

Practical No. 6

Aim: Configure DHCP Server, Configure DHCP (Dynamic Host Configuration Protocol) Server, Configure NFS Server to share directories on your Network, Configure NFS Client. (Ubuntu and Windows Client OS)

Description:

Define:

1. DHCP Server
2. NFS Server

Steps:



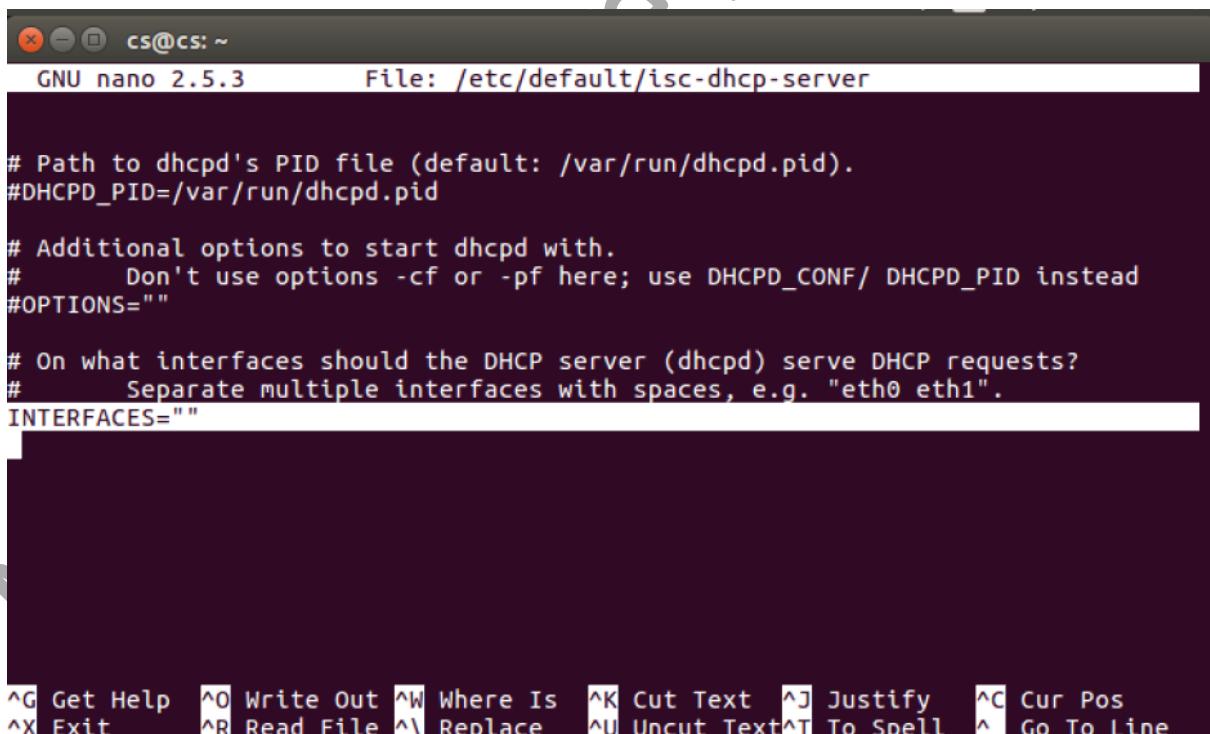
```
cs@cs:~$ sudo apt-get install isc-dhcp-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  libirs-export141 libisccfg-export140
Suggested packages:
  isc-dhcp-server-ldap policycoreutils
The following NEW packages will be installed:
  isc-dhcp-server libirs-export141 libisccfg-export140
0 upgraded, 3 newly installed, 0 to remove and 39 not upgraded.
Need to get 470 kB of archives.
After this operation, 1,587 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu xenial-updates/main amd64 libisccfg-export140 amd64 1:9.10.3.dfsg.P4-8ubuntu1.19 [38.6 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu xenial-updates/main amd64 libirs-export141 amd64 1:9.10.3.dfsg.P4-8ubuntu1.19 [17.5 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu xenial-updates/main amd64 isc-dhcp-server amd64 4.3.3-5ubuntu12.10 [414 kB]
Fetched 470 kB in 0s (823 kB/s)
Preconfiguring packages ...
Selecting previously unselected package libisccfg-export140.
```

```
cs@cs:~$ ifconfig
ens3      Link encap:Ethernet HWaddr 00:0c:29:1c:f5:7d
          inet addr:192.168.173.132 Bcast:192.168.173.255 Mask:255.255.255.0
          inet6 addr: fe80::c8fa:acec:af2:c62d/64 Scope:Link
                  UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
                  RX packets:2498 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:701 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:1000
                  RX bytes:3415788 (3.4 MB) TX bytes:55572 (55.5 KB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1 Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
                  UP LOOPBACK RUNNING MTU:65536 Metric:1
                  RX packets:330 errors:0 dropped:0 overruns:0 frame:0
                  TX packets:330 errors:0 dropped:0 overruns:0 carrier:0
                  collisions:0 txqueuelen:1000
                  RX bytes:27839 (27.8 KB) TX bytes:27839 (27.8 KB)

cs@cs:~$
```

```
cs@cs:~$ sudo nano /etc/default/isc-dhcp-server
cs@cs:~$
```



```
cs@cs: ~
File: /etc/default/isc-dhcp-server

# Path to dhcpcd's PID file (default: /var/run/dhcpcd.pid).
#DHCPD_PID=/var/run/dhcpcd.pid

# Additional options to start dhcpcd with.
#       Don't use options -cf or -pf here; use DHCPD_CONF/ DHCPD_PID instead
#OPTIONS=""

# On what interfaces should the DHCP server (dhcpcd) serve DHCP requests?
#       Separate multiple interfaces with spaces, e.g. "eth0 eth1".
INTERFACES=""
```

```
cs@cs: ~
GNU nano 2.5.3          File: /etc/default/isc-dhcp-server           Modified

# Path to dhcpcd's PID file (default: /var/run/dhcpcd.pid).
#DHCPD_PID=/var/run/dhcpcd.pid

# Additional options to start dhcpcd with.
#       Don't use options -cf or -pf here; use DHCPD_CONF/ DHCPD_PID instead
#OPTIONS=""

# On what interfaces should the DHCP server (dhcpcd) serve DHCP requests?
#       Separate multiple interfaces with spaces, e.g. "eth0 eth1".
INTERFACES="ens33"

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit      ^R Read File ^\ Replace ^U Uncut Text^T To Spell ^L Go To Line
```

```
cs@cs: /etc/dhcp
cs@cs:~$ cd /etc/dhcp
cs@cs:/etc/dhcp$ ls
ddns-keys  dhclient.conf          dhclient-exit-hooks.d
debug      dhclient-enter-hooks.d  dhcpd.conf
cs@cs:/etc/dhcp$ sudo nano /etc/dhcp/dhcpd.conf
```

```
cs@cs: /etc/dhcp
GNU nano 2.5.3          File: /etc/dhcp/dhcpd.conf

#
# Sample configuration file for ISC dhcpcd for Debian
#
# Attention: If /etc/ltsp/dhcpd.conf exists, that will be used as
# configuration file instead of this file.
#
#
# The ddns-updates-style parameter controls whether or not the server will
# attempt to do a DNS update when a lease is confirmed. We default to the
# behavior of the version 2 packages ('none', since DHCP v2 didn't
# have support for DDNS.)
ddns-update-style none;

# option definitions common to all supported networks...
option domain-name "example.org";
option domain-name-servers ns1.example.org, ns2.example.org;

default-lease-time 600;
[ Read 111 lines ]
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text^T To Spell ^_ Go To Line
```

```
cs@cs: /etc/dhcp
GNU nano 2.5.3          File: /etc/dhcp/dhcpd.conf          Modified

#
# Sample configuration file for ISC dhcpcd for Debian
#
# Attention: If /etc/ltsp/dhcpd.conf exists, that will be used as
# configuration file instead of this file.
#
#
# The ddns-updates-style parameter controls whether or not the server will
# attempt to do a DNS update when a lease is confirmed. We default to the
# behavior of the version 2 packages ('none', since DHCP v2 didn't
# have support for DDNS.)
ddns-update-style none;

# option definitions common to all supported networks...
#option domain-name "example.org";
#option domain-name-servers ns1.example.org, ns2.example.org;

default-lease-time 600;
[ Read 111 lines ]
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text^T To Spell ^_ Go To Line
```

```
cs@cs: /etc/dhcp
GNU nano 2.5.3           File: /etc/dhcp/dhcpd.conf          Modified

# If this DHCP server is the official DHCP server for the local
# network, the authoritative directive should be uncommented.
#authoritative;

# Use this to send dhcp log messages to a different log file (you also
# have to hack syslog.conf to complete the redirection).
log-facility local7;

# No service will be given on this subnet, but declaring it helps the
# DHCP server to understand the network topology.

#subnet 10.152.187.0 netmask 255.255.255.0 {
#}

# This is a very basic subnet declaration.

#subnet 10.254.239.0 netmask 255.255.255.224 {
#  range 10.254.239.10 10.254.239.20;

^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos
^X Exit      ^R Read File  ^\ Replace   ^U Uncut Text^T To Spell  ^L Go To Line
```

```
cs@cs: /etc/dhcp
GNU nano 2.5.3           File: /etc/dhcp/dhcpd.conf          Modified

# If this DHCP server is the official DHCP server for the local
# network, the authoritative directive should be uncommented.
authoritative;

# Use this to send dhcp log messages to a different log file (you also
# have to hack syslog.conf to complete the redirection).
log-facility local7;

# No service will be given on this subnet, but declaring it helps the
# DHCP server to understand the network topology.

#subnet 10.152.187.0 netmask 255.255.255.0 {
#}

# This is a very basic subnet declaration.

#subnet 10.254.239.0 netmask 255.255.255.224 {
#  range 10.254.239.10 10.254.239.20;

^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos
^X Exit      ^R Read File  ^\ Replace   ^U Uncut Text^T To Spell  ^L Go To Line
```

cs@cs: /etc/dhcp

GNU nano 2.5.3 File: /etc/dhcp/dhcpd.conf Modified

```
# A slightly different configuration for an internal subnet.
#subnet 10.5.5.0 netmask 255.255.255.224 {
#  range 10.5.5.26 10.5.5.30;
#  option domain-name-servers ns1.internal.example.org;
#  option domain-name "internal.example.org";
#  option subnet-mask 255.255.255.224;
#  option routers 10.5.5.1;
#  option broadcast-address 10.5.5.31;
#  default-lease-time 600;
#  max-lease-time 7200;
#}

# Hosts which require special configuration options can be listed in
# host statements. If no address is specified, the address will be
# allocated dynamically (if possible), but the host-specific information
# will still come from the host declaration.

#host passacaglia {

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text ^T To Spell ^_ Go To Line
```

cs@cs: /etc/dhcp

GNU nano 2.5.3 File: /etc/dhcp/dhcpd.conf Modified

```
# A slightly different configuration for an internal subnet.
subnet 192.168.173.0 netmask 255.255.255.0 {
    range 192.168.173.100 192.168.173.200;
    #option domain-name-servers ns1.internal.example.org;
    #option domain-name "internal.example.org";
    option subnet-mask 255.255.255.0;
    option routers 192.168.173.255;
    option broadcast-address 192.168.173.255;
    default-lease-time 600;■
    max-lease-time 7200;
}

# Hosts which require special configuration options can be listed in
# host statements. If no address is specified, the address will be
# allocated dynamically (if possible), but the host-specific information
# will still come from the host declaration.

#host passacaglia {

^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text ^T To Spell ^_ Go To Line
```

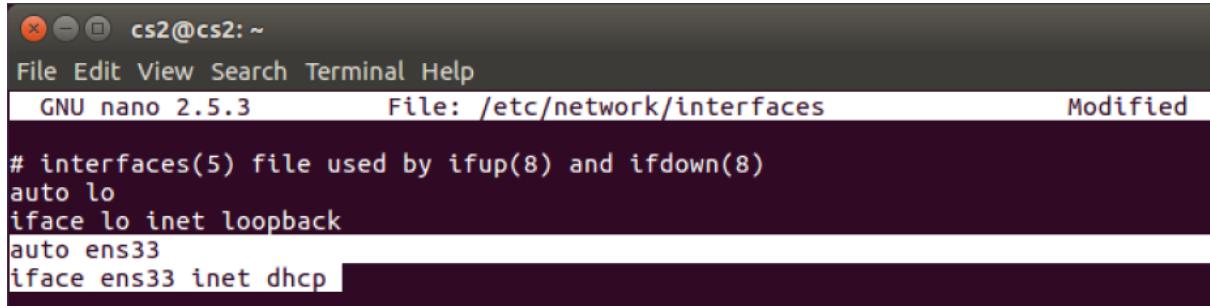
```
cs@cs: /etc/dhcp$ sudo systemctl start isc-dhcp-server
cs@cs: /etc/dhcp$ sudo systemctl status isc-dhcp-server
● isc-dhcp-server.service - ISC DHCP IPv4 server
   Loaded: loaded (/lib/systemd/system/isc-dhcp-server.service; enabled; vendor
   Active: active (running) since Sun 2021-08-08 22:59:19 IST; 9s ago
     Docs: man:dhcpd(8)
 Main PID: 3755 (dhcpd)
 CGroup: /system.slice/isc-dhcp-server.service
         └─3755 dhcpd -user dhcpd -group dhcpd -f -4 -pf /run/dhcp-server/dhcp

Aug 08 22:59:19 cs dhcpd[3755]: All rights reserved.
Aug 08 22:59:19 cs dhcpd[3755]: For info, please visit https://www.isc.org/softw
Aug 08 22:59:19 cs dhcpd[3755]: Wrote 0 leases to leases file.
Aug 08 22:59:19 cs dhcpd[3755]: Listening on LPF/ens33/00:0c:29:1c:f5:7d/192.168
Aug 08 22:59:19 cs sh[3755]: Listening on LPF/ens33/00:0c:29:1c:f5:7d/192.168.17
Aug 08 22:59:19 cs sh[3755]: Sending on   LPF/ens33/00:0c:29:1c:f5:7d/192.168.17
Aug 08 22:59:19 cs sh[3755]: Sending on   Socket/fallback/fallback-net
Aug 08 22:59:19 cs dhcpd[3755]: Sending on   LPF/ens33/00:0c:29:1c:f5:7d/192.168
Aug 08 22:59:19 cs dhcpd[3755]: Sending on   Socket/fallback/fallback-net
Aug 08 22:59:19 cs dhcpd[3755]: Server starting service.
lines 1-18/18 (END)
```

```
cs@cs: /etc/dhcp$ sudo systemctl enable isc-dhcp-server
Synchronizing state of isc-dhcp-server.service with SysV init with /lib/systemd/
systemd-sysv-install...
Executing /lib/systemd/systemd-sysv-install enable isc-dhcp-server
cs@cs: /etc/dhcp$ sudo ufw status
Status: inactive
cs@cs: /etc/dhcp$ dhcp-lease-list
To get manufacturer names please download http://standards.ieee.org/regauth/oui/
oui.txt to /usr/local/etc/oui.txt
Cannot open /var/db/dhcpd.leases: No such file or directory at /usr/sbin/dhcp-lease-list line 69.
cs@cs: /etc/dhcp$
```

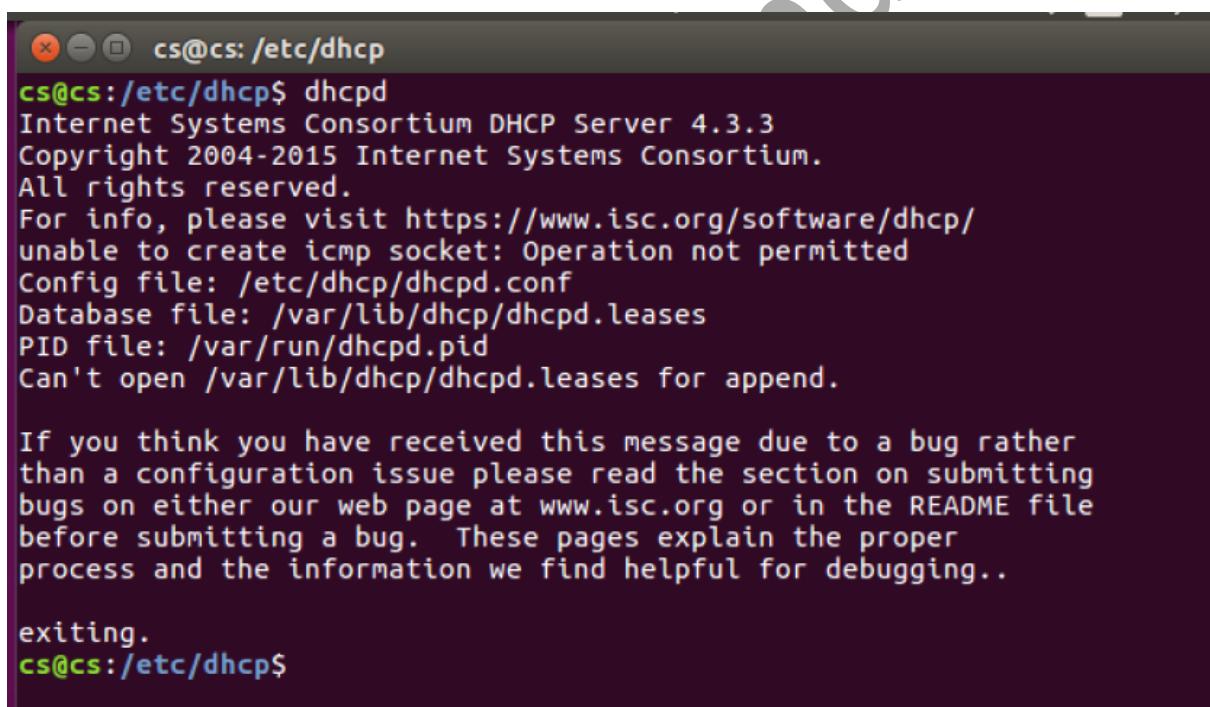
On Client Side:

```
cs2@cs2:~$ sudo nano /etc/network/interfaces
[sudo] password for cs2:
cs2@cs2:~$
```



```
File Edit View Search Terminal Help
GNU nano 2.5.3           File: /etc/network/interfaces      Modified

# interfaces(5) file used by ifup(8) and ifdown(8)
auto lo
iface lo inet loopback
auto ens33
iface ens33 inet dhcp
```



```
cs@cs:/etc/dhcp$ dhcpcd
Internet Systems Consortium DHCP Server 4.3.3
Copyright 2004-2015 Internet Systems Consortium.
All rights reserved.
For info, please visit https://www.isc.org/software/dhcp/
unable to create icmp socket: Operation not permitted
Config file: /etc/dhcp/dhcpd.conf
Database file: /var/lib/dhcp/dhcpd.leases
PID file: /var/run/dhcpd.pid
Can't open /var/lib/dhcp/dhcpd.leases for append.

If you think you have received this message due to a bug rather
than a configuration issue please read the section on submitting
bugs on either our web page at www.isc.org or in the README file
before submitting a bug. These pages explain the proper
process and the information we find helpful for debugging..

exiting.
cs@cs:/etc/dhcp$
```

```
cs@cs: /etc/dhcp
cs@cs:/etc/dhcp$ sudo nano /var/lib/dhcp/dhcpd.leases
[sudo] password for cs:
Sorry, try again.
[sudo] password for cs:
cs@cs:/etc/dhcp$
```

```
cs@cs: /etc/dhcp
GNU nano 2.5.3          File: /var/lib/dhcp/dhcpd.leases

# The format of this file is documented in the dhcpcd.leases(5) manual page.
# This lease file was written by isc-dhcp-4.3.3

server-duid "\000\001\000\001(\242\320\357\000\014)\034\365";

lease 192.168.173.100 {
    starts 0 2021/08/08 17:36:50;
    ends 0 2021/08/08 17:46:50;
    cltt 0 2021/08/08 17:36:50;
    binding state active;
    next binding state free;
    rewind binding state free;
    hardware ethernet 00:0c:29:42:bd:a8;
    client-hostname "cs2";
}
lease 192.168.173.132 {
    starts 0 2021/08/08 17:40:49;
    ends 0 2021/08/08 17:50:49;
    cltt 0 2021/08/08 17:40:49;
```

[Read 45 lines]

^G Get Help **^O** Write Out **^W** Where Is **^K** Cut Text **^J** Justify **^C** Cur Pos
^X Exit **^R** Read File **^** Replace **^U** Uncut Text **^T** To Spell **^** Go To Line

```
cs2@cs2:~$ sudo systemctl restart networking
cs2@cs2:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
        valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
        valid_lft forever preferred_lft forever
2: ens33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast state UP group default qlen 1000
    link/ether 00:0c:29:42:bd:a8 brd ff:ff:ff:ff:ff:ff
    inet 192.168.173.100/24 brd 192.168.173.255 scope global ens33
        valid_lft forever preferred_lft forever
    inet 192.168.173.133/24 brd 192.168.173.255 scope global secondary dynamic ens33
        valid_lft 590sec preferred_lft 590sec
cs2@cs2:~$
```

NFS

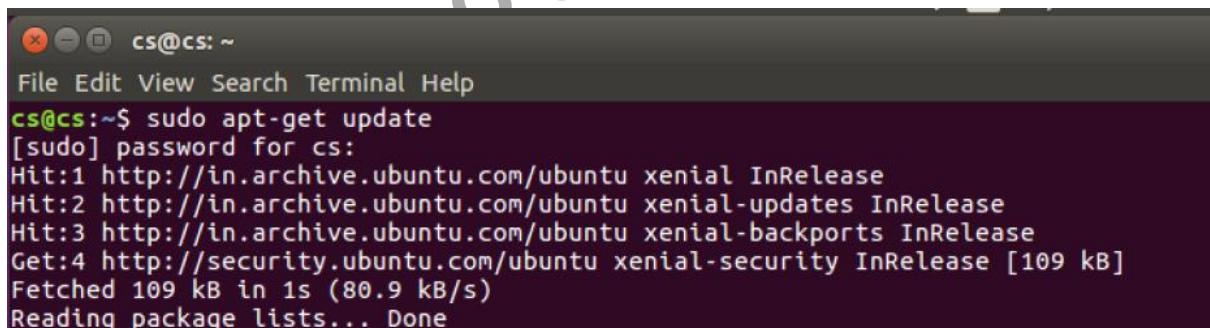
NFS, or Network File System, is a distributed file system protocol that allows you to mount remote directories on your server. This lets you manage storage space in a different location and write to that space from multiple clients. NFS provides a relatively quick and easy way to access remote systems over a network and works well in situations where the shared resources will be accessed regularly.

NFS Server IP 192.168.173.132
NFS Client IP 192.168.173.100

1. Install NFS Server

To install NFS Server on ubuntu 16.04, Use the following commands with root privileges.

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



A screenshot of a terminal window titled "Terminal". The window has a dark background and light-colored text. At the top, it shows the session identifier "cs@cs: ~" and the menu bar "File Edit View Search Terminal Help". Below the menu, the command "sudo apt-get update" is entered, followed by the password prompt "[sudo] password for cs:". The terminal then displays the output of the command, which includes several "Hit" messages for xenial releases and security updates, and a final message "Reading package lists... Done".

```
cs@cs:~$ sudo apt-get install nfs-kernel-server
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following additional packages will be installed:
  keyutils libnfsidmap2 libtirpc1 nfs-common rpcbind
Suggested packages:
  open-iscsi watchdog
The following NEW packages will be installed:
  keyutils libnfsidmap2 libtirpc1 nfs-common nfs-kernel-server rpcbind
0 upgraded, 6 newly installed, 0 to remove and 7 not upgraded.
Need to get 468 kB of archives.
After this operation, 1,847 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://in.archive.ubuntu.com/ubuntu xenial/main amd64 libnfsidmap2 amd64 0.25-5 [32.2 kB]
Get:2 http://in.archive.ubuntu.com/ubuntu xenial/main amd64 keyutils amd64 1.5.9-8ubuntu1 [47.1 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu xenial-updates/main amd64 libtirpc1 amd64 0.2.5-1ubuntu0.1 [75.4 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu xenial-updates/main amd64 rpcbind amd64 0.2.3-0.2ubuntu0.16.04.1 [40.7 kB]
Get:5 http://in.archive.ubuntu.com/ubuntu xenial-updates/main amd64 nfs-common amd64 1:1.2.8-9ubuntu12.3 [185 kB]
```

2. Create NFS share Directory

To share any directory on NFS server, You need to create a directory by following the commands.

Public – read only

Private – read, write

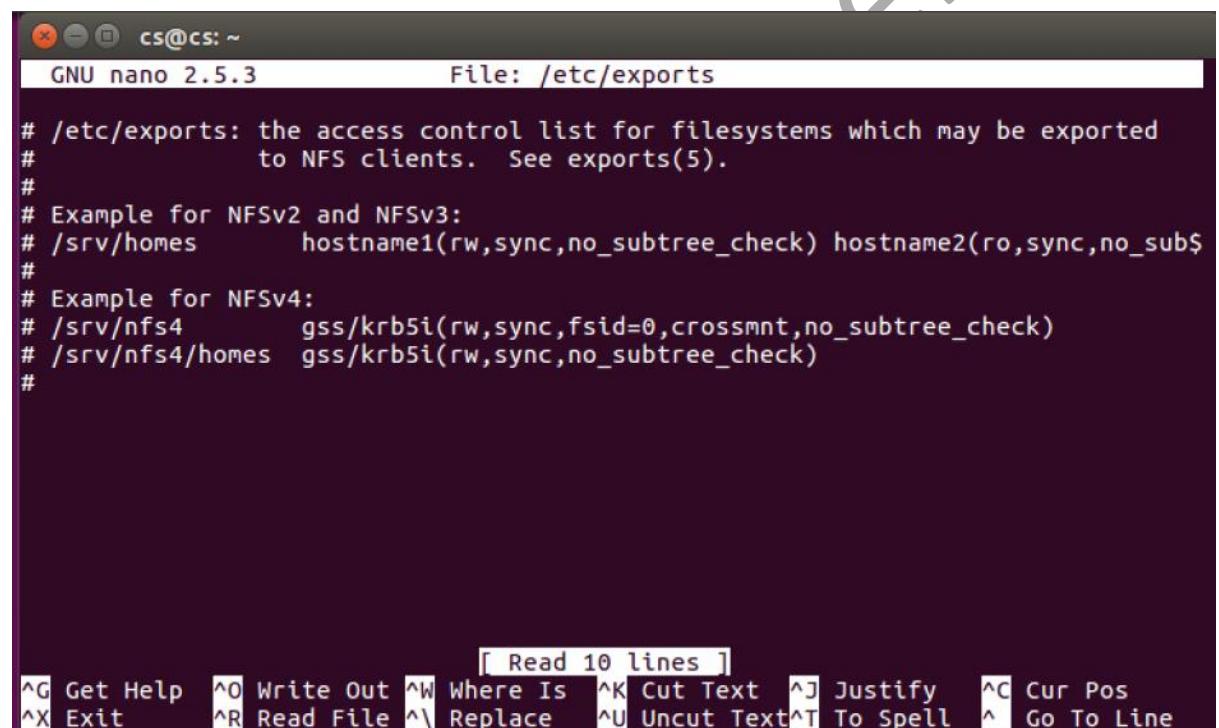
```
cs@cs:~$ sudo mkdir /public
cs@cs:~$ sudo mkdir /private
cs@cs:~$ sudo chmod 755 /public/
cs@cs:~$ sudo chmod 777 /private
cs@cs:~$
```

3. Configure NFS Server with Shared Directory

To configure created directory with NFS server use the following commands.

File to give shared definitions:

```
cs@cs:~$ sudo nano /etc/exports
```



```
cs@cs:~$ nano /etc/exports
GNU nano 2.5.3          File: /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,async,fsid=0,crossmnt,no_subtree_check)
# /srv/nfs4/homes  gss/krb5i(rw,async,no_subtree_check)
#



[ Read 10 lines ]
^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos
^X Exit     ^R Read File  ^\ Replace   ^U Uncut Text ^T To Spell  ^L Go To Line
```

Add the given parameter.

```
cs@cs: ~
GNU nano 2.5.3          File: /etc/exports          Modified

# /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$#
#
# 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)
#
/public *(ro,sync,no_subtree_check)
/private 192.168.173.100(rw,sync,no_subtree_check)

^G Get Help  ^O Write Out  ^W Where Is  ^K Cut Text  ^J Justify  ^C Cur Pos
^X Exit       ^R Read File  ^\ Replace   ^U Uncut Text ^T To Spell  ^  Go To Line
```

Save and exit from nano editor

```
cs@cs:~$ sudo exportfs -arvf
exporting 192.168.173.100:/private
exporting *:/public
cs@cs:~$
```

4. Restart the NFS Service

To get effect use the following commands.

```
cs@cs:~$ sudo systemctl start nfs-kernel-server
cs@cs:~$ sudo systemctl enable nfs-kernel-server
Synchronizing state of nfs-kernel-server.service with SysV init with /lib/systemd/systemd-sysv-install...
Executing /lib/systemd/systemd-sysv-install enable nfs-kernel-server
cs@cs:~$ sudo systemctl status nfs-kernel-server
● nfs-server.service - NFS server and services
  Loaded: loaded (/lib/systemd/system/nfs-server.service; enabled; vendor prese
  Active: active (exited) since Sun 2021-08-08 23:38:12 IST; 10min ago
    Main PID: 29443 (code=exited, status=0/SUCCESS)

Aug 08 23:38:12 cs systemd[1]: Starting NFS server and services...
Aug 08 23:38:12 cs exportfs[29441]: exportfs: can't open /etc/exports for reading
Aug 08 23:38:12 cs systemd[1]: Started NFS server and services.
Aug 08 23:38:13 cs systemd[1]: Started NFS server and services.
Aug 08 23:48:32 cs systemd[1]: Started NFS server and services.
lines 1-10/10 (END)
```

NFS Server side configuration is completed.

5. NFS Client Configuration

You need to install NFS client packages with root privileges using the given commands.

```
cs2@cs2:~$ sudo apt-get update
[sudo] password for cs2:
Hit:1 http://in.archive.ubuntu.com/ubuntu xenial InRelease
Hit:2 http://in.archive.ubuntu.com/ubuntu xenial-updates InRelease
Hit:3 http://in.archive.ubuntu.com/ubuntu xenial-backports InRelease
Get:4 http://security.ubuntu.com/ubuntu xenial-security InRelease [109 kB]
Get:5 http://security.ubuntu.com/ubuntu xenial-security/main amd64 DEP-11 Metadata [93.8 kB]
Get:6 http://security.ubuntu.com/ubuntu xenial-security/universe amd64 DEP-11 Metadata [130 kB]
Get:7 http://security.ubuntu.com/ubuntu xenial-security/multiverse amd64 DEP-11 Metadata [2,468 B]
Fetched 335 kB in 2s (137 kB/s)
Reading package lists... Done
```

```
cs2@cs2:~$ sudo apt-get install nfs-common
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following packages were automatically installed and are no longer required:
  libirs-export141 libisccfg-export140
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  keyutils libnfsidmap2 libtirpc1 rpcbind
Suggested packages:
  open-iscsi watchdog
The following NEW packages will be installed:
  keyutils libnfsidmap2 libtirpc1 nfs-common rpcbind
0 upgraded, 5 newly installed, 0 to remove and 39 not upgraded.
Need to get 380 kB of archives.
After this operation, 1,360 kB of additional disk space will be used.
Do you want to continue? [Y/n]
```

6. Create Mount Point

To get access on nfs shared directory in nfs client machine, You need to create or use any others directory, Use the given command to create a mount point directory.

To display mount enter server ip address

```
cs2@cs2:~$ showmount -e 192.168.173.132
Export list for 192.168.173.132:
/public *
/private 192.168.173.100
cs2@cs2:~$
```

Temporary mounting file:

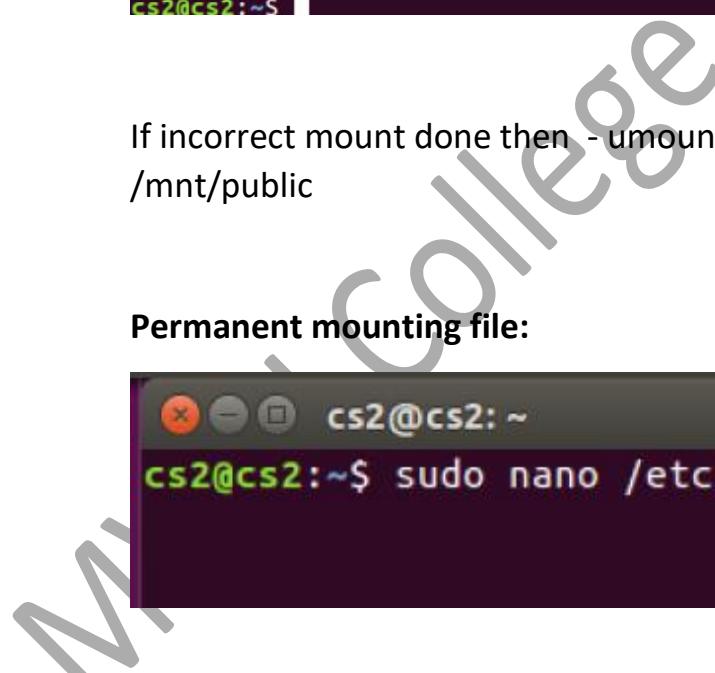
```
sudo mkdir /mnt/public
```

```
sudo mkdir /mnt/private
```

```
sudo mount -t nfs 192.168.173.132:/public /mnt/public
```

```
sudo mount -t nfs 192.168.173.132:/private /mnt/private
```

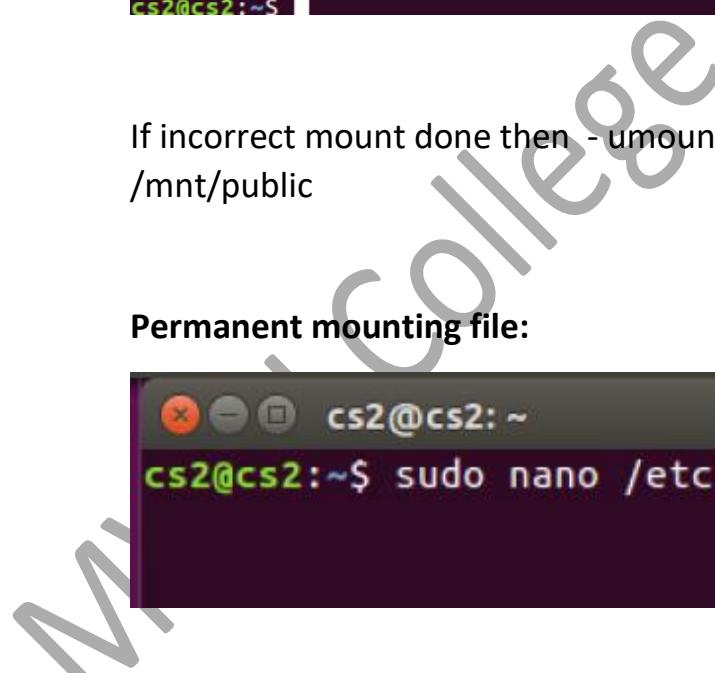
```
mount
```



```
cs2@cs2: ~
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=24,pgrp=1,time
out=0,minproto=5,maxproto=5,direct,pipe_ino=19317)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,pagesize=2M)
mqueue on /dev/mqueue type mqueue (rw,relatime)
debugfs on /sys/kernel/debug type debugfs (rw,relatime)
sunrpc on /run/rpc_pipefs type rpc_pipefs (rw,relatime)
fusectl on /sys/fs/fuse/connections type fusectl (rw,relatime)
configfs on /sys/kernel/config type configfs (rw,relatime)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,size=201756k,mode=7
00,uid=1000,gid=1000)
gvfsd-fuse on /run/user/1000/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime
,user_id=1000,group_id=1000)
/dev/sr0 on /media/cs2/Ubuntu 16.04.7 LTS amd64 type iso9660 (ro,nosuid,nodev,rel
atime,nojoliet,check=s,map=n,blocksize=2048,uid=1000,gid=1000,dmode=500,fmode=4
00,uhelper=udisks2)
192.168.173.132:/private on /mnt/private type nfs4 (rw,relatime,vers=4.0,rsize=2
62144,wsize=262144,namlen=255,hard,proto=tcp,timeo=600,retrans=2,sec=sys,clienta
ddr=192.168.173.100,local_lock=none,addr=192.168.173.132)
192.168.173.132:/public on /mnt/public type nfs4 (rw,relatime,vers=4.0,rsize=262
144,wsize=262144,namlen=255,hard,proto=tcp,timeo=600,retrans=2,sec=sys,clientadd
r=192.168.173.100,local_lock=none,addr=192.168.173.132)
cs2@cs2:~$
```

If incorrect mount done then - umount /mnt/private OR umount /mnt/public

Permanent mounting file:



```
cs2@cs2: ~
cs2@cs2:~$ sudo nano /etc/fstab
```

```
cs2@cs2: ~
GNU nano 2.5.3          File: /etc/fstab

# /etc/fstab: static file system information.
#
# Use 'blkid' to print the universally unique identifier for a
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# <file system> <mount point> <type> <options>      <dump> <pass>
# / was on /dev/sda1 during installation
UUID=1bc2dd75-2b1f-4618-8348-a477d70fc4a3 /           ext4   errors=remoun$#
# swap was on /dev/sda5 during installation
UUID=234f0682-108d-454d-82ee-985a5c9e7012 none        swap    sw             $

[ Read 11 lines ]
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit      ^R Read File ^\ Replace   ^U Uncut Text^T To Spell ^L Go To Line
```

```
cs2@cs2: ~
GNU nano 2.5.3          File: /etc/fstab          Modified

# /etc/fstab: static file system information.
#
# Use 'blkid' to print the universally unique identifier for a
# device; this may be used with UUID= as a more robust way to name devices
# that works even if disks are added and removed. See fstab(5).
#
# <file system> <mount point> <type> <options>      <dump> <pass>
# / was on /dev/sda1 during installation
UUID=1bc2dd75-2b1f-4618-8348-a477d70fc4a3 /           ext4   errors=remoun$#
# swap was on /dev/sda5 during installation
UUID=234f0682-108d-454d-82ee-985a5c9e7012 none        swap    sw             $#
192.168.173.132:/public  /mnt/public  nfs  defaults,_netdev 0 0
192.168.173.132:/private /mnt/private nfs  defaults, netdev 0 0
```

```
cs2@cs2: ~
cs2@cs2:~$ sudo umount /mnt/public
cs2@cs2:~$ sudo umount /mnt/private
cs2@cs2:~$
```

Execute mount command

```
cs2@cs2: ~
getlb)
cgroup on /sys/fs/cgroup/perf_event type cgroup (rw,nosuid,nodev,noexec,relatime
,perf_event)
cgroup on /sys/fs/cgroup/devices type cgroup (rw,nosuid,nodev,noexec,relatime,de
vices)
cgroup on /sys/fs/cgroup/pids type cgroup (rw,nosuid,nodev,noexec,relatime,pids)
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpus
et)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=24,pgrp=1,time
out=0,minproto=5,maxproto=5,direct,pipe_ino=19317)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,pagesize=2M)
mqueue on /dev/mqueue type mqueue (rw,relatime)
debugfs on /sys/kernel/debug type debugfs (rw,relatime)
sunrpc on /run/rpc_pipefs type rpc_pipefs (rw,relatime)
fusectl on /sys/fs/fuse/connections type fusectl (rw,relatime)
configfs on /sys/kernel/config type configfs (rw,relatime)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,size=201756k,mode=7
00,uid=1000,gid=1000)
gvfsd-fuse on /run/user/1000/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime
,user_id=1000,group_id=1000)
/dev/sr0 on /media/cs2/Ubuntu 16.04.7 LTS amd64 type iso9660 (ro,nosuid,nodev,re
latime,nojoliet,check=s,map=n,blocksize=2048,uid=1000,gid=1000,dmode=500,fmode=4
00,uhelper=udisks2)
cs2@cs2:~$
```

```
cs2@cs2: ~
cs2@cs2:~$ mount -a
mount: only root can use "--all" option
cs2@cs2:~$ sudo mount -a
cs2@cs2:~$
```

After executing mount command:

```
cs2@cs2: ~
cgroup on /sys/fs/cgroup/cpuset type cgroup (rw,nosuid,nodev,noexec,relatime,cpuset)
systemd-1 on /proc/sys/fs/binfmt_misc type autofs (rw,relatime,fd=24,pgrp=1,time
out=0,minproto=5,maxproto=5,direct,pipe_ino=19317)
hugetlbfs on /dev/hugepages type hugetlbfs (rw,relatime,pagesize=2M)
mqueue on /dev/mqueue type mqueue (rw,relatime)
debugfs on /sys/kernel/debug type debugfs (rw,relatime)
sunrpc on /run/rpc_pipefs type rpc_pipefs (rw,relatime)
fusectl on /sys/fs/fuse/connections type fusectl (rw,relatime)
configfs on /sys/kernel/config type configfs (rw,relatime)
tmpfs on /run/user/1000 type tmpfs (rw,nosuid,nodev,relatime,size=201756k,mode=7
00,uid=1000,gid=1000)
gvfsd-fuse on /run/user/1000/gvfs type fuse.gvfsd-fuse (rw,nosuid,nodev,relatime
,user_id=1000,group_id=1000)
/dev/sr0 on /media/cs2/Ubuntu 16.04.7 LTS amd64 type iso9660 (ro,nosuid,nodev,re
latime,nojoliet,check=s,map=n,blocksize=2048,uid=1000,gid=1000,dmode=500,fmode=4
00,uhelper=udisks2)
192.168.173.132:/public on /mnt/public type nfs4 (rw,relatime,vers=4.0,rsize=262
144,wsize=262144,namlen=255,hard,proto=tcp,timeo=600,retrans=2,sec=sys,clientadd
r=192.168.173.100,local_lock=none,addr=192.168.173.132,_netdev)
192.168.173.132:/private on /mnt/private type nfs4 (rw,relatime,vers=4.0,rsize=2
62144,wsize=262144,namlen=255,hard,proto=tcp,timeo=600,retrans=2,sec=sys,clienta
ddr=192.168.173.100,local_lock=none,addr=192.168.173.132,_netdev)
cs2@cs2:~$
```

```
cs2@cs2: /mnt/public
cs2@cs2:/mnt/public$ ls
cs2@cs2:/mnt/public$ touch file
touch: cannot touch 'file': Read-only file system
cs2@cs2:/mnt/public$ cd ..../private/
cs2@cs2:/mnt/private$ ls
cs2@cs2:/mnt/private$ touch file
cs2@cs2:/mnt/private$ ll
total 8
drwxrwxrwx 2 root root 4096 Aug  9 00:27 /
drwxr-xr-x 4 root root 4096 Aug  9 00:00 ..
-rw-rw-r-- 1 cs2 cs2     0 Aug  9 00:27 file
cs2@cs2:/mnt/private$
```