77,dmask=0x77,codepage=437,iocharset=ascii,shortname=winnt,errors=remount-ro)
/dev/mapper/zl_10-home on /home type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,noquota)
sunrpc on /var/lib/nfs/rpc_pipefs type rpc_pipefs (rw,relatime)
vagrant on /vagrant type vboxsf (rw,nodev,relatime,iocharset=utf8,uid=1000,gid=1000)
vagrant on /vagrant type vboxsf (rw,nodev,relatime,iocharset=utf8,uid=1000,gid=1000,_netdev)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,seclabel,size=372136k,nr_inodes=93034,mode=700,uid=1000,gid=1000,inode64)
gvfsd-fuse on /run/user/1000/gvfs type fuse_gvfsd-fuse (rw,nosuid,nodev,relatime,user_id=1000,group_id=1000)
portal on /run/user/1000/doc type fuse.portal (rw,nosuid,nodev,relatime,user_id=1000,group_id=1000)
tmpfs on /run/user/1001 type tmpfs (rw,nosuid,nodev,relatime,seclabel,size=372136k,nr_inodes=93034,mode=700,uid=1001,gid=1001,inode64)
server.dmosharov.net:/srv/nfs on /mnt/nfs type nfs4 (rw,relatime,vers=4.2,rsize=524288,wsize=524288,namlen=255,hard,proto=tcp,timeo=60,retrans=2,sec=sys,clientaddr=192.168.1.30,local_lock=none,addr=192.168.1.1)
[root@client.dmosharov.net ~]#
```

Рис. 15: Монтирование каталога NFS на клиенте и проверка через mount

Настройка автоматического монтирования в /etc/fstab



The screenshot shows a terminal window with the title "GNU nano 8.1" and the path "/etc/fstab". The content of the file is displayed in green text on a black background. The file contains comments at the top, followed by a section for accessible filesystems, and then specific entries for drives. It includes a Vagrant configuration section and ends with a line for a network share.

```
#  
# /etc/fstab  
# Created by anaconda on Tue Nov 25 17:14:02 2025  
#  
# 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=d3e7b147-c1d6-424e-819d-7a2628a132ec / xfs defaults 0 0  
UUID=86c00fec-6d70-4d3e-9d8f-62dca78372f5 /boot xfs defaults 0 0  
UUID=3D80-501E /boot/efi vfat umask=0077,shortname=winnt 0 2  
UUID=e7ad08e1-c163-42a6-8723-3d23736bc2c9 /home xfs defaults 0 0  
UUID=84eb6ba-1981-4517-8c07-547bd3127c94 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.dmmosharov@net:/srv/nfs /mnt/nfs nfs _netdev 0 0
```

Рис. 16: Настройка автоматического монтирования в /etc/fstab

Проверка статуса remote-fs.target

```
[root@client.dmmosharov.net ~]# systemctl status remote-fs.target
● remote-fs.target - Remote File Systems
    Loaded: loaded (/usr/lib/systemd/system/remote-fs.target; enabled; preset: enabled)
    Active: active since Sun 2026-02-01 20:15:30 UTC; 1min 39s ago
      Invocation: dce231f1d0914acba09d279b9f267c3e
        Docs: man:systemd.special(7)

Feb 01 20:15:30 client.dmmosharov.net systemd[1]: Reached target remote-fs.target - Remote File Systems.
[root@client.dmmosharov.net ~]#
```

Рис. 17: Проверка статуса remote-fs.target

Проверка подключенных ресурсов командой mount

```
[root@client.dimosharov.net ~]# mount
/dev/mapper/r1_10-root on / type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,noquota)
devtmpfs on /dev type devtmpfs (rw,nosuid,seclabel,size=4096k,nr_inodes=460476,mode=755,inode64)
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)
sysfs on /sys type sysfs (rw,nosuid,nodev,noexec,relatime,seclabel)
securityfs on /sys/kernel/security type securityfs (rw,nosuid,nodev,noexec,relatime)
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)
efivars on /sys/firmware/efi/efivars type efivars (rw,nosuid,nodev,noexec,relatime)
bpf on /sys/fs/bpf type bpf (rw,nosuid,nodev,noexec,relatime,mode=700)
configfs on /sys/kernel/config type configfs (rw,nosuid,nodev,noexec,relatime)
proc on /proc type proc (rw,nosuid,nodev,noexec,relatime)
tmpfs on /run type tmpfs (rw,nosuid,nodev,seclabel,size=744284k,nr_inodes=819200,mode=755,inode64)
selinuxfs on /sys/fs/selinux type selinuxfs (rw,nosuid,noexec,relatime)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=36,pgsize=1,timeout=0,minproto=5,maxproto=5,direct,pipe_ino=3904)
debugfs on /sys/kernel/debug type debugfs (rw,nosuid,nodev,noexec,relatime,seclabel)
queue on /dev/queue type queueue (rw,nosuid,nodev,noexec,relatime,seclabel)
hugegetlbfs on /dev/hugepages type hugegetlbfs (rw,nosuid,nodev,relatime,seclabel,pagesize=2M)
tracefs on /sys/kernel/tracing type tracefs (rw,nosuid,nodev,noexec,relatime,seclabel)
tmpfs on /run/credentials/systemd-journald.service type tmpfs (ro,nosuid,nodev,noexec,relatime,nosymfollow,seclabel,size=1024k,nr_inode
s=1024,mode=700,inode64,noswap)
fusectl on /sys/fs/fuse/connections type fusectl (rw,nosuid,nodev,noexec,relatime)
/dev/sda2 on /boot type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,noquota)
/dev/sdal on /boot/efi type vfat (rw,relatime,fmask=0077,dmask=0077,codepage=437,iocharset=ascii,shortname=winnt,errors=remount-ro)
/dev/mapper/r1_10-home on /home type xfs (rw,relatime,seclabel,attr2,inode64,logbufs=8,logbsize=32k,noquota)
sunrise on /var/lib/nfs/rpc_pipefs type rpc_pipefs (rw,relatime)
vagrant on /vagrant type vboxsf (rw,nodev,relatime,iocharset=utf8,uid=1000,gid=1000)
server.dimosharov.net:/srv/nfs on /mnt/nfs type nfs4 (rw,relatime,vers=4.2,rsIZE=524288,wSIZE=524288,namlen=255,hard,proto=tcp,timeo=60
0,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,iocharset=utf8,uid=1000,gid=1000,,netdev)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,seclabel,size=372140k,nr_inodes=93035,mode=700,uid=1000,gid=1000,inode64)
gvfs-fuse on /run/user/1000/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime,user_id=1000,group_id=1000)
portal on /run/user/1000/doc type fuse.portal (rw,nosuid,nodev,relatime,user_id=1000,group_id=1000)
tmpfs on /run/user/1001 type tmpfs (rw,nosuid,nodev,relatime,seclabel,size=372140k,nr_inodes=93035,mode=700,uid=1001,gid=1001,inode64)
[root@client.dimosharov.net ~]#
```

Рис. 18: Проверка подключенных ресурсов командой mount

Bind-монтирование каталога веб-сервера на сервере NFS

```
[root@server.dmmosharov.net ~]# mkdir -p /srv/nfs/www
[root@server.dmmosharov.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.dmmosharov.net ~]# ls /srv/fs
ls: cannot access '/srv/fs': No such file or directory
[root@server.dmmosharov.net ~]# ls /srv/nfs
www
[root@server.dmmosharov.net ~]# 
```

Рис. 19: Bind-монтирование каталога веб-сервера на сервере NFS

Проверка отображения нового каталога на клиенте

```
[root@client.dmmosharov.net ~]# ls /mnt/nfs  
www  
[root@client.dmmosharov.net ~]# █
```

Рис. 20: Проверка отображения нового каталога на клиенте

Редактирование файла /etc(exports на сервере



The screenshot shows a terminal window with a dark background and light-colored text. At the top, it says "root@server:~ – sudo -i". Below that is a command prompt with a tilde (~). The text area contains the following content:

```
GNU nano 8.1          /etc/exports
/srv/nfs *(ro)
/srv/nfs/www 192.168.0.0/16(rw)
```

The cursor is positioned at the end of the second line, after the closing parenthesis of "192.168.0.0/16(rw)".

Рис. 21: Редактирование файла /etc/exports на сервере

Экспорт каталогов командой exportfs

```
[root@server.dmmosharov.net ~]# exportfs -r
```

Рис. 22: Экспорт каталогов командой exportfs

Проверка наличия каталога www на клиенте

```
www
[root@client.dmmosharov.net ~]# ls /mnt/nfs
www
[root@client.dmmosharov.net ~]# ls /mnt/nfs/www
[root@client.dmmosharov.net ~]# 
```

Рис. 23: Проверка наличия каталога www на клиенте

Добавление bind-монтирования в /etc/fstab

```
GNU nano 8.1          /etc/fstab

#
# /etc/fstab
# Created by anaconda on Tue Nov 25 17:14:02 2025
#
# Accessible filesystems, by reference, are maintained under '/dev/di>
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for mor>
#
# After editing this file, run 'systemctl daemon-reload' to update sy>
# units generated from this file.
#
UUID=d3e7b147-c1d6-424e-819d-7a2628a132ec /           xfs>
UUID=86c00fec-6d70-4d3e-9d8f-62dca78372f5 /boot        xfs>
UUID=3D80-501E          /boot/efi           vfat      umask=0077,sh>
UUID=e7ad08e1-c163-42a6-8723-3d23736bc2c9 /home        xfs>
UUID=84ebe6ba-1981-4517-8c07-547bd3127c94 none        swa>
#VAGRANT-BEGIN
# The contents below are automatically generated by Vagrant. Do not m>
vagrant /vagrant vboxsf uid=1000,gid=1000,_netdev 0 0
#VAGRANT-END
var/www /srv/nfs/www none bind 0 0
```

Рис. 24: Добавление bind-монтирования в /etc/fstab

Повторный запуск exportfs на сервере

```
[root@server.dmmosharov.net ~]# exportfs -r  
[root@server.dmmosharov.net ~]# █
```

Рис. 25: Повторный запуск exportfs на сервере

Проверка доступа к каталогу www на клиенте

```
Last login: Sun Feb  1 20:16:32 UTC 2026 on pts/0
[dmmosharov@client.dmmosharov.net ~]$ ls /mnt/nfs
www
[dmmosharov@client.dmmosharov.net ~]$ ls /mnt/nfs/www
cgi-bin  html
[dmmosharov@client.dmmosharov.net ~]$ 
```

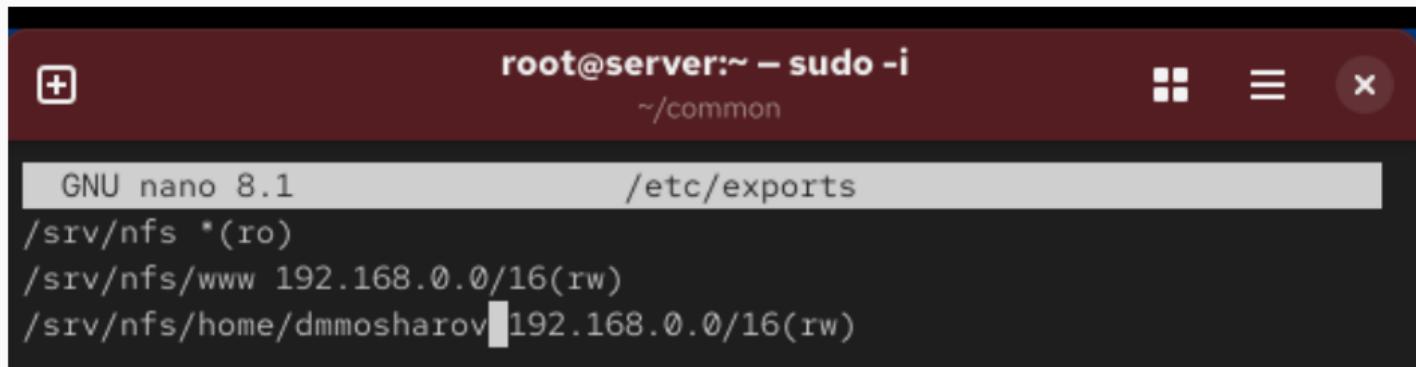
Рис. 26: Проверка доступа к каталогу www на клиенте

Подготовка каталога пользователя и bind-монтирование на сервере

```
[dmmosharov@server.dmmosharov.net ~]$ mkdir -p -m 700 ~/common
[dmmosharov@server.dmmosharov.net ~]$ cd ~/common
[dmmosharov@server.dmmosharov.net common]$ touch dmmosharov@server.txt
[dmmosharov@server.dmmosharov.net common]$ sudo mkdir -p /srv/nfs/home/dmmosharov
[sudo] password for dmmosharov:
[dmmosharov@server.dmmosharov.net common]$ mount -o bind /home/dmmosharov/common /srv/nfs/home/dmmosharov
mount: /srv/nfs/home/dmmosharov: must be superuser to use mount.
      dmesg(1) may have more information after failed mount system call.
mount: (hint) your fstab has been modified, but systemd still uses
      the old version; use 'systemctl daemon-reload' to reload.
[dmmosharov@server.dmmosharov.net common]$ sudo mount -o bind /home/dmmosharov/common /srv/nfs/home/dmmosharov
mount: (hint) your fstab has been modified, but systemd still uses
      the old version; use 'systemctl daemon-reload' to reload.
[dmmosharov@server.dmmosharov.net common]$ █
```

Рис. 27: Подготовка каталога пользователя и bind-монтирование на сервере

Настройка экспорта каталога пользователя



The screenshot shows a terminal window with the following details:

- Terminal Title:** root@server:~ – sudo -i
- Working Directory:** ~/common
- Content:** The terminal displays the output of the 'nano' editor showing the contents of the '/etc/exports' file. The file contains the following entries:
 - GNU nano 8.1
 - /etc/exports
 - /srv/nfs *(ro)
 - /srv/nfs/www 192.168.0.0/16(rw)
 - /srv/nfs/home/dmmosharov 192.168.0.0/16(rw)

Рис. 28: Настройка экспорта каталога пользователя

Настройка автоматического bind-монтирования в fstab

```
GNU nano 8.1          /etc/fstab

#
# /etc/fstab
# Created by anaconda on Tue Nov 25 17:14:02 2025
#
# Accessible filesystems, by reference, are maintained under '/dev/disk'
# See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more
#
# After editing this file, run 'systemctl daemon-reload' to update sy
# units generated from this file.
#
UUID=d3e7b147-c1d6-424e-819d-7a2628a132ec /           xfs
UUID=86c00fec-6d70-4d3e-9d8f-62dca78372f5 /boot        xfs
UUID=3080-501E          /boot/efi         vfat      umask=0077,sh
UUID=e7ad08e1-c163-42a6-8723-3d23736bc2c9 /home        xfs
UUID=84ebbe6ba-1981-4517-8c07-547bd3127c94 none       swap
#VAGRANT-BEGIN
# The contents below are automatically generated by Vagrant. Do not m
vagrant /vagrant vboxsf uid=1000,gid=1000,_netdev 0 0
#VAGRANT-END
var/www /srv/nfs/www none bind 0 0
/home/dmmosharov/common /srv/nfs/home/dmmosharov none bind 0 0
```

Рис. 29: Настройка автоматического bind-монтирования в fstab

Проверка доступа к каталогу home на клиенте

```
[dmmosharov@client.dmmosharov.net ~]$ ls /mnt/nfs
home  www
[dmmosharov@client.dmmosharov.net ~]$ ls /mnt/nfs/home
dmmosharov
[dmmosharov@client.dmmosharov.net ~]$
```

Рис. 30: Проверка доступа к каталогу home на клиенте

Проверка доступа к смонтированному каталогу пользователя на клиенте

```
[dmmosharov@client.dmmosharov.net ~]$ cd /mnt/nfs/home/dmmosharov
[dmmosharov@client.dmmosharov.net dmmosharov]$ touch dmmosharov@client.txt
[dmmosharov@client.dmmosharov.net dmmosharov]$ echo "123123" >> dmmosharov@client.txt
[dmmosharov@client.dmmosharov.net dmmosharov]$ sudo -i
[sudo] password for dmmosharov:
[root@client.dmmosharov.net ~]# cd /mnt/nfs/home/dmmosharov
-bash: cd: /mnt/nfs/home/dmmosharov: Permission denied
[root@client.dmmosharov.net ~]#
```

Рис. 31: Проверка доступа к смонтированному каталогу пользователя на клиенте

Проверка изменений в каталоге common на сервере

```
[root@server.dmmosharov.net ~]# logout  
[dmmosharov@server.dmmosharov.net common]$ ls  
dmmosharov@client.txt dmmosharov@server.txt  
[dmmosharov@server.dmmosharov.net common]$ cat dmmosharov@client.txt  
123123  
[dmmosharov@server.dmmosharov.net common]$
```

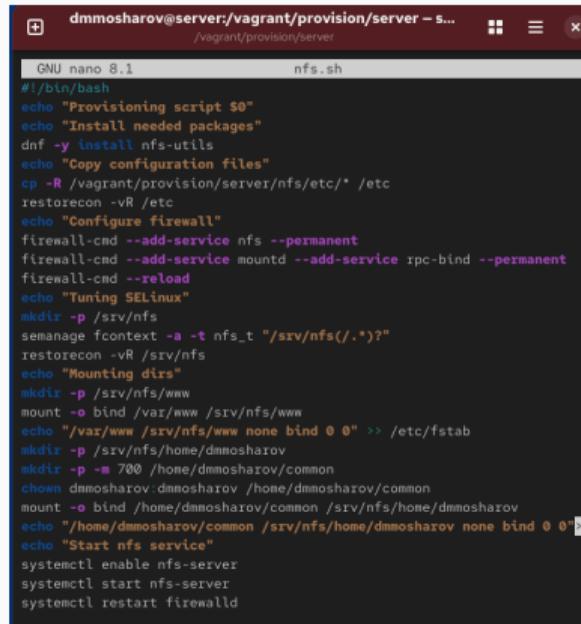
Рис. 32: Проверка изменений в каталоге common на сервере

Подготовка каталогов и создание скрипта nfs.sh на сервере

```
[dmmosharov@server.dmmosharov.net server]$ sudo mkdir -p /vagrant/provision/server/nfs/etc
[sudo] password for dmmosharov:
Sorry, try again.
[sudo] password for dmmosharov:
[dmmosharov@server.dmmosharov.net server]$ sudo cp -R /etc/exports /vagrant/provision/server/nfs/etc/
[dmmosharov@server.dmmosharov.net server]$ cd /vagrant/provision/server
[dmmosharov@server.dmmosharov.net server]$ touch nfs.sh
[dmmosharov@server.dmmosharov.net server]$ chmod +x nfs.sh
[dmmosharov@server.dmmosharov.net server]$ sudo nano nfs.sh
```

Рис. 33: Подготовка каталогов и создание скрипта nfs.sh на сервере

Содержимое скрипта автоматической настройки сервера



The screenshot shows a terminal window titled "dmmosharov@server:/vagrant/provision/server - s... /vagrant/provision/server". The window displays a shell script named "nfs.sh" with the following content:

```
GNU nano 8.1
#!/bin/bash
echo "Provisioning script $0"
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/dmmosharov
mkdir -p -m 700 /home/dmmosharov/common
chown dmmosharov:dmmosharov /home/dmmosharov/common
mount -o bind /home/dmmosharov/common /srv/nfs/home/dmmosharov
echo "/home/dmmosharov/common /srv/nfs/home/dmmosharov none bind 0 0"
echo "Start nfs service"
systemctl enable nfs-server
systemctl start nfs-server
systemctl restart firewalld
```

Рис. 34: Содержимое скрипта автоматической настройки сервера

Создание скрипта nfs.sh на клиенте

```
[root@client.dmmosharov.net ~]# cd /vagrant/provision/client
[root@client.dmmosharov.net client]# cd /vagrant/provision/client
[root@client.dmmosharov.net client]# touch nfs.sh
[root@client.dmmosharov.net client]# chmod +x nfs.sh
[root@client.dmmosharov.net client]# nano nfs.sh
```

Рис. 35: Создание скрипта nfs.sh на клиенте

Скрипт настройки NFS на клиенте

```
+                                         root@client:/vagrant/provision/client – sudo -i
                                               ~
GNU nano 8.1                                     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.dmmosharov.net:/srv/nfs /mnt/nfs
echo "server.dmmosharov.net:/srv/nfs /mnt/nfs nfs _netdev 0 0" >> /etc/fstab
restorecon -vR /etc
```

Рис. 36: Скрипт настройки NFS на клиенте

Добавление запуска скриптов в Vagrantfile

```
123   server.vm.provision "io-vbox_ntfs",
124     type: "shell",
125     preserve_order: true,
126     path: "provision/server/ntfs.sh"
127   end
128
129   ## Client configuration
130   config.vm.define "client", autostart: false do |client|
131     client.vm.box = "rockylinux8"
132     client.vm.hostname = "client"
133
134     client.vm.boot_timeout = 1440
135
136     client.ssh.insert_key = false
137     client.ssh.username = "vagrant"
138     client.ssh.password = "vagrant"
139
140     client.vm.network "private network",
141       type: "dhcp",
142       virtualbox_intnet: true
143
144     client.vm.provider :virtualbox do |virtualbox|
145       virtualbox.customize ["modifyvm", :id, "--vde", "on"]
146       virtualbox.customize ["modifyvm", :id, "--vndeptools", "1302"]
147     end
148
149     client.vm.provision "client_dummy",
150       type: "shell",
151       preserve_order: true,
152       path: "provision/client/01-dummy.sh"
153
154     client.vm.provision "client_routing",
155       type: "shell",
156       preserve_order: true,
157       run: "always",
158       path: "provision/client/01-routing.sh"
159     client.vm.provision "client_wall",
160       type: "shell",
161       preserve_order: true,
162       path: "provision/client/wall.sh"
163     client.vm.provision "client_ntp",
164       type: "shell",
165       preserve_order: true,
166       path: "provision/client/ntp.sh"
167
168   client.vm.provision "client_ntfs",
169     type: "shell",
170     preserve_order: true,
171     path: "provision/client/ntfs.sh"
172   end
173 end
174 end
```

Рис. 37: Добавление запуска скриптов в Vagrantfile

Выводы

В результате выполнения лабораторной работы были получены навыки работы с nfs и сетевыми хранилищами, а так же их настройка