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Experiment no. 12

Aim: Configuration ofNFS (Network File System) Server and transfer files to a Linux Client.

Theory: NFS (Network File System) is a distributed file system. An NFS server has one or more file systems that are mounted by NFS clients. These file systems are mounted by using the standard UNIX mount commands. NFS is the standard method to share files between Linux and Unix-like systems.

NFS is a networking protocol for distributed file sharing. A file system defines the way files are stored and retrieved from storage devices, such as hard disk drives, solid-state drives and on tape drives across networks. It enables network administrators to share all or a portion of a file system on a networked server to make it accessible to remote computer users. NFS is one of the most widely used protocols for file servers. Cloud vendors also implement the NFS protocol for cloud storage, including Amazon Elastic File System, NFS file shares in Microsoft Azure and Google Cloud Filestore.

How does the Network File System work?

NFS is a client-server protocol. An NFS Server is a host that meets the following requirements:

- has NFS Installed
- has at least one network connection for sharing NFS resources; and
- is configured to accept and respond to NFS requests over the network connection.

An NFS Client is a host that meets the following requirements:

- has NFS client software installed has network connectivity to an NFS server is authorized to access resources on the NFS server; and is configured to send and receive NFS requests over the network connection.

NFS was initially conceived as a method for sharing file systems across workgroups using UNIX. It is still often used for ad hoc sharing of resources.

Installation of NFS Server

Install the package for "nfs-kernel-server" on your machine.

Installation of NYS Server

Install the package for "nfs-kernel-server" on your machine.

root@ubuntu: —

```
root apt install nfs-kernel-server Reading package
lists. Done
Bui Iding dependency tree
Reading state information. .. Done nfs-kernet-server is already the
newest version (1 : 1.3.4-2.5ubuntu3.4) .
The following packages were automatically installed and are no longer required :
  gimp-data 065-va-driver intel-media-va-drtver libaacso Iibamd2 Ii-baomo
  tibavcodec58 Iibavformat58 t ibavuti156 libbabt-O.1-O tibbdptuso tibbtas3
  libbluray2 ltbcamd2 IibccoIamd2 ltbcholmod3 libchromaprintl ltbcodec2-o.9
  Iibcotamd2 1tbde265-O IibgegI-O .4-0 tibgegt-common Iibgfortran5 tibgimp2.O
  IibgmeO Iibgsml t ibheifl I ibtgdgmmll I ibiImbase24 IibIapack3 Iibmetts5
      Iibmng2 Iibmypaint-I.5-I Iibmypaint-common Iibopenexr24 IibopenmptO
  IibquadmathO libraw19 1 tbsdt2-2.0-0 1 tbshtne3 tibsnappy1v5 Iibssh-gcrypt-4
  Iibsuttesparseconftg5 IibswresampIe3 IibswscaIe5 ItbumfpackS Iibva-drm2
  Iibva-xII-2 L tbva2 Itbvdpaul Iibx264-155 Iibx265-179 Iibxvtdcore4
Iibzvbt-common ItbzvbtO mesa-va-drivers mesa-vdpau-drtvers oct-
icd-libopencll 'yea-driver-all vdpau-drtver-all use ' apt auto remove'
to remove them .
  u raded O newt installed . O to remove and 47 not u raded r oot@ubuntu :
```

root@ubuntu: —

```
  Iibsuitesparseconfig5 IibswresampIe3 IibswscaIe5 Iibumfpack5 Iibva-
  drm2 Iibva-xII-2 1 ibva2 Iibvdpaul 11bx264-155 libx265-179
  11bxvtdcore4
Iibzvbi-common IibzvbiO mesa-va-drivers mesa-vdpau-drivers oct-icd-
ltbopencll va-drtver-all vdpau-drtver-all Use ' apt auto remove' to remove
them .
O upgraded, O newly installed, O to remove and 47 not upgraded .root@ubuntu
: root@ubuntu : root@ubuntu :
root          apt install nfs- common Reading
package       Done
```

Building dependency tree
Reading state information... Done nfs-common is already the newest version (I : I. 3.4-2. subuntu3.4) .
The following packages were automatically installed and are no longer required : gimp-data 1965-va-drtver intel-medta-va-drtver libaacsO I ibamd2 libaomO 1ibavcodec58 Iibavformat58 Iibavuti156 libbab1-O.1-O Iibbdp1usO Iibb1as3 I tbbIuray2 Iibcamd2 IibccoIamd2 IibchoImod3 Iibchromaprintl I tbcodec2-O.9 Iibcotamd2 Iibde265-O Iibgeg1-O.4-O Iibgegl-common Iibgfortran5 Iibgimp2.O I ibgmeO Iibgsml Iibheifl libigdgmmll libitmbase24 IibIapack3 Iibmetis5 I tbmng2 Iibmypatnt-1.5-I Iibmypatnt-common Iibopenexr24 LibopenmptO Iibquadmatho Iibraw19 Iibsdt2-2.0-0 Iibshine3 Iibsnappy1v5 Iibssh-gcrypt-4 I tbsuitesparseconfig5 t IbswresampIe3 IibswscaIe5 Iibumfpack5 Iibva-drm21ibva-x11-2 1 ibva2 Itbvdpaul libx264-155 libx265-179 11bxvidcore4 I ibzvbi-common I tbzvbiO mesa-va -drivers mesa -vdpau-drivers oct-tcd-ltbopencll va-drtver-all vdpau-drtver-all Use ' apt auto remove' to remove them .
O u raded O newt installed , O to remove and 47 not u raded root@ubuntu :

Create the folder that needs to be shared,

```
root@ubuntu:~#
root@ubuntu:~# cd /mnt
root@ubuntu:/mnt#
root@ubuntu:/mnt#
root@ubuntu:/mnt# ls -lrt
total 0
root@ubuntu:/mnt#
root@ubuntu:/mnt# mkdir nfsshare
root@ubuntu:/mnt#
root@ubuntu:/mnt# ls -lrt
total 4
drwxr-xr-x 2 root root 4096 Apr 27 07:35 nfsshare
root@ubuntu:/mnt#
```

Provide permissions as below,

```
root@ubuntu:/mnt#
root@ubuntu:/mnt# chown -R nobody:nogroup nfsshare
root@ubuntu:/mnt#
root@ubuntu:/mnt# ls -lrt
total 4
drwxr-xr-x 2 nobody nogroup 4096 Apr 27 07:35 nfsshare
root@ubuntu:/mnt#
root@ubuntu:/mnt#
root@ubuntu:/mnt#
root@ubuntu:/mnt# chmod -R 777 nfsshare/
root@ubuntu:/mnt#
root@ubuntu:/mnt#
root@ubuntu:/mnt# ls -lrt
total 4
drwxrwxrwx 2 nobody nogroup 4096 Apr 27 07:35 nfsshare
root@ubuntu:/mnt#
root@ubuntu:/mnt#
```

Edit "/etc/exports" with below entry with IP or (*) for all servers,

```
# /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_sub
tree_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)

/mnt/nfsshare  192.168.75.129(rw,sync,no_root_squash,insecure)
~
~
~
~
```

//add the IP address of server with details of the file being sharedCheck the status of NFS service after making these changes,

r oot@ubuntu : —-4 root@ubuntu:—# systemctl [redacted] status nfs-kernel- server nfs-server . service NFS server and services
Loaded : loaded (/lib/systemd/system/nfs -server . service; enabled; vendor p
Active : active (exited) since wed 2022-04-27 PDT ; 34s ago Process : 6243 ExecStartPre=/usr/sbin/exportfs - r (code—exited, status=O/SU Process : 6244 Execstart=/usr/sbin/rpc . nfsd SRPCNFSDARGS (code—exited, stat main PID: 6244 (code—exited, status=O/SUCCESS) Apr 27 07:44:40 ubuntu systemd[l]: Starting NFS server and services... A r 27 07:44 •.41 ubuntu systemd[l] •. F int shed NFS server and services.

Check the firewall status,

```
root@ubuntu:~# ufw status
Status: inactive
root@ubuntu:~#
root@ubuntu:~#
```

Ex ort the NFS folder and mount the shared folder,

```
root@ubuntu:/mnt#
root@ubuntu:/mnt# exportfs -rav
exportfs: /etc/exports [3]: Neither 'subtree_check' or 'no_subtree_check' speci
fied for export "*:/mnt/nfsshare".
  Assuming default behaviour ('no_subtree_check').
  NOTE: this default has changed since nfs-utils version 1.0.x

exporting *:/mnt/nfsshare
root@ubuntu:/mnt#
root@ubuntu:/mnt#
root@ubuntu:/mnt# mount 192.168.75.129:/mnt/nfsshare  /mnt/nfs_client_Share
root@ubuntu:/mnt#
root@ubuntu:/mnt# ls -lrt
total 8
drwxrwxrwx 2 nobody nogroup 4096 Apr 27 07:35 nfsshare
drwxrwxrwx 2 nobody nogroup 4096 Apr 27 07:35 nfs_client_Share
root@ubuntu:/mnt#
```

root@ubuntu:/mnt#

Folder actin as server, has a "a.txt" file

cd nfsshare/

root@ubuntu : / mn t / nf s s ha

root@ubuntu : /mnt/nfsshare#

root@ubuntu : / mnt/nfsshare#

root@ubuntu : /mnt/nfsshare#

root@ubuntu:/mnt/nfsshare# Is -I rt

total [redacted]

I 27 08: 06

root root 28 Apr a. txt [redacted]

root@ubuntu : /mnt/ nf s sha

root@ubuntu : /mnt/nfsshare# cat [redacted]

This	file is	a. txt shared on NFS. [redacted]

root@ubuntu : /mnt /nfsshare#

Text file acting as a server has a txt file and is also now visible via Client share machine

```
root@ubuntu:/mnt#
root@ubuntu:/mnt#
root@ubuntu:/mnt# cd nfs_client_Share/
root@ubuntu:/mnt/nfs_client_Share#
root@ubuntu:/mnt/nfs_client_Share#
root@ubuntu:/mnt/nfs_client_Share# ls -lrt
total 4
-rw-r--r-- 1 root root 28 Apr 27 08:06 a.txt
root@ubuntu:/mnt/nfs_client_Share#
root@ubuntu:/mnt/nfs_client_Share#
root@ubuntu:/mnt/nfs_client_Share# cat a.txt
This file is shared on NFS.
```

Conclusion: Hence, we have studied about the configuration of NFS Server and transferred files across Linux clients and servers.