Cloud Central

Linux on Azure

Linux NFS Server: How to Set Up Server and Client

December 10, 2020 | Topics: Azure, File Services, Azure NetApp Files, Elementary

What is Linux NFS Server?

Network File Sharing (NFS) is a protocol that allows you to share directories and files with other Linux clients over a network. Shared directories are typically created on a file server, running the NFS server component. Users add files to them, which are then shared with other users who have access to the folder.

An NFS file share is mounted on a client machine, making it available just like folders the user created locally. NFS is particularly useful when disk space is limited and you need to exchange public data between client computers.

This is part of our series of articles about Linux on Azure.

In this article, you will learn:

- Quick Tutorial #1: Setting Up an NFS Server with an NFS Share
  - Installing NFS Server
  - Create Root NFS Directory
  - Define Access for NFS Clients in Export File

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Quick Tutorial #1: Setting Up an NFS Server with an NFS Share

Let's see how to set up an NFS server and create an NFS file share, which client machines can mount and access.

Related content: Build Your Own Enterprise NFS Service

Installing NFS Server

Here is how to install the NFS Kernel—this is the server component that enables a machine to expose directories as NFS shares.

On Ubuntu and Debian:

```
sudo apt-get update

sudo apt install nfs-kernel-server
```

On CentOS and Fedora:

```
yum -y install nfs-utils

apt-get install nfs-kernel-server
```

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Create Root NFS Directory

We'll now create the root directory of the NFS shares, this is also known as an export folder.

```
sudo mkdir /mnt/myshareddir
```

Set permissions so that any user on the client machine can access the folder (in the real world you need to consider if the folder needs more restrictive settings).

```
sudo chown nobody:nogroup /mnt/myshareddir #no-one is owner

sudo chmod 777 /mnt/myshareddir #everyone can modify files
```

Define Access for NFS Clients in Export File

To grant access to NFS clients, we'll need to define an export file. The file is typically located at `/etc/exports`

Edit the `/etc/exports file` in a text editor, and add one of the following three directives.

All the directives below use the options `rw`, which enables both read and write, `sync`, which writes changes to disk before allowing users to access the modified file, and `no_subtree_check`, which means NFS doesn't check if each subdirectory is accessible to the user.

To enable access to a single client	`/mnt/myshareddir {clientIP} (rw,sync,no_subtree_check)`
To enable access to several clients	`/mnt/myshareddir {clientIP-1} (rw,sync,no_subtree_check) {clientIP-2}(...)`

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To enable access to an entire subnet	`/mnt/myshareddir {subnetIP}/{subnetMask} (rw,sync,no_subtree_check)`

Make the NFS Share Available to Clients

You can now make the shared directory available to clients using the `exportfs` command. After running this command, the NFS Kernel should be restarted.

```
sudo exportfs -a #making the file share available

sudo systemctl restart nfs-kernel-server #restarting the NFS kernel
```

If you have a firewall enabled, you'll also need to open up firewall access using the `sudo ufw allow` command.

Quick Tutorial #2: Setting Up NFS on Client Machine and Mounting an NFS Share

Now that we have set up the NFS server, let's see how to share a folder, defined as an NFS share, with a Linux computer by mounting it on the local machine.

Installing NFS Client Packages

Here are the packages you need to install to enable mounting an NFS share on a local Linux machine.

On Ubuntu and Debian:

```
sudo apt update

sudo apt install nfs-common
```

On CentOS and Fedora:

```
sudo yum install nfs-utils
```

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Mounting the NFS File Share Temporarily

You can mount the NFS folder to a specific location on the local machine, known as a mount point, using the following commands.

1. Create a local directory—this will be the mount point for the NFS share. In our example we'll call the folder `/var/locally-mounted`.

```
sudo mkdir /var/locally-mounted
```

2. Mount the file share by running the `mount` command, as follows. There is no output if the command is successful.

```
sudo mount -t nfs {IP of NFS server}:{folder path on server} /var/locally-mounted
```

For example:

```
sudo mount -t nfs 192.168.20.100:/myshareddir /var/locally-mounted
```

The mount point now becomes the root of the mounted file share, and under it you should find all the subdirectories stored in the NFS file share on the server.

3. To verify that the NFS share is mounted successfully, run the `mount` command or `df -h`.

Mounting NFS File Shares Permanently

Remote NFS directories can be automatically mounted when the local system is started. You can define this in the `/etc/fstab` file. In order to ensure an NFS file share is mounted locally on startup, you need to add a line to this file with the relevant file share details.

To automatically mount NFS shares on Linux, do the following:

4. Create a local directory that will be used to mount the file share.

```
sudo mkdir /var/locally-mounted
```

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5. Edit the `/etc/fstab` file using the `nano` command or any text editor.

6. Add a line defining the NFS share. Insert a tab character between each parameter. It should appear as one line with no line breaks.

The last three parameters indicate NFS options (which we set to default), dumping of file system and filesystem check (these are typically not used so we set them to 0).

```
{IP of NFS server}:{folder path on server} /var/locally-mounted nfs defaults 0 0
```

7. Now mount the file share using the following command. The next time the system starts, the folder will be mounted automatically.

```
mount /var/locally-mounted

mount {IP of NFS server}:{folder path on server}
```

Azure NetApp Files: A Cloud-Based NFS Server Replacement

Microsoft Azure, a popular public cloud service, lets you set up NFS file shares in the cloud and access them from machines in your local data center, or deployed in the Azure cloud.

Azure NetApp Files is a cloud service offering enterprise-class, high-performance file storage for enterprises. It supports NFS versions 3.1 and onwards.

Azure NetApp Files supports all types of production workloads and provides built-in high availability. You can choose the level and performance of the service, and perform instant snapshots of your data.

Extreme File Performance

Leverage industry-leading NetApp technology to migrate the most demanding Linux and Windows file workloads to Azure. Azure NetApp Files delivers sub-millisecond latency and equivalent performance to what you would

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Azure NetApp Files provides three performance levels: Standard, Premium, and Ultra. You can provision file shares in any of the tiers with one click.

Integrated Data Management

Azure NetApp Files integrates with complex business workloads such as SAP HANA, high performance computing (HPC), line of business (LOB) applications, and virtual desktop infrastructure (VDI). For these and many more enterprise workloads, it offers integrated data management and application awareness for backups and snapshots.

Central Management

You can manage file shares using Azure Portal or CLI, PowerShell commands, or a REST API, just like any other Azure service. Azure NetApp Files supports multiple storage protocols in one service, including NFSv3, SMB3.1.x, and NFSv4.1. This allows you to transition workloads to the cloud in a "lift and shift" model, without requiring code changes.

Migrate with Confidence

When migrating large enterprise workloads, rsync data transfer is not enough. With Azure NetApp Files you can manage large-scale data transfer and synchronization at ease.

The service provides FIPS 140-2-compliant data encryption, role-based access control (RBAC), Active Directory authentication, and access control lists (ACL). Azure NetApp Files complies with major industry certifications such as HIPAA, SOC and GDPR. These and other enterprise-grade features mean you can migrate any enterprise workload to the cloud with complete confidence.

Want to get started? See Azure NetApp Files for yourself with a free demo

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Jeff Whitaker

Cloud Data Services

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