



How to Setup NFS Server on CentOS 8 / RHEL 8



James Kiarie / February 11, 2021

An acronym for Network File Share, **NFS** is a cross-platform client/server protocol that allows clients machines to access files shared by the NFS server over a network. Client systems can locally mount the filesystems from the NFS server and access files and directories as though they were locally mounted. In this guide, we will walk you through the installation and configuration of NFS Server on **CentOS 8 / RHEL 8**.

Note: In CentOS 8 or RHEL 8 **NFSv3** & **v4** both are supported. NFSv3 allows safe asynchronous write and supports 64-bit file sizes & offset. Whereas NFSv4 works through OS firewall and support ACL (Access Control List) and doesn't require rpcbind service

NFS Server/Client setup

Before we get started, we are going to use the setup below to simulate how the NFS protocol works in a client/server setup.

- Server machine IP: address: 192.168.2.102 CentOS 8
- Client machine IP: address: 192.168.2.103 CentOS 8

With our setup at hand, let's begin the installation of NFS on the server machine.

Step 1) Install and Configure NFS on the CentOS 8 / RHEL 8 server

To begin, we will install the NFS server package called **nfs-utils** which acts as the NFS daemon. To install the nfs-utils package, launch the terminal and run the command:

```
$ sudo dnf install nfs-utils -y
```

In the example below, nfs-utils is already installed.

```
linuxtechi@centos-8:~  
File Edit View Search Terminal Help  
[linuxtechi@centos-8 ~]$ sudo dnf install nfs-utils  
CentOS-8 - AppStream          260 kB/s | 6.8 MB    00:26  
CentOS-8 - Base               336 kB/s | 6.0 MB    00:18  
CentOS-8 - Extras            4.7 kB/s | 5.5 kB     00:01  
Copr repo for neofetch owned by konimex 597 B/s  | 1.3 kB     00:02  
Docker CE Stable - x86_64     16 kB/s  | 22 kB     00:01  
Extra Packages for Enterprise Linux Modula 17 kB/s | 116 kB    00:06  
Extra Packages for Enterprise Linux 8 - x8 256 kB/s | 6.3 MB    00:25  
Jenkins-stable               9.4 kB/s | 17 kB     00:01  
Remi's Modular repository for Enterprise L 56 kB/s  | 542 kB    00:09  
Safe Remi's RPM repository for Enterprise 44 kB/s  | 1.5 MB    00:34  
Last metadata expiration check: 0:00:01 ago on Fri 17 Apr 2020 01:01:53 PM EAT.  
Package nfs-utils-1:2.3.3-26.el8.x86_64 is already installed.  
Dependencies resolved.  
Nothing to do.  
Complete!
```

Once the installation is complete, start and enable the `nfs-server` service so it will be automatically across the reboots. Run the following commands,

```
$ sudo systemctl start nfs-server.service  
$ sudo systemctl enable nfs-server.service
```

```
linuxtechi@centos-8:~  
File Edit View Search Terminal Help  
[linuxtechi@centos-8 ~]$ sudo systemctl start nfs-server.service  
[linuxtechi@centos-8 ~]$  
[linuxtechi@centos-8 ~]$  
[linuxtechi@centos-8 ~]$ sudo systemctl enable nfs-server.service  
Created symlink /etc/systemd/system/multi-user.target.wants/nfs-server.serv  
ice → /usr/lib/systemd/system/nfs-server.service.  
[linuxtechi@centos-8 ~]$
```

To confirm that NFS service is running, execute:

```
$ sudo systemctl status nfs-server.service
```

```
linuxtechi@centos-8:~  
File Edit View Search Terminal Help  
[linuxtechi@centos-8 ~]$ sudo systemctl status nfs-server.service  
● nfs-server.service - NFS server and services  
   Loaded: loaded (/usr/lib/systemd/system/nfs-server.service; enabled; ve  
   Active: active (exited) since Fri 2020-04-17 13:06:12 EAT; 52s ago  
 Main PID: 4495 (code=exited, status=0/SUCCESS)  
    Tasks: 0 (limit: 11495)  
   Memory: 0B  
    CGroup: /system.slice/nfs-server.service  
  
Apr 17 13:06:12 centos-8 systemd[1]: Starting NFS server and services...  
Apr 17 13:06:12 centos-8 systemd[1]: Started NFS server and services.  
lines 1-10/10 (END)
```

You can verify the version of nfs protocol that you are running by executing the command:

```
$ rpcinfo -p | grep nfs
```

The version is indicated by the second column in the output presented below.

```
linuxtechi@centos-8:~  
File Edit View Search Terminal Help  
[linuxtechi@centos-8 ~]$ rpcinfo -p | grep nfs  
100003      3      tcp    2049    nfs  
100003      4      tcp    2049    nfs  
100227      3      tcp    2049    nfs_acl  
[linuxtechi@centos-8 ~]$
```

For additional configuration of the NFS server, you can find the configuration files at [/etc/nfs.conf](#) which is the NFS daemon config file and the [/etc/nfsmount.conf](#) which is the configuration file for the NFS mount.

Step 2) Creating and exporting NFS share

In this step, we are going to create a file system that will be shared from the server to client systems. In this guide, we will create a directory at [/mnt/nfs_share/docs](#) as shown below

```
$ sudo mkdir -p /mnt/nfs_shares/docs
```

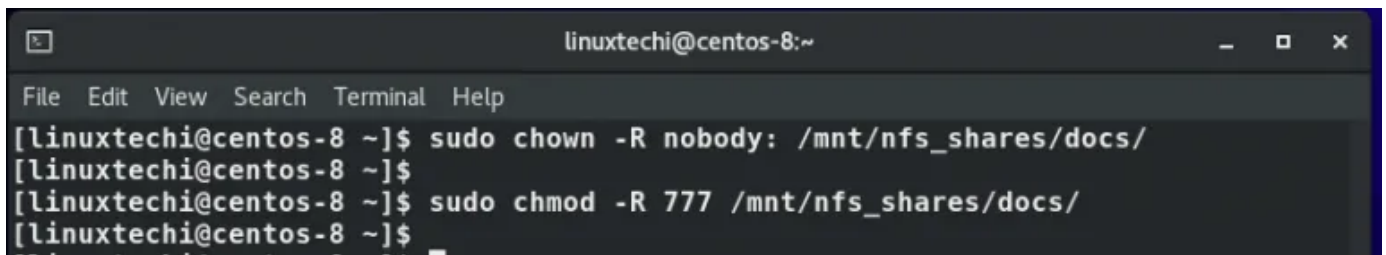
```
linuxtechi@centos-8:~  
File Edit View Search Terminal Help  
[linuxtechi@centos-8 ~]$ sudo mkdir -p /mnt/nfs_shares/docs  
[linuxtechi@centos-8 ~]$  
[linuxtechi@centos-8 ~]$
```

To avoid file restrictions on the NFS share directory, it's advisable to configure directory ownership as shown. This allows creation of files from the client systems without encountering any permission issues.

```
$ sudo chown -R nobody: /mnt/nfs_shares/docs
```

Also, you can decide to adjust the directory permissions according to your preference. For instance, in this guide, we will assign all the permissions (read , write and execute) to the NFS share folder

```
$ sudo chmod -R 777 /mnt/nfs_shares/docs
```

A terminal window titled 'linuxtechi@centos-8:~' with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal shows the following commands and their outputs:

```
[linuxtechi@centos-8 ~]$ sudo chown -R nobody: /mnt/nfs_shares/docs/
[linuxtechi@centos-8 ~]$
[linuxtechi@centos-8 ~]$ sudo chmod -R 777 /mnt/nfs_shares/docs/
[linuxtechi@centos-8 ~]$
```

For the changes to come into effect, restart the NFS daemon:

```
$ sudo systemctl restart nfs-utils.service
```

To export the NFS share so that client systems can access it, we need to edit the **/etc/exports** file. You can allow multiple clients access to the share by specifying a subnet as shown

```
/mnt/nfs_shares/docs 192.168.2.0/24(rw,sync,no_all_squash,root_squash)
```

Also, you can specify each client on a separate line:

```
/mnt/nfs_shares/docs client-IP(rw,sync,no_all_squash,root_squash)
```

```
/mnt/nfs_shares/docs client-IP(rw,sync,no_all_squash,root_squash)
```

Using our setup, we will grant access to our client machine with an IP 192.168.2.103. Add the following line in the file '**/etc/exports**':

```
$ sudo vi /etc/exports  
/mnt/nfs_shares/docs    192.168.2.103(rw,sync,no_all_squash,root_squash)
```

Save and exit the file. Use the cat command to confirm the entry as shown

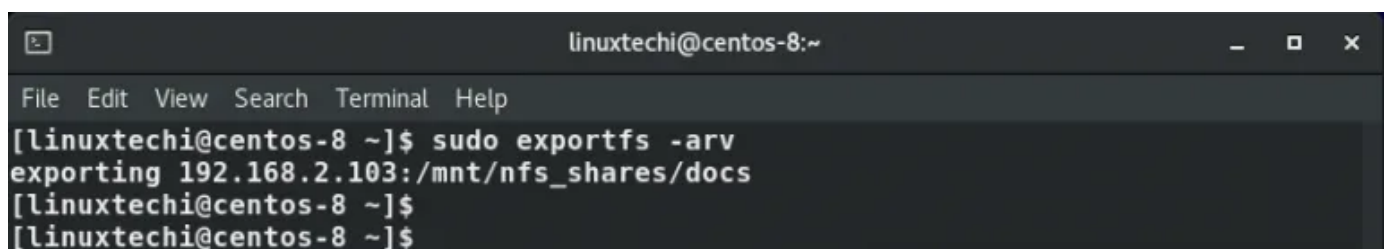
```
[linuxtechi@centos-8] cat /etc/exports  
/mnt/nfs_shares/docs    192.168.2.103(rw,sync,no_all_squash,root_squash)  
[linuxtechi@centos-8]
```

Let's look at the meaning of the parameters used:

- **rw** – This stands for read/write. It grants read and write permissions to the NFS share.
- **sync** – The parameter requires the writing of the changes on the disk first before any other operation can be carried out.
- **no_all_squash** – This will map all the UIDs & GIDs from the client requests to identical UIDS and GIDs residing on the NFS server.
- **root_squash** – The attribute maps requests from the root user on the client-side to an anonymous UID / GID.

To export the above created folder, use the exportfs command as shown:

```
$ sudo exportfs -arv
```

A terminal window titled 'linuxtechi@centos-8:~' with a menu bar (File, Edit, View, Search, Terminal, Help). The terminal shows the command 'sudo exportfs -arv' being executed, followed by the output 'exporting 192.168.2.103:/mnt/nfs_shares/docs'. The prompt returns to the user three times.

```
linuxtechi@centos-8:~  
File Edit View Search Terminal Help  
[linuxtechi@centos-8 ~]$ sudo exportfs -arv  
exporting 192.168.2.103:/mnt/nfs_shares/docs  
[linuxtechi@centos-8 ~]$  
[linuxtechi@centos-8 ~]$  
[linuxtechi@centos-8 ~]$
```

The **-a** option implies that all the directories will be exported, **-r** stands for re-exporting all directories and finally **-v** flag displays verbose output.

Just to be dead-sure about the export list, you can display the export list using the command:

```
$ sudo exportfs -s
```

Perfect! Our export list exists. So far so good. The only configuration left on the NFS server is allowing NFS services on the firewall.

Step 3) Configuring the firewall rules for NFS Server

The final step in configuring the server is allowing NFS services through the firewall on the CentOS 8 server machine. These services are **nfs**, **rpc-bind**, and **mountd**. So, execute the commands below.

```
$ sudo firewall-cmd --permanent --add-service=nfs
$ sudo firewall-cmd --permanent --add-service=rpc-bind
$ sudo firewall-cmd --permanent --add-service=mountd
```

Then reload the firewall for the changes to come into effect

```
$ sudo firewall-cmd --reload
```

Now let's head out to the client system and set it up to access the NFS shares.

Setting up the NFS Client system

To configure the client system to access the NFS file shares, follow the procedure below

Step 1) Install the required NFS packages

On the CentOS 8 client system, install the requisite packages for accessing the NFS share residing on the NFS server

```
$ sudo dnf install nfs-utils nfs4-acl-tools -y
```

For Debian or Ubuntu System:

```
$ sudo apt install nfs-common nfs4-acl-tools -y
```

To display the mounted NFS shares on the server, use the **showmount** command:

```
$ showmount -e 192.168.2.102
```

Step 2) Mounting the remote NFS share located on the server

Next, we need to mount the remote NFS share directory sitting on the local client system. But first, let's create a directory to mount the NFS share.

```
$ sudo mkdir -p /mnt/client_share
```

To mount the NFS share, execute the command below. Recall that 192.168.2.102 is the IP address of the NFS server.

```
$ sudo mount -t nfs 192.168.2.102:/mnt/nfs_shares/docs /mnt/client_share
```

You can verify the remote NFS share has been mounted by executing:

```
$ sudo mount | grep -i nfs
```

To make the mount share persistent upon a reboot, you need to edit the [/etc/fstab](#) file and append the entry below.


```
192.168.2.102:/mnt/nfs_shares/docs /mnt/client_share nfs defaults 0 0
```

Save and close the file.

Testing NFS Server & Client Setup

At this point, we are done with all the configurations. However, we need to test our setup and ensure everything works. So, first, we are going to create a test file in the NFS server share directory and check whether it is present at the client's NFS mounted directory.

```
$ sudo touch /mnt/nfs_shares/docs/server_nfs_file.txt
```

Now, head out to the client system and check whether the file exists on the client side.

```
$ ls -l /mnt/client_share/
```

Great! From the output, we can clearly see that the file exists. Let's now do the opposite. We are going to create a file on the NFS client system and verify whether it can be accessed from the NFS server.

On the client create the file as shown:

```
$ sudo touch /mnt/client_share/client_nfs_file.txt
```

Now, head back to the server and check whether the file is present at the NFS share directory

```
$ ls -l /mnt/nfs_shares/docs
```

Awesome! We can view and access the file.

As you can see, you can easily create files on both the NFS server and client and share them seamlessly between the two systems as well as other client systems that have been

configured to access the shares. And this brings us to the end of our tutorial today. In this guide, we showed you how to install and setup the NFS server and client system setup on CentOS 8 and RHEL 8.

Read Also : [How to Setup NFS Server on CentOS 8 / RHEL 8](#)

Tags: [NFS Server Linux](#)

7 thoughts on “How to Setup NFS Server on CentOS 8 / RHEL 8”

ALEXEY

May 5, 2020 at 12:47 pm

Are there any prerequisites for Windows clients to get access /mnt/nfs_share/docs?

Thank you!

[Reply](#)

JAMES KIARIE

May 7, 2020 at 10:35 am

Hey Alexey,

For Windows systems, e.g Windows 10, you need to enable the NFS client feature in the Control Panel under ‘Add or Remove programs’ section. Thereafter, hit ‘Windows key + R’ and type in the path to the NFS share which is located on the CentOS 8 system and press ENTER. Let me know if that works for you.

[Reply](#)

KUDZAYI NDORO

July 12, 2020 at 11:06 pm

```
$ sudo vi /etc/exports
/mnt/nfs_shares/docs 192.168.2.103(rw,sync,no_all_squash,root_squash
```

Should be:

```
$ sudo vi /etc/exports
```

```
/mnt/nfs_share/docs 192.168.2.103(rw, sync, no_all_squash, root_squash
```

(/mnt/nfs_shares/docs should be /mnt/nfs_share/docs because /mnt/nfs_shares/docs doesn't exist)

[Reply](#)

PRADEEP KUMAR

July 13, 2020 at 3:58 am

Hi Kudzayi,

It was due to the typo, i have fixed it now.

[Reply](#)

VISHAL SHARMA

October 13, 2020 at 7:57 am

refereed all above but unable to create a file in client system . it is saying below .

touch: cannot touch 'test2.txt': Read-only file system

Please update .

[Reply](#)

PRADEEP KUMAR

October 14, 2020 at 4:36 am

Please make sure you have set correct permissions on exported nfs share and your user should have rights to write a file on mounted nfs share.

[Reply](#)

ARUN

June 13, 2021 at 4:04 pm

it should be error with exports

make sure you values in /etc/exports is in one line and have write permission

[Reply](#)

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