**Network File Sharing (NFS)**

NFS (Network File System) is basically developed for sharing of files and folders between Linux/Unix systems It allows you to mount your local file systems over a network

* A *Network File System* (NFS) allows remote hosts to mount file systems over a network and interact with those file systems as though they are mounted locally.
* The Network File System (**NFS**) is a way of mounting **Linux** discs/directories over a network. An **NFS** server can export one or more directories that can then be mounted on a remote **Linux** machine. Note, that if you need to mount a **Linux** filesystem on a Windows machine, you need to use Samba/CIFS instead.
* Default NFS uses 2049 TCP port.
* NFS was developed by Sun Microsystems in 1980.
* NFS stand for Network File System.
* NFS is used to share files and printer between Linux / Unix systems.
* Red Hat Enterprise Linux 6 supports NFSv2, NFSv3, and NFSv4 clients.
* By default RHEL6 use NFSv4 if the server supports it.
* TCP 2049 is the default port number for NFS.

**Benifits of NFS:-**

* **NFS** allows local access to remote files.
* It uses standard **client**/**server** architecture for file sharing between all \***nix** based machines.
* With **NFS** it is not necessary that both machines run on the same **OS**.
* With the help of **NFS** we can configure **centralized storage** solutions.
* Users get their **data** irrespective of physical location.
* No manual **refresh** needed for new files.
* Newer version of **NFS** also supports **acl**, **pseudo** root mounts.
* Can be secured with **Firewalls** and **Kerberos**.

**NFS Version :-**

**NFSv1**

NFSv1 was the development stage of NFS protocol. It was used only for in house experimental purpose. When a stable version of NFS was ready, Developers decided to release it as the new version of NFS known as NFSv2.

**NFSv2**

* NFSv2 supports only 32 bit.
* NFSv2 only allowed the first 2 GB of a file to be read
* NFSv2 operated only over UDP

**NFSv3**

* NFSv3 supports 64 bit file system.
* NFSv3 can handle files larger than 2 GB.
* NFSv3 supports asynchronous writes on the server. asynchronous writes improve write performance.
* NFSv3 supports additional file attributes in many replies, to avoid the need to re-fetch them.
* NFSv3 supports READDIRPLUS operation. READDIRPLUS operation get file handles and attributes along with file names when scanning a directory.
* NFSv3 supports TCP. Using TCP as a transport made NFS over a WAN more feasible.

**NFSv4**

* NFSv4 supports only TCP.
* NFSv4 retains all NFSv3 advantages.
* NFSv4 supports ACLs.
* NFSv4 uses the virtual file system to present the server's export.
* NFSv4 supports Pseudo file system. Pseudo File System provide maximum flexibility. Exports Pathname on servers can be changed transparently to clients.
* NFSv4 have locking operations as the part of protocol which keep track of open files and delegations.
* NFSv4 works through firewalls and on the Internet and no longer requires rpcbind service.

**Important Files For NFS Configuration :-**

* **/etc/exports** It’s a main configuration file of NFS, all exported files and directories are defined in this file at the NFS Server end.
* **/etc/fstab:** To mount a NFS directory on your system across the reboots, we need to make an entry in/etc/fstab.
* **/etc/sysconfig/nfs:**Configuration file of NFS to control on which port rpc and other services are listening.

**Inportant Commands For NFS :-**

* **showmount -e :** Shows the available shares on your local machine.
* **showmount -e &ltserver-ip or hostname&gt:** Lists the available shares at the remote server.
* **showmount -d :** Lists all the sub directories.
* **exportfs -v :** Displays a list of shares files and options on a server.
* **exportfs -a :** Exports all shares listed in **/etc/exports**, or given name.
* **exportfs -u :** Unexports all shares listed in **/etc/exports**, or given name.
* **exportfs -r :** Refresh the server’s list after modifying /etc/exports.

**Configuration NFS**

IP address of NFS Server: 192.168.1.100

IP address of NFS client: 192.168.1.101

**Server Side:**

1. Both the NFS Server and NFS Client will have the NFS package installed and running.

# yum install nfs\*

# yum install rpcbind\* (RPC :- Remote Procedure Calls)

1. Create the directory that you want to share on nfs server. You may also able to share the existing directory on your system without creating the new directory. Put the required data in the given directory that you want to share.

[root@sunil ~]#mkdir /home/nfs\_test

1. Edit the “export file” in any editor. It is the main configuration file of NFS.

[root@sunil ~]#vi /etc/exports

1. The configuration file consist of two columns, first for list the directories that you want to make available on the network and second is the list the networks/DNS domains that can get access to the directory & list of NFS options in bracket. Make one of the following entry in the export file.
2. It provides read only access to /nfs\_test file to all network

/home/nfs\_test \*(ro,sync)

1. Read/Write permission from all servers on the 192.168.1.0/24 network ie the addresses from 192.168.1.0 to 192.168.1.255.

/home/nfs\_test 192.168.1.0/24(rw,sync)

OR

/home/nfs\_test 192.168.1.\*/255.255.255.0(rw,sync)

1. Read/Write permission for single user 192.168.1.101.

/home/nfs\_test 192.168.1.101/255.255.255.255(rw,sync)

OR

/home/nfs\_test 192.168.1.101/32(rw,sync)

1. Read/Write permission from servers in the di.com DNS domain.

/home/nfs\_test \*.di.com(rw,sync)

**Note: For permission**. If the user created the file having permission “rwe” then you can able to restrict the permission in “export” file. Actual permission is “r­\_e” and you are giving the permission “rw” in export file then the given file is not able to modify. The file permission are like the filter, the minimum permissions are applied to the file.

1. Before starting the NFS services first check nfs is running properly or not. Also check whether the iptables service is stop. Then start the services required for the NFS Server as follows: (You can also restart/stop the services)

[root@sunil ~]#service rpcbind start

[root@sunil ~]#service nfs start

1. You can also make the above services permanent on using “chkconfig” command.

[root@sunil ~]#chkconfig nfs on

[root@sunil ~]#chkconfig rpcbind on

1. If you are adding the new directory to the /etc/export file or making the changes in it then we need to use the following command before restarting the above services. It is use to make the changes in the network file.

[root@sunil ~]#exportfs –av

[root@sunil ~]#exports –r

After running these commands we need to restart the “rpcbind”, “nfs”, “nfslock” service.

**Client Side:**

1. We need to show all shared files/directory on the nfs server using showmount command.

[root@sunil ~]#showmount -e 192.168.1.100

1. On the client side we need to start the nfs services and mount the exported directory from nfs server on the temporary local directory “mount point” on the client side. Then you can easily get data from server directory to mounted directory.

[root@sunil ~]#mkdir -p /mnt/nfs/mount\_dir

[root@sunil ~]#mount -t nfs 192.168.1.100:/home/nfs\_test /mnt/nfs/mount\_dir

[root@sunil ~]#services rpcbind restart

[root@sunil ~]#service nfs restart

[root@sunil ~]#service nfslock restart

[root@sunil ~]#cd /mnt/nfs/mount\_dir

1. Making the nfs mounting permanent by making the entry in the /etc/fstab file

[root@sunil ~]#vi /etc/fstab

* Directory Mount Point Type Options Dump FSCK

192.168.1.100:/nfs\_test /mnt/nfs/ount\_dir nfs soft,nfsvers=2 0 0

[root@sunil ~]#mount -a

Note: For making the mounting permanent, it is used only when the server is running 24\*7 time otherwise on the client side it may gives an error while startup. So please check whether the server is running or not. Also you need to start the service required service permanent using chkconfig command.

1. For Remove the nfs mount on client side.

a)[root@sunil ~]#umount /mnt/nfs/mount\_dir

b)Delete the entry of nfs mount from the /etc/fstab file.

# vi /etc/fstab

c)[root@sunil ~]#mount –a

5) For unshared the directory on the nfs server only remove the entry from /etc/export file.

[root@sunil ~]# vi /etc/exports

[root@sunil ~]#exportfs -a

[root@sunil ~]#service rpcbind restart

[root@sunil ~]#service nfs restart

[root@sunil ~]#service nfslock restart

How to check unmount or not your mount point

#umount /mnt/nfs/mount\_dir/