

BOOTCAMP ESPECIALIDAD GNU/LINUX (2023)

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## Lab 06 - NFS

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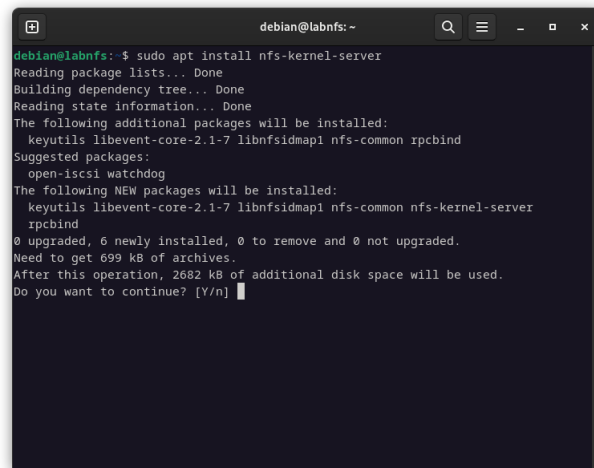
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# 1. Instalación de NFS Server

Para la instalación de NFS, necesitamos el siguiente paquete:

```
1 sudo apt install nfs-kernel-server
```

A terminal window titled 'debian@labnfs: ~' showing the command 'sudo apt install nfs-kernel-server' and its output. The output indicates that several additional packages will be installed along with the requested one, including keyutils, libevent-core-2.1-7, libnfsidmap1, nfs-common, rpcbind, and open-iscsi. It also shows the disk space requirements and asks for confirmation to continue.

```
debian@labnfs: ~  
$ sudo apt install nfs-kernel-server  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following additional packages will be installed:  
  keyutils libevent-core-2.1-7 libnfsidmap1 nfs-common rpcbind  
Suggested packages:  
  open-iscsi watchdog  
The following NEW packages will be installed:  
  keyutils libevent-core-2.1-7 libnfsidmap1 nfs-common nfs-kernel-server  
  rpcbind  
0 upgraded, 6 newly installed, 0 to remove and 0 not upgraded.  
Need to get 699 kB of archives.  
After this operation, 2682 kB of additional disk space will be used.  
Do you want to continue? [Y/n]
```

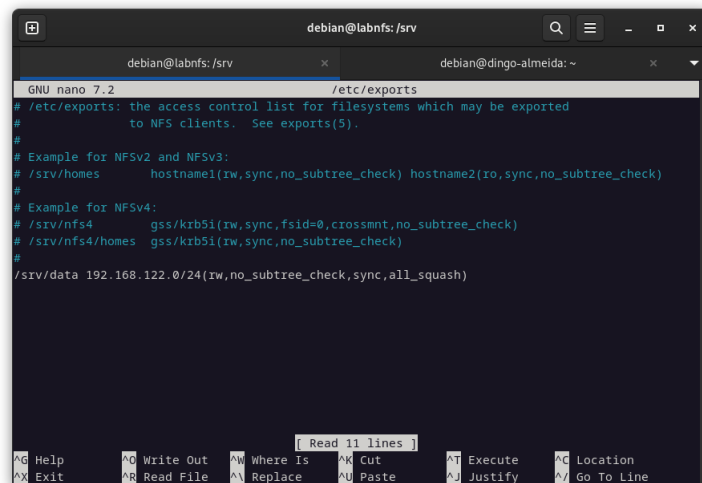
Figura 1: Instalación del servicio NFS.

Ahora creamos una carpeta en `/srv/data`, para que esté lista para la exportación de NFS. Le cambiamos el usuario y grupo, de manera que permitamos que los usuarios ajenos puedan escribir/leer/ejecutar en ellas. Esto debe ser combinado con el `all_squash` (si queremos que todos los usuarios no tengan permisos especiales), o `root_squash` (si queremos que el usuario root no tenga permisos de superusuario).

```
1 sudo mkdir /srv/data  
2 sudo chown -R nobody:nogroup /srv/data
```

Luego a continuación vamos al fichero localizado en `/etc/exports`, donde en ese fichero indicamos la exportación de la carpeta.

```
1 sudo nano /etc/exports  
2 # Dentro del fichero  
3 /srv/data 192.168.122.0/24(rw,no_subtree_check, sync, all_squash)  
4 # Luego, activamos y comprobamos el servicio  
5 systemctl enable nfs-kernel-server  
6 sudo systemctl start nfs-kernel-server  
7 sudo systemctl status nfs-kernel-server  
8 # Exportamos el directorio  
9 sudo exportfs -ra  
10 # Verificamos el export  
11 sudo exportfs
```

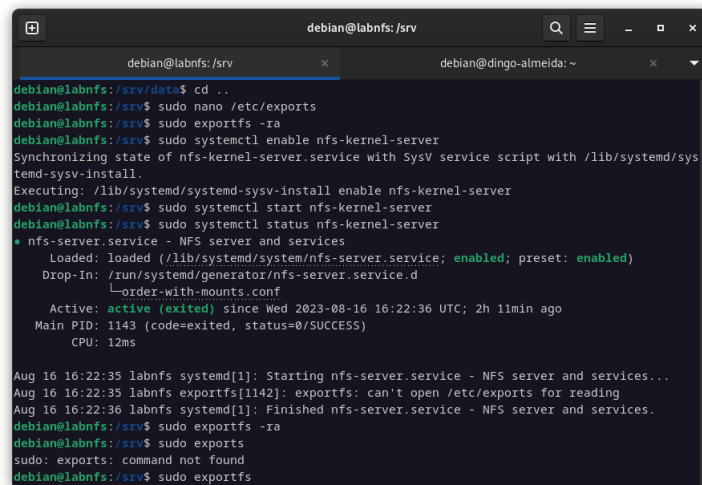
A screenshot of a terminal window with two tabs. The active tab is titled 'debian@labnfs: /srv' and shows the nano 7.2 editor editing the file '/etc/exports'. The file content includes a comment about the access control list, examples for NFSv2, NFSv3, and NFSv4, and a specific export line for '/srv/data' to the IP '192.168.122.0/24' with options '(rw,no\_subtree\_check, sync, all\_squash)'. The bottom of the terminal shows the nano editor's command palette with options like Help, Write Out, Where Is, Cut, Execute, Location, Exit, Read File, Replace, Paste, Justify, and Go To Line.

```
debian@labnfs: /srv
GNU nano 7.2 /etc/exports
# /etc/exports: the access control list for filesystems which may be exported
# to NFS clients.  See exports(5).
#
# Example for NFSv2 and NFSv3:
# /srv/homes hostname1(rw,sync,no_subtree_check) hostname2(ro,sync,no_subtree_check)
#
# Example for NFSv4:
# /srv/nfs4 gss/krb5i(rw,sync,fsid=0,crossmnt,no_subtree_check)
# /srv/nfs4/homes gss/krb5i(rw,sync,no_subtree_check)
#
/srv/data 192.168.122.0/24(rw,no_subtree_check, sync, all_squash)

[ Read 11 lines ]
^G Help      ^O Write Out ^W Where Is  ^K Cut       ^T Execute   ^C Location
^X Exit      ^R Read File ^_ Replace   ^U Paste     ^J Justify   ^_ Go To Line
```

Figura 2: Fichero `/etc/exports`.

1. 192.168.122.0/24 - Indicamos la subred permitida.
2. rw - Permitimos la escritura y lectura.
3. sync - Modo de sincronización total, indica al servidor NFS que espere a terminar una petición antes de atender la siguiente.
4. all\_squash - Indica que todos los usuarios serán identificados como nobody.
5. no\_subtree\_check - Indicamos al sistema NFS, que no tenga en cuenta los permisos root en el sistema de ficheros original, es decir dentro de los subdirectorios exportados.



```
debian@labnfs:/srv
debian@labnfs:/srv/data$ cd ..
debian@labnfs:/srv$ sudo nano /etc/exports
debian@labnfs:/srv$ sudo exportfs -ra
debian@labnfs:/srv$ sudo systemctl enable nfs-kernel-server
Synchronizing state of nfs-kernel-server.service with SysV service script with /lib/systemd/sys
temd-sysv-install.
Executing: /lib/systemd/systemd-sysv-install enable nfs-kernel-server
debian@labnfs:/srv$ sudo systemctl start nfs-kernel-server
debian@labnfs:/srv$ sudo systemctl status nfs-kernel-server
• nfs-server.service - NFS server and services
   Loaded: loaded (/lib/systemd/system/nfs-server.service; enabled; preset: enabled)
   Drop-In: /run/systemd/generator/nfs-server.service.d
            └─order-with-mounts.conf
   Active: active (exited) since Wed 2023-08-16 16:22:36 UTC; 2h 11min ago
   Main PID: 1143 (code=exited, status=0/SUCCESS)
   CPU: 12ms

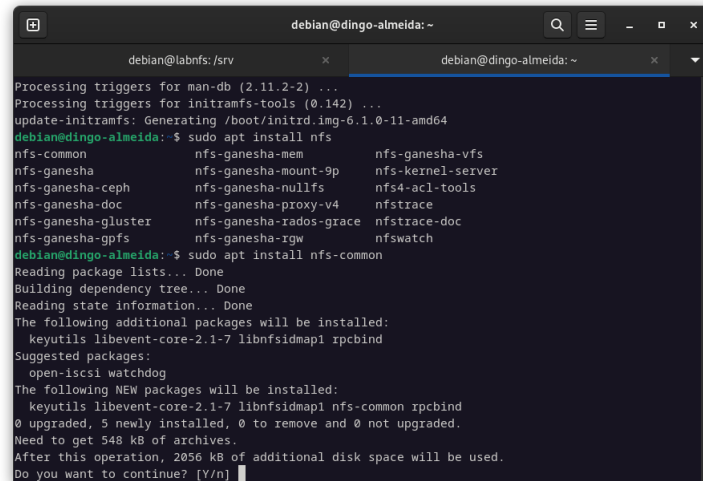
Aug 16 16:22:35 labnfs systemd[1]: Starting nfs-server.service - NFS server and services...
Aug 16 16:22:35 labnfs exportfs[1142]: exportfs: can't open /etc/exports for reading
Aug 16 16:22:36 labnfs systemd[1]: Finished nfs-server.service - NFS server and services.
debian@labnfs:/srv$ sudo exportfs -ra
debian@labnfs:/srv$ sudo exports
sudo: exports: command not found
debian@labnfs:/srv$ sudo exportfs
```

Figura 3: Activación del servicio y exportación del directorio.

## 2. Cliente NFS

Para el cliente instalamos el siguiente paquete:

```
1 sudo apt install nfs-common
```



```
Processing triggers for man-db (2.11.2-2) ...
Processing triggers for initramfs-tools (0.142) ...
update-initramfs: Generating /boot/initrd.img-6.1.0-11-amd64
debian@dingo-almeida:~$ sudo apt install nfs
nfs-common          nfs-ganesha-mem      nfs-ganesha-vfs
nfs-ganesha         nfs-ganesha-mount-9p  nfs-kernel-server
nfs-ganesha-ceph    nfs-ganesha-nullfs   nfs4-acl-tools
nfs-ganesha-doc     nfs-ganesha-proxy-v4  nfstrace
nfs-ganesha-gluster nfs-ganesha-rados-grace nfstrace-doc
nfs-ganesha-gpfs    nfs-ganesha-rgw       nfs-watch
debian@dingo-almeida:~$ sudo apt install nfs-common
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  keyutils libevent-core-2.1-7 libnfsidmap1 rpcbind
Suggested packages:
  open-iscsi watchdog
The following NEW packages will be installed:
  keyutils libevent-core-2.1-7 libnfsidmap1 nfs-common rpcbind
0 upgraded, 5 newly installed, 0 to remove and 0 not upgraded.
Need to get 548 kB of archives.
After this operation, 2056 kB of additional disk space will be used.
Do you want to continue? [Y/n]
```

Figura 4: Instalación del paquete.

Después de instalarlo, comprobamos la disponibilidad de los puntos de exportación, lo montamos con mount para hacer la prueba y finalmente creamos los ficheros o directorios dentro de ella para poder probar el sistema NFS.

```
1 # Buscamos el servidor NFS
2 sudo showmount -e 192.168.122.4
3 # Creamos la carpeta de montaje
4 sudo mkdir -p /var/www/html/DATA
5 # Montamos manualmente
6 sudo mount -t nfs4 192.168.122.4:/srv/data /var/www/html/DATA
```

```
debian@dingo-almeida: ~  
debian@labnfs:/srv  
debian@dingo-almeida: ~  
debian@dingo-almeida:~$ sudo showmount -e 192.168.122.4  
Export list for 192.168.122.4:  
/srv/data 192.168.122.0/24  
debian@dingo-almeida:~$ sudo nmkdir -p /var/www/html/DATA  
sudo: nmkdir: command not found  
debian@dingo-almeida:~$ sudo mkdir -p /var/www/html/DATA  
debian@dingo-almeida:~$ sudo showmount -e 192.168.122.4  
Export list for 192.168.122.4:  
/srv/data 192.168.122.0/24  
debian@dingo-almeida:~$ sudo mount -t nfs4 192.168.122.4:/srv/data /var/www/html/DATA  
mount.nfs4: Failed to resolve server 192.168.122.4: Name or service not known  
debian@dingo-almeida:~$ sudo mount -t nfs4 192.168.122.4:/srv/data /var/www/html/DATA  
debian@dingo-almeida:~$ sudo mount | tail -n 1  
192.168.122.4:/srv/data on /var/www/html/DATA type nfs4 (rw,relatime,vers=4.2,rsize=65536,wsiz  
e=65536,namlen=255,hard,proto=tcp,timeo=600,retrans=2,sec=sys,clientaddr=192.168.122.200,local_l  
ock=None,addr=192.168.122.4)  
debian@dingo-almeida:~$
```

Figura 5: Comprobando disponibilidad y montaje manual.

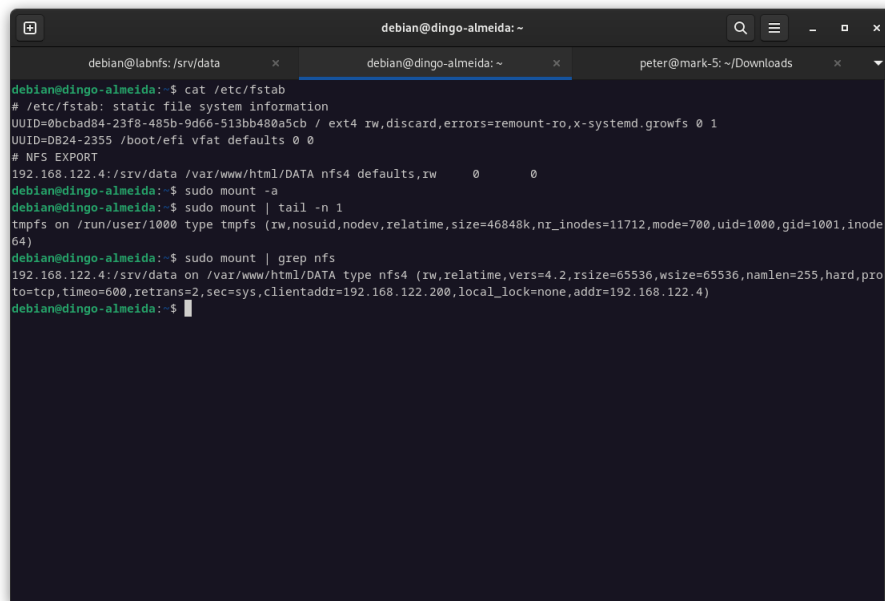
```
peter@mark-5: ~/Downloads  
debian@labnfs:/srv/data  
debian@dingo-almeida: /var/www/html/D...  
peter@mark-5: ~/Downloads  
a  
debian@dingo-almeida:/var/www/html/DATA$ mkdir -p web/srv  
debian@dingo-almeida:/var/www/html/DATA$ sudo apt install -y tree >  
/dev/null  
WARNING: apt does not have a stable CLI interface. Use with caution  
in scripts.  
E: Unable to locate package  
debian@dingo-almeida:/var/www/html/DATA$ sudo apt install -y tree >  
/dev/null  
WARNING: apt does not have a stable CLI interface. Use with caution  
in scripts.  
debian@dingo-almeida:/var/www/html/DATA$ tree  
├── a  
└── web  
    └── srv  
3 directories, 1 file  
debian@labnfs:/srv/data$ tree  
├── a  
└── web  
    └── srv  
3 directories, 1 file  
debian@labnfs:/srv/data$ ls -la  
total 12  
drwxr-xr-x 3 nobody nogroup 4096 Aug 16 19:10 .  
drwxr-xr-x 3 root root 4096 Aug 16 18:12 ..  
-lrw-r--r-- 1 nobody nogroup 0 Aug 16 19:01 a  
drwxr-xr-x 3 nobody nogroup 4096 Aug 16 19:10 web  
debian@labnfs:/srv/data$  
debian@dingo-almeida:/var/www/html/DATA$  
[0] 0:python3* "mark-5" 21:12 16-Aug-23
```

Figura 6: Pruebas de creación de directorios.

## 2.1. Persistencia de NFS en el cliente

Para que el cliente cada vez que arranque su sistema pueda montar la exportación de manera automática. Tenemos que crear la siguiente entrada en **/etc/fstab**.

```
1 # NFS EXPORT  
2 192.168.122.4:/srv/data /var/www/html/DATA nfs4 defaults ,rw 0 0
```



```
debian@dingo-almeida: ~  
# cat /etc/fstab  
# /etc/fstab: static file system information  
UUID=0bcbad84-23f8-485b-9d66-513bb480a5cb / ext4 rw,discard,errors=remount-ro,x-systemd.growfs 0 1  
UUID=DB24-2355 /boot/efi vfat defaults 0 0  
# NFS EXPORT  
192.168.122.4:/srv/data /var/www/html/DATA nfs4 defaults,rw 0 0  
debian@dingo-almeida: ~$ sudo mount -a  
debian@dingo-almeida: ~$ sudo mount | tail -n 1  
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,size=46848k,nr_inodes=11712,mode=700,uid=1000,gid=1001,inode  
64)  
debian@dingo-almeida: ~$ sudo mount | grep nfs  
192.168.122.4:/srv/data on /var/www/html/DATA type nfs4 (rw,relatime,vers=4.2,rsize=65536,wsiz=65536,namlen=255,hard,proto=tcp,timeo=600,retrans=2,sec=sys,clientaddr=192.168.122.200,local_lock=none,addr=192.168.122.4)  
debian@dingo-almeida: ~$
```

Figura 7: Montaje automático.